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# **Do Disclosures of Customer Metrics Lower Investors' and Analysts' Uncertainty, But Hurt Firm Performance?**

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## **Do Disclosures of Customer Metrics Lower Investors' and Analysts' Uncertainty, But Hurt Firm Performance?**

### *Abstract*

Investors, analysts, and regulators frequently advocate greater disclosure of non-financial information, such as customer metrics. Managers, however, argue that such metrics are costly to report, reveal sensitive information to competitors, and therefore will lower future cash-flows. To examine these counter arguments, this study presents the first empirical examination of the prevalence and consequences of backward- and forward-looking disclosures of customer metrics by manually coding 511 annual reports of firms in two industries, Telecommunications (365 reports) and Airlines (146 reports). The results reveal significant heterogeneity in the disclosure of customer metrics across firms and between industries. On average, in both industries, firms make more backward-looking than forward-looking disclosures. Interestingly, forward-looking disclosures of customer metrics are negatively associated with investors' uncertainty in both industries, and with analysts' uncertainty in the Telecommunications industry. Importantly, results do not support the managerial thesis that such disclosures have a negative impact on future cash-flows.

*Keywords:* disclosure, customer metrics, accounting, financial reporting, marketing-finance interface

Over the last decade a large number of marketing scholars have recommended that publicly listed firms should provide more disclosures of customer metrics (e.g., Chakravarty and Grewal 2011, p. 1607; Wiesel, Skiera, and Villanueva 2008, p. 1). In fact, an MSI report concludes:

“We advocate expanding and formalizing disclosures of marketing-related activities and performance drivers. We argue that expanded mandatory disclosure is a feasible first step toward improving financial reporting.” (Mizik and Nissim 2011, p. 1).

Indeed, the Marketing Accountability Standards Board (MASB) has repeatedly called for more disclosures of marketing activities and outcomes (Gregory and Moore 2013; Stewart and Gugel 2016). Despite multiple calls, there exists no empirical research that examines whether and to what extent firms disclose customer metrics. Accordingly, the first objective of this study is to empirically examine the prevalence of disclosures of customer metrics by publicly listed firms.

Interestingly, in 2001, the Financial Accounting Standards Board (FASB) proposed mandatory disclosure of several customer metrics such as the number of current customers and profitability per customer in its project “Disclosure of Information about Intangible Assets Not Recognized in Financial Statements” (FASB 2001). However, this proposal was met with strong resistance from managers who argued that disclosures of such metrics were not useful for investors. In addition, the managers argued that such disclosures are costly to implement and reveal sensitive information to competitors resulting in lower future financial performance. As noted by a manager at The Business Roundtable:

“We do not support quantitative disclosure requirements because it would require substantial resources to capture and value intangible assets that would not be useful to investors and could cause competitive harm.” (Raines 2001, p. 2)

Following these objections, the FASB closed this project in 2004 (FASB 2004). However, prior research has not explored whether disclosures of customer metrics by firms are useful

for investors and analysts, and if they have a negative effect on firms' future financial performance. Accordingly, the second objective of this study is to examine these outcomes of disclosures of customer metrics. The study seeks to make three contributions:

*First*, using hand-coded data we present the first empirical examination of disclosures of 34 customer metrics for firms in two industries, Telecommunications (Telecom) and Airlines. We articulate the difference between backward- and forward-looking disclosures of customer metrics and underscore the importance of doing so. The study, therefore, is responsive to the Securities and Exchange Commission (SEC)'s emphasis on forward-looking disclosures, that is, disclosures of managers' expectations about future actions or outcomes (see SEC 1989, 2003). In both industries we find that firms make more backward- than forward-looking disclosures of customer metrics. In addition, Telecom firms disclose more customer metrics than Airlines. The empirical examination, therefore, provides a more nuanced insight into both the quantity and the types of disclosures of customer metrics in two industries.

*Second*, we propose and test hypotheses about the outcomes of the quantity of backward- and forward-looking disclosures of customer metrics. We find that the quantity of forward-looking disclosures of customer metrics is negatively associated with the uncertainty faced by investors in both industries. We also find that quantity of forward-looking disclosures of customer metrics is negatively associated with analysts' uncertainty for Telecom firms. As such, the study identifies forward-looking disclosures of customer outcome metrics as "...the critical marketing information elements that should be made available to investors" (Srinivasan and Hanssens 2009, p. 308). Importantly, these results lend empirical support for recommendations by MASB about the usefulness of marketing disclosures in annual reports for investors (see Stewart and Gugel 2016). Additional analyses also show that the impact of forward-looking disclosures of

customer metrics is due to disclosures of metrics that focus on customer outcomes (e.g., customer satisfaction, customer retention rate) rather than firm actions (e.g., marketing spending, advertising spending).

*Third*, in contrast to managerial objections, we find no support for the argument that greater backward- or forward-looking disclosures of customer metrics have a negative impact on future financial performance. Given that forward-looking disclosures of customer metrics lower investors' and analysts' uncertainty, but do not have a negative impact on firms' future financial performance, suggests that perhaps FASB should re-consider the decision to terminate its project encouraging disclosures of intangibles metrics (see FASB 2001, 2004).

### *CONCEPTUAL FRAMEWORK*

In their seminal work, Srivastava, Shervani, and Fahey (1998) propose that marketing assets and actions are important for senior managers and the investment community because they have an impact on future cash-flows. Consequently, a large body of work in marketing examines the financial impact of marketing assets and actions, as reflected in firms' performance with customers or actions directed towards customers (see Srinivasan and Hanssens 2009). Interestingly, many studies in this domain argue for more disclosures of customer metrics that reflect firms' performance with its customers and its actions targeting customers. For example, Mizik and Jacobson (2008, p. 29) present strong arguments for more disclosures of customers' brand perceptions. Related to firms' actions, Chakravarty and Grewal (2011, p. 1607) call for more disclosures of firms' advertising and R&D spending (also see Hanssens, Rust, and Srivastava 2009, p. 118; Tuli and Bharadwaj 2009, p. 184; Wiesel, Kräussl, and Srivastava 2012, p. 5-6).

These repeated calls are based on the thesis that more disclosures of customer metrics will lower investors' and analysts' uncertainty about the future financial performance of the firm.

Indeed, Srinivasan and Hanssens (2009, p. 118) conclude in their review of this literature that “marketing managers need to generate better information about their intangibles (e.g., investments in brand building, product and service innovations, R&D) and the benefits that flow from them to give investors a sharper picture of the company’s performance outlook.”

From a regulatory perspective, these calls for more disclosures of customer metrics can be viewed as calls for more “disclosure of non-financial information”. Disclosure of non-financial information by publicly listed firms is of fundamental interest to regulatory bodies such as the SEC and FASB ([Healy and Palepu 2001](#)). This interest occurs because disclosure of non-financial information by managers provides a clearer picture of the prospects of the firm to investors and also allows them to monitor the use of their capital by managers ([Beyer et al. 2010](#)). Importantly, prior work in marketing and the literature on disclosures offer three key insights that are relevant in studying the disclosure of customer metrics.

*First*, disclosures of non-financial information lower analysts’ and investors’ uncertainty if they provide information about future cash-flows of the firm above and beyond the information provided by financial metrics (see [Beyer et al. 2010](#); [Srivastava, Shervani, and Fahey 1998](#)). An important corollary of this thesis is that if disclosures of non-financial information are important, then greater quantity of such disclosures will lower analysts’ and investors’ uncertainty about future cash-flows (see Han and Tan 2010). Accordingly a number of studies examine how analysts’ and investors’ uncertainty are a function of non-financial disclosures such as R&D (e.g., Jones 2007; Merkley 2014), environmental actions (e.g., Al-Tuwaijri, Christensen, and Hughes 2004), and corporate social responsibility (e.g., Dhaliwal et al. 2011, 2012). Therefore, in developing our hypotheses, we focus on the effect of quantity of disclosures of customer metrics on investors’ and analysts’ uncertainty.

*Second*, disclosure of non-financial information can be classified into backward- and forward-looking disclosures (e.g., [Beyer et al. 2010](#); [Matsumoto, Pronk, and Roelofsen 2011](#)).

Backward-looking disclosures provide information related to firms' performance or actions that have already taken place, but are being disclosed for the first time to investors. A typical example of a backward-looking disclosure would be firms' disclosures of earnings per share in the recently concluded fiscal year. An example of a backward-looking disclosure of a customer metric (i.e., customer acquisition costs) by a telecom firm would be:

Ubiquitel Inc (2003): Cost Per Gross Addition (CPGA) was approximately \$450 for the year ended December 31, 2003 which is comparable to approximately \$444 for the year ended December 31, 2002.

Forward-looking disclosures provide information about the managers' expectations of a firm's actions or performance ([Muslu et al. 2014](#)). A typical example of a forward-looking disclosure would be the earnings per share guidance or revenue estimates provided by a firm for the next fiscal year. An example of a forward-looking disclosure of a customer metric (e.g., customer acquisition cost) would be:

Ubiquitel Inc (2003): We believe that CPGA will remain at approximately current levels in the near-term due to significant competition coupled with our commitment to quality subscriber additions.

It is important to note that both backward- and forward-looking disclosures provide information to investors and analysts for the first time. The difference is that the former represents what has already happened, whereas the latter represents managers' expectations about the future and is also being disclosed to the investors and analysts for the first time. Securities regulations also reflect the distinction between backward- and forward-looking disclosures. Specifically, on December 22, 1995, United States Congress passed the Private Securities Litigation Reform Act (PSLRA) to lower the litigation risk for making forward-looking disclosures ([Johnson, Kasznik,](#)



and Nelson 2000). In addition, both the SEC and the International Accounting Standards Board (IASB) have repeatedly emphasized the need for more forward-looking disclosures as they are helpful for investors (see IASB 2010; SEC 1989, 2003).

Therefore, in this study, we consider the quantity of both backward- and forward-looking disclosures of customer metrics. We define the *quantity of backward-looking disclosures of customer metrics* as the amount of information released by the firm that reflects prior actions of the firm directed towards customers or the firm's prior performance with customers. As such, a firm providing information about its customer churn in the annual report for the recently completed fiscal year is an example of a backward-looking disclosure of a customer metric.

*Quantity of forward-looking disclosures of customer metrics*, in turn, refers to the amount of information released by the firm that reflects managers' expectations of the firm's future actions directed towards customers or its future performance with customers. Therefore, a firm providing information about its expectations of customer churn in the coming fiscal year in its annual report is an example of a forward-looking disclosure of a customer metric.

*Third*, disclosure of non-financial information is not costless for firms because they might incur proprietary costs (Berger and Hann 2007), defined as the costs that incur because disclosures provide sensitive information to competitors (Verrecchia 1983). Competitors, in turn, may use this information to their advantage resulting in poor subsequent financial performance of the disclosing firm (Berger 2011). As such, it is important to understand whether there are proprietary costs associated with more disclosures of customer metrics. Therefore, we develop hypotheses about the effects of the quantity of backward- and forward-looking disclosures of customer metrics on firm's future financial performance.

## *HYPOTHESES*

### *Backward-Looking Disclosures of Customer Metrics*

Literature in marketing provides robust arguments for the usefulness of backward-looking disclosures of customer metrics for both investors and analysts (e.g., Aaker and Jacobson 2001; Mizik and Jacobson 2008). The underlying logic is that information pertaining to these metrics allows investors and analysts to better predict future cash-flows of the firm. For example, because customer satisfaction leads to higher loyalty and share of wallet, information about current customer satisfaction levels improves investors' and analysts' prediction of future cash flows (see Tuli and Bharadwaj 2009). Indeed, customer metrics, such as customers' retention rate can be helpful in better predicting a firm's future cash flows (see Schulze, Skiera, and Wiesel 2012).

Given that backward-looking disclosures of customer metrics are likely to be useful in assessing the future cash-flows, analysts and investors following a firm that provides greater quantity of such disclosures will have better understanding about its future cash-flows. Consequently, we expect that analysts' and investors' uncertainty about future cash-flows of a firm will be lower for firms that provide greater quantity of backward-looking disclosures of customer metrics:

*H1: The greater the quantity of backward-looking disclosures of customer metrics, the lower the (a) analysts' and (b) investors' uncertainty about the future cash-flows of the firm.*

### *Forward-Looking Disclosures of Customer Metrics*

Both the SEC and FASB argue that disclosures based on "...expectations of the future are inherently more relevant to investment decision-making than disclosures based on historical measures" (Peters 2014). The reason is that forward-looking disclosures provide investors and analysts with insights about the future actions and expectations of managers and their outcomes

(see [Muslu et al. 2015](#)). Indeed, empirical studies show that forward-looking disclosures of earnings lower investors' and analysts' uncertainty (e.g., Hussainey, Schleicher, and Walker 2003; Hussainey and Walker 2009).

To the extent that customer metrics provide information above and beyond financial metrics, it can be argued that forward-looking disclosures of customer metrics provide valuable information to investors and analysts. Consider the disclosure by Continental Airlines about its intended improvement of customer service with the goal of being ranked in the top three airlines in terms of on-time flights, rate of missing bags, and customer complaints (Continental Airlines Annual Report 1995). This disclosure presents valuable information for both analysts and investors because better service quality is likely to increase customer retention, customers' share of wallet with the firm, and therefore the future cash-flows of the firm (see Fornell et al. 2006).

Prior literature in marketing also suggests that forward-looking disclosures of customer metrics allow investors to anticipate future cash-flows. For example, Sorescu, Shankar, and Kushwaha (2007) find that investors consider announcements of future product launches to draw conclusions about future cash-flows of a firm. Taken together, we expect that firms that provide greater quantity of forward-looking disclosures of customer metrics will lower investors' and analysts' uncertainty about its future cash-flows. Formally:

*H2: The greater the quantity of forward-looking disclosures of customer metrics, the lower the (a) analysts' and (b) investors' uncertainty about the future cash-flows of the firm.*

### *Future Financial Performance*

Managers frequently argue that greater disclosures of customer metrics have an adverse effect on a firm's future cash-flows. This concern stems from the argument that backward- and forward-

looking disclosures of customer metrics impose significant proprietary costs on firms as they reveal important information to competitors (see for example, Dedman and Lennox 2009; [Li 2010](#)). Competitors, in turn, can use such information to their advantage, which results in a lower future financial performance of the disclosing firm. As noted by a manager:

“We would also point out that disclosing the existence of competitive advantages, proprietary information, or other intangibles actually has the potential of damaging the business enterprise.” (Graham 2001, p. 2, in response to FASB 2001)

In addition, managers argue that providing greater amount of backward- and forward-looking disclosures of customer metrics imposes significant costs related to collection, analysis, and reporting of these metrics. As noted by a manager:

“While we believe it will not be feasible to develop relevant information, we expect the potential cost to a large, complex entity of monitoring, capturing, valuing and reporting such information would be significant.” (Richter 2001, p. 2)

In summary, the managerial thesis asserts that more backward- and forward-looking disclosures of customer metrics are likely to incur significant proprietary and compliance costs resulting in lower future financial performance. Therefore, the managerial thesis is:

*H3a: The greater the quantity of backward-looking disclosures of customer metrics made by a firm, the lower the future cash-flows of the firm.*

*H3b: The greater the quantity of forward-looking disclosures of customer metrics made by a firm, the lower the future cash-flows of the firm.*

## *RESEARCH DESIGN*

### *Data*

Prior studies that use hand-coded data to examine non-financial disclosures by publicly listed firms typically focus on one industry because disclosure practices and their consequences are likely to be industry-specific (see Bhojraj, Blacconiere, and D'Souza 2004; Botosan 1997). We complement prior studies by examining disclosures of customer metrics by firms in two different industries, the Telecom industry (Standard Industrial Classification [SIC] 4812 and 4813) and

the Airlines industry (SIC 4512). Customer metrics are widely tracked and firms typically maintain large customer databases in both of these industries (Bryan 2014; Noyes 2014). As such, information about customer metrics is likely to be particularly informative not only for analysts and investors, but also for competitors.

However, the two industries differ significantly in their size. For example, in 2012, US-based Telecom firms had total revenues of \$928 billion and a total market capitalization of \$1.18 trillion. In contrast, the US-based Airlines had total revenues of \$327 billion and a total market capitalization of \$92 billion. In addition, the focus on these two industries allows us to analyze whether the prevalence and consequences of disclosures of customer metrics vary between an industry with contractual customer relationships, i.e., Telecom, and an industry without these, i.e., Airlines (also see Reinartz and Kumar 2003).

We draw on four data sources. Starting with the Compustat data base, we first identified all publicly listed firms in the two industries from 1994-2011 from SIC codes 4812, 4813 (Telecom) and 4512 (Airlines). Within this sample, we focus only on firms that end their fiscal year at December 31<sup>st</sup>. This focus is important as we have to ensure that the term “year” is the same for all the firms in our sample and therefore all firms were subject to the same industry conditions and that analysts had access to the same microeconomic and industry data during the sample period (e.g., Dao, Raghunandan, and Rama 2012; Jones 2007; Loh and Mian 2006).<sup>1</sup> This procedure yields two unbalanced panel data sets of 365 firm-year observations from Telecom and 146 firm-year observations from Airlines (see Web Appendix A for the list of firms included).

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<sup>1</sup> Jones (2007, p.494) provides the following example to illustrate why the exclusion of firms with fiscal year endings other than December 31<sup>st</sup> is crucial: “If an industry-wide event occurred in March 1998 that affected all firms, such as a price increase, then a firm might disclose information about it. This would be a fiscal-year 1997 disclosure for a March year-end firm, but not a December year-end firm. However, the price increase would impact analysts’ forecasts of both firms.”

Second, for each of these firms, we retrieved the 10-K report from the website of the Securities and Exchange Commission ([www.sec.gov](http://www.sec.gov)). Third, we matched the resulting sample with historical data on analysts' earnings forecasts using the Institutional Brokers Estimate System (I/B/E/S). Since we require at least 2 analyst earnings forecasts to measure analysts' uncertainty about future firm's performance, we excluded all observations for which less than 2 analyst earnings forecasts were available. Finally, we used University of Chicago's CRSP data set to obtain daily stock returns, whose standard deviation is our measure of investors' uncertainty. This alignment across four databases resulted in 192 firm-year observations for Telecom and 95 firm-year observations for Airlines. The resulting sample is favorable when compared to prior studies that use hand-coded data to measure disclosures (e.g., 81 observations in Bhojraj, Blacconiere, and D'Souza 2004; 119 observations in Jones 2007).

### *Measures*

*Customer Metrics Disclosure Score.* We follow prior research and use hand-coded data to construct disclosure scores that measure the quantity of backward- and forward-looking disclosures of customer metrics made by each firm in every year (e.g., Bhojraj, Blacconiere, and D'Souza 2004; Jones 2007). We started by identifying all customer metrics that are likely to provide useful information for analysts and investors. Accordingly, we reviewed all articles published from 1993-2012 in four leading marketing journals (*Journal of Marketing*, *Journal of Marketing Research*, *Marketing Science*, and *Management Science*). If a customer metric had an effect (empirically or conceptually) on firms' future financial performance (e.g., cash-flows, stock returns, risk, shareholder value, Tobin's q), then we considered it in our disclosure score.

In total, we identified 31 customer metrics. Thus, we followed FASB's advice to aim for a broad instead of restrictive disclosure approach (FASB 2001). Specifically,

“As pointed out by the FASB, extensive disclosures across all metrics are more useful than isolated presentation of metrics (FASB 2001). For instance, analysts could better forecast the earnings of a firm if they are provided with information on both, rather than just one, of average revenue per user and customer acquisition cost, because this would enable them to match revenues and expenses and gauge the profitability of the company at the subscriber level. Similarly, analysts may discount the contribution of high average revenue per user if the company also discloses a high churn rate, revealing that future revenue generation may not be sustainable at the current levels.” (Simpson 2010, p. 253-254)

To this list of 31 customer metrics, we added the metric ‘Major Contracts’ with customers, whose disclosure is recommended by the Jenkins Committee Report (AICPA 1994). In addition, we included two customer metrics whose disclosure is mandated by FASB (i.e., names of customers that contribute 10% or more to the revenue of the firm, and customer-related business segments). Table 1 outlines the 34 customer metrics and examples of the supporting literature.

[Insert Table 1 About Here]

The second step was to manually code all annual reports corresponding to the firm-year observations identified before. For the coding work, we hired 20 doctoral students enrolled in business and economics and trained them in two courses. The first course gave an introduction on “Empirical Research on Disclosure & Capital Market Regulation”. The second course was particularly designed for this research project and made the students familiar with the customer metrics to be coded and provided specific coding instructions.<sup>2</sup> In order to ensure the accuracy of the coding process, we conducted several coding exercises of annual reports as examples. After the courses, the doctoral students had 8 weeks to read the reports they were assigned and to indicate for each of the 34 customer metrics on a checklist whether an annual report disclosed (= 1)

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<sup>2</sup> The instructions were to (i) consider a piece of information about a metric as “disclosure” only if the firm provided explicit information on its past/future level, and (ii) code the complete 10-K report including exhibits.

or did not disclose (= 0) information related to the customer metrics. For each customer metric, the checklist differentiated between backward- and forward-looking disclosures.

The scoring process yielded a matrix, with binary information about the occurrence of backward- and forward-looking disclosures for each of the 34 customer metrics and each of the 365 and 146 annual reports in the Telecom and Airlines industry respectively. Thus, we derived  $2 \times 34 \times (365 + 146) = 34,748$  pieces of disclosure information about customer metrics. The average coding time per annual report was about 2 hours.

For the Telecom sample, we asked two different research assistants to code 30 annual reports. Similarly, for the Airlines sample we asked two different research assistants to code 23 reports. For the Telecom sample we found 89.61% agreement in the coding process, while it was 87.48% for the Airlines industry. Both values compare very well with the traditional reliability checks (for an overview, see Hassan and Marston 2010). Table 2 outlines examples of backward- and forward-looking disclosures of customer metrics for both industries.

[Insert Table 2 About Here]

Finally, for each firm-year we calculated the score for backward- and forward-looking disclosures of customer metrics by adding up the binary values indicating disclosure (= 1) and non-disclosure (= 0) for the 34 metrics. This procedure is consistent with prior work that uses hand-coded data to measure disclosures (e.g., [Botosan 1997](#); [Clarkson et al. 2008](#); [Jones 2007](#)).

*Analysts' and Investors' Uncertainty.* Since our objective is to test whether disclosures of customer metrics have an impact on analysts' and investors' uncertainty about future cash-flows of a firm, we measure both metrics after these disclosures occurred. We measure analysts' uncertainty as the standard deviation of the earnings forecasts made by analysts between the day after the release of a firm's 10-K filing and the day before the release of the next quarterly 10-Q filing,



scaled by the stock price at the end of the fiscal year (e.g., [Dhaliwal et al. 2011](#); [Jones 2007](#)). Similarly, we measure investors' uncertainty as the standard deviation of daily stock returns between the day of the release of a firm's annual report (10-K filing) and the day before the release of the next quarterly report (10-Q). Stock price represents the discounted future cash-flows and investors trade firms' shares because they have different expectations of future cash-flows ([Srinivasan and Hanssens 2009](#)). As such, greater standard deviation of stock returns reflects greater investor uncertainty about a firm's future cash-flows ([Sorescu and Spanjol 2008](#)).

*Firm's Performance.* We measure firms' financial performance using net operating cash-flows scaled by total assets (see [Gruca and Rego 2005](#); [Srivastava, Shervani, and Fahey 1998](#)). If the disclosures of customer metrics by a firm are likely to be used by competitors, then such disclosures should have a negative effect on the future cash-flows of the firm.

### *Model*

To test the proposed hypotheses, we need an approach that addresses three critical concerns.

*First*, it is important to isolate the effect of disclosures of customer metrics on the dependent variables above and beyond metrics that reflect a firm's financial health. Therefore, we use multiple control variables to account for arguments that better firms are likely to have higher cash flows, market capitalization, and liquidity, but lower leverage. It is also important to take into account the marketing investments of the firm as it can be argued that firms that make higher disclosures of customer metrics are better at marketing. Therefore, we use SG&A spending scaled by total assets as an indicator of marketing investments of the firm (see [Kim and McAlister 2011](#); [Kurt and Hulland 2013](#)). Table 3 outlines all the control variables and their measures.

We also use hand-coded data to construct a score for the general financial disclosures and use it as a control variable (see Web Appendix B). To account for firm-specific fixed effects,

each model also includes firm-specific dummies. Furthermore, each model includes the lagged value of the dependent variable as a control variable to account for inertia and persistence in the dependent variable. These control variables result in the following:

$$\begin{aligned}
 (1) \text{SD}_{i,t+1} &= \beta_1 \text{BD}_{i,t} + \beta_2 \text{FD}_{i,t} + \beta_3 \text{SD}_{i,t} + \beta_4 \text{GD}_{i,t} + \beta_5 \text{ES}_{i,t} + \beta_6 \text{CF}_{i,t} + \beta_7 \text{VOL}_{i,t} + \beta_8 \text{SIZE}_{i,t} \\
 &\quad + \beta_9 \text{LEV}_{i,t} + \beta_{10} \text{LIQ}_{i,t} + \beta_{11} \text{SG}_{i,t} + \beta_{12} \text{NOE}_{i,t} + \beta_{13} \text{NOS}_{i,t} + \beta_{14} \text{PIO}_{i,t} \\
 &\quad + \beta_{15} \text{IC}_t + \beta_{16} \text{REC}_{t+1} + \beta_{17} \text{GDP}_{t+1} + \beta_{18} \text{T}_{t+1} + \alpha_{1i} + \varepsilon_{1i,t+1} \\
 (2) \text{SR}_{i,t+1} &= \gamma_1 \text{BD}_{i,t} + \gamma_2 \text{FD}_{i,t} + \gamma_3 \text{SR}_{i,t} + \gamma_4 \text{GD}_{i,t} + \gamma_5 \text{ES}_{i,t} + \gamma_6 \text{CF}_{i,t} + \gamma_7 \text{VOL}_{i,t} + \gamma_8 \text{SIZE}_{i,t} \\
 &\quad + \gamma_9 \text{LEV}_{i,t} + \gamma_{10} \text{LIQ}_{i,t} + \gamma_{11} \text{SG}_{i,t} + \gamma_{12} \text{NOE}_{i,t} + \gamma_{13} \text{NOS}_{i,t} + \gamma_{14} \text{PIO}_{i,t} \\
 &\quad + \gamma_{15} \text{IC}_t + \gamma_{16} \text{REC}_{t+1} + \gamma_{17} \text{GDP}_{t+1} + \gamma_{18} \text{T}_{t+1} + \alpha_{2i} + \varepsilon_{2i,t+1} \\
 (3) \text{CF}_{i,t+1} &= \delta_1 \text{BD}_{i,t} + \delta_2 \text{FD}_{i,t} + \delta_3 \text{CF}_{i,t} + \delta_4 \text{GD}_{i,t} + \delta_5 \text{VOL}_{i,t} + \delta_6 \text{LEV}_{i,t} + \delta_7 \text{LIQ}_{i,t} \\
 &\quad + \delta_8 \text{SG}_{i,t} + \delta_9 \text{NOS}_{i,t} + \delta_{10} \text{PIO}_{i,t} + \delta_{11} \text{IC}_t \\
 &\quad + \delta_{12} \text{REC}_{t+1} + \delta_{13} \text{GDP}_{t+1} + \delta_{14} \text{T}_{t+1} + \alpha_{3i} + \varepsilon_{3i,t+1}
 \end{aligned}$$

where:

- $\text{SD}_{i,t+1}$  = Analysts' uncertainty about the financial performance of firm  $i$  for the year  $t+1$ .
- $\text{SR}_{i,t+1}$  = Investors' uncertainty about the financial performance of firm  $i$  for the year  $t+1$ .
- $\text{CF}_{i,t+1}$  = Net operating cash-flows of firm  $i$  at the end of year  $t+1$ ,
- $\text{BD}_{i,t}$  = Score of backward-looking disclosures of customer metrics of firm  $i$  for year  $t$ ,
- $\text{FD}_{i,t}$  = Score of forward-looking disclosures of customer metrics of firm  $i$  for year  $t$ ,
- $\text{GD}_{i,t}$  = General disclosure score of firm  $i$  based upon its annual report for year  $t$ ,
- $\text{ES}_{i,t}$  = Earnings Surprise of firm  $i$  during the year  $t$ ,
- $\text{VOL}_{i,t}$  = Standard deviation of monthly stock returns of firm  $i$  during the year  $t$ ,
- $\text{SIZE}_{i,t}$  = Size of firm  $i$  at the end of year  $t$ ,
- $\text{LEV}_{i,t}$  = Financial leverage of firm  $i$  at the end of year  $t$ ,
- $\text{LIQ}_{i,t}$  = Financial liquidity of firm  $i$  at the end of year  $t$ ,
- $\text{SG}_{i,t}$  = SG&A spending of firm  $i$  at the end of year  $t$ ,
- $\text{NOE}_{i,t}$  = Number of earnings estimates provided for firm  $i$  by financial analysts during year  $t$ ,
- $\text{NOS}_{i,t}$  = Number of operating business segments of firm  $i$  at the end of year  $t$ ,
- $\text{PIO}_{i,t}$  = Percentage of stock held by institutional investors of firm  $i$  at the end of year  $t$ ,
- $\text{IC}_t$  = Industry concentration at the end of year  $t$ ,
- $\text{REC}_{t+1}$  = A dummy variable that is = 1 before 2008, else = 0.
- $\text{GDP}_{t+1}$  = Growth in the Gross Domestic Product of the United States for the year  $t+1$ ,
- $\text{T}_{t+1}$  = Panel Specific Trend of firm  $i$  for the year  $t+1$ ,
- $\alpha_{ni}$  = Firm-specific dummy of firm  $i$  in equation  $n$  to account for firm-specific fixed effects.

[Insert Table 3 About Here]

*Second*, disclosures of non-financial metrics are usually voluntarily made by firms. Thus, backward- ( $BD_{i,t}$ ) and forward-looking ( $FD_{i,t}$ ) disclosures of customer metrics and the general disclosures ( $GD_{i,t}$ ) are likely to be endogenous variables (see Ellis, Fee, and Thomas 2012). To address this endogeneity, we use two instrumental variables. We first propose that the lagged values of disclosures are relevant and valid instruments for current disclosures, i.e.,  $BD_{i,t-1}$ ,  $FD_{i,t-1}$ , and  $GD_{i,t-1}$  are used as instruments for  $BD_{i,t}$ ,  $FD_{i,t}$ , and  $GD_{i,t}$  respectively. Lagged values of disclosures are likely to be correlated with the current values of disclosures because firms show a similar disclosure behavior over time (Simpson 2010). However, disclosures at time (t-1) are not likely to have an impact on analysts' and investors' uncertainty at time (t+1) because markets are efficient (see Fama 1991) so that analysts and investors respond to disclosures immediately instead of waiting for two years (from t-1 to t+1). We also expect that disclosures at time (t-1) do not affect cash-flows at time (t+1) because competitors react much quicker to newly available information, if they react at all (see Steenkamp et al. 2005).

Recent research shows that the characteristics of the top management team of a firm have an effect on its disclosure policies (see Bamber, Jiang, and Wang 2010). Consistent with this finding, we propose that the presence of a Chief Marketing Officer (CMO) is a relevant and valid instrument. CMO presence is likely to increase the availability and use of customer metrics within the firm (Mintz and Currim 2013). In addition, CMO presence indicates the importance of the marketing function for the top management of the firm (Nath and Mahajan 2008, 2011). Thus, the availability of customer information combined with the salience of marketing for the top management likely results in more disclosures of customer metrics by firms that have a CMO.

Prior research, however, provides conflicting results regarding the effect of presence of a CMO on firm's future cash-flows (see German, Ebbes, and Grewal 2015; Nath and Mahajan 2008). Indeed, Boyd, Chandy, and Cunha Jr. (2010) find that on average, the appointment of a CMO does not generate significant abnormal returns. Therefore, we expect that the presence of a CMO at (t) does not have an effect on analysts' uncertainty ( $SD_{i,t+1}$ ), investors' uncertainty ( $SR_{i,t+1}$ ), and future cash-flows ( $CF_{i,t+1}$ ). To examine the validity of our assumptions for instrumental variables, we outline the first stage results. In addition, we use the Hansen J test to examine whether the instruments are valid. The joint null hypothesis in this test is that the instruments are not correlated with the error term in the proposed model and that the instruments are correctly excluded from the main model (see Hayashi 2000).

*Third*, the three dependent variables, i.e., analysts' uncertainty, investors' uncertainty, and firms' cash-flows are related to each other. Accordingly, we use a Three Stage Least Squares (3SLS) approach to estimate Equations 1-3. This approach allows for errors across the equations to be correlated and the endogeneity of the three disclosure-related variables.

## *RESULTS*

### *Descriptive Statistics*

Table 4 outlines the frequency of backward- and forward-looking disclosures of customer metrics. We find that in both industries, firms make significantly more backward- than forward-looking disclosures of customer metrics.<sup>3</sup> In addition, Telecom firms provide more backward-

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<sup>3</sup> Specifically, Telecommunications: (M = .24, SD = .04 of backward- versus forward-looking disclosures of customer metrics M = .08, SD = .02);  $t(33) = 4.963, p = .000$ ; Airlines: (M = .17, SD = .04 of backward versus forward-looking disclosures of customer metrics M = .03, SD = .01);  $t(33) = 3.794, p = .00$ .

and forward-looking disclosures of customer metrics than Airlines.<sup>4</sup> The frequency of disclosures also differs across customer metrics. For example, 90% of firms in both industries disclose the size of their customer base, but less than 10% of the firms disclose their customer profitability.

[Insert Table 4 About Here]

Within industries, firms differ in the amount of disclosures of customer metrics (see Figure 1). For example, Sprint Nextel provides high levels of backward- and forward-looking disclosures of customer metrics as compared to Verizon. Similarly, Alaska Air consistently provides higher levels of backward-looking disclosures of customer metrics as compared to Skywest. Interestingly, while Alaska Air increased forward-looking disclosures of customer metrics (2007-2011), Skywest stopped making such disclosures in recent years (2010-2011).

[Insert Figure 1 About Here]

As shown in Figure 1, firms tend to be consistent in their disclosures over time. Following DeKunder and Kohli (2008), we measure consistency as the average share of actually implemented reversals out of all the possible reversals in disclosures of customer metrics. Reversal of disclosure of customer metrics means that a firm goes from disclosure in one year to non-disclosure in the following year or the other way around, i.e., from non-disclosure to disclosure (see Web Appendix C for formal description). We find that Telecom (Airlines) firms implemented 4.06% (2.26%) of all possible reversals of backward-looking disclosures of customer metrics. A

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<sup>4</sup> Specifically, Backward-looking: (M = 5.84, SD = .22 of Telecommunication disclosures versus Airline disclosures M= 4.92, SD= .1);  $t(145) = -2.816, p = .005$ ; Forward-looking: (M= 1.71, SD= .15 of Telecommunication disclosures versus Airline disclosures M= .57, SD= .08);  $t(145) = -6.327, p = .00$ .

similar pattern is observed for forward-looking disclosures, as we find 2.43% (1.12%) of all possible reversals for Telecom (Airlines) firms. Indeed, in examining the standard deviation of the disclosures, we find that in both industries, the cross-sectional standard deviation is more than twice the within-panel standard deviation.<sup>5</sup>

### *Consequences of Disclosure*

Table 5 outlines the descriptive statistics and Table 6 provides the correlation matrix for the dependent variables, hypothesized variables, and the control variables in both industries.

[Insert Tables 5 & 6 About Here]

*Diagnostics.* Across models, the Hausman test underscores the importance of including firm specific fixed-effects.<sup>6</sup> As such, the results of hypotheses testing are driven by the “within” variation for each firm. We also examine the instrument relevance and validity for each model in both industries and find that the lagged value of disclosure has a significant positive impact on current disclosure (see Web Appendix D for the 1<sup>st</sup> stage results). Consistent with our expectations, the presence of a CMO has a significant positive effect on forward-looking disclosures of customer metrics in the Telecom industry (.15,  $p < .05$ ) and a significant positive effect on backward-looking disclosures in the Airlines industry (.12,  $p < .00$ ). Importantly, in almost every case

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<sup>5</sup> Specifically, Telecommunications: (i) backward-looking disclosures of customer metrics (Standard Deviation, *cross-sectional* = 6.104; *within* = 1.983), (ii) forward-looking disclosure of customer metrics (Standard Deviation, *cross-sectional* = 2.981; *within* = .844). Airlines: (i) backward-looking disclosures of customer metrics (Standard Deviation, *cross-sectional* = 2.366; *within* = .847), (ii) forward-looking disclosure of customer metrics (Standard Deviation, *cross-sectional* = 1.253; *within* = .462).

<sup>6</sup> Specifically, Telecommunications: (i) Analyst Uncertainty:  $F(37, 139) = 5.76$ ;  $\text{Prob}>F = .000$ ; (ii) Investor Uncertainty:  $F(37, 139) = 1.44$ ;  $\text{Prob}>F = .0671$ ; (iii) Future Financial Performance:  $F(37, 143) = 2.41$ ;  $\text{Prob}>F = .00$ . Airlines: (i) Analyst Uncertainty:  $F(14, 65) = 6.12$ ;  $\text{Prob}>F = .000$ ; (ii) Investor Uncertainty:  $F(14, 65) = .72$ ;  $\text{Prob}>F = .747$ ; (iii) Future Financial Performance:  $F(14, 69) = 2.17$ ;  $\text{Prob}>F = .018$ . Given that we are simultaneously estimating the models, we include firm fixed-effects for each model.

we fail to reject the null hypotheses in the Hansen J test (see Table 7). In summary, the proposed instruments are both relevant and valid.<sup>7</sup>

*Backward-Looking Disclosures.* We do not find support for H1a as the quantity of backward-looking disclosures of customer metrics is neither associated with analysts' uncertainty in the Telecom ( $\beta_1 = .021$ , n.s.) nor the Airlines industry ( $\beta_1 = .095$ , n.s.). In addition, we find only weak support for H1b, as the quantity of backward-looking disclosures of customer metrics is weakly associated with investors' uncertainty in the Telecom firms ( $\gamma_1 = -.014$ ,  $p < .10$ ), but does not have a significant effect in the Airlines industry ( $\gamma_1 = .14$ , n.s.).

*Forward-Looking Disclosures.* Consistent with H2a, quantity of forward-looking disclosures of customer metrics has a significant negative effect on analysts' uncertainty for Telecom firms ( $\beta_2 = -.125$ ,  $p < .00$ ). This effect, however, is not significant for firms in the Airlines industry ( $\beta_2 = -.043$ , n.s.). Consistent with H2b, we find that quantity of forward-looking disclosures of customer metrics has a significant negative impact on investors' uncertainty in both Telecom ( $\gamma_2 = -.014$ ,  $p < .05$ ) and Airlines industry ( $\gamma_2 = -.822$ ,  $p < .05$ ).

*Future Financial Performance.* In contrast to H3a, the effect of the quantity of backward-looking disclosures on future cash flows is positive in the Telecom industry ( $\delta_2 = .052$ ,  $p < .05$ ). This effect, however, is not significant for firms in the Airlines industry ( $\delta_2 = -.066$ , n.s.). We do not find support for H3b as quantity of forward-looking disclosures of customer metrics does not have a significant effect on future cash flows in the Telecom industry ( $\delta_2 = -.015$ , n.s.). In sharp

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<sup>7</sup> We also examined whether lagged CMO does have any impact on the dependent variables when all the control variables are included in a model. Consistent with our expectations, we find that in 5 out of the 6 cases (3 DVs  $\times$  2 Samples) CMO presence does not have a significant impact on the dependent variables.

contrast to H3b, we find that the quantity of forward-looking disclosures of customer metrics is positively associated with future cash-flows in the Airlines industry ( $\delta_2 = .105, p < .00$ ).

[Insert Table 7 About Here]

### *Sensitivity Analyses*

We conduct multiple sensitivity analyses to mitigate concerns related to alternative explanations and to examine the robustness of current findings. *First*, we examine whether the theoretical distinction between backward- and forward-looking disclosures as opposed to total disclosure scores, provides empirically distinct findings. As shown in Row 1, Table 8, examining only the total disclosure of customer metrics will lead to the erroneous conclusion that any type of disclosure of customer metric can lower investors' and analysts' uncertainty.

*Second*, we examine the use of alternative measures of disclosure metrics. It can be argued that in order to test the proposed hypotheses, it is important to measure disclosure of customer metrics relative to industry averages to account for industry practices. Accordingly, we examine both the difference between the firm's disclosure score and the industry's average score, and if the firm's disclosure score is measured as a proportion of industry's average score. As shown in Rows 2 and 3 of Table 8, results remain unchanged if we use these two alternative measures. The current coding scheme gives equal weights to both numerical and non-numerical disclosures. However, it can be argued that numerical disclosures should have more weightage than non-numerical disclosures (see Jones 2007). Therefore, we use a weighted measure of disclosures of customer metrics such that numerical disclosures are given a score of 2 while verbal disclosures are given a score of 1 (see Row 4). Finally, we also examine the robustness of results if the customer disclosure scores are scaled by the maximum possible score for customer disclosures (see Row 5) or if they are scaled by the score for the general financial disclosures by the



firm (see Row 6). As shown in Rows 4, 5, and 6, we find that our basic conclusions do not change if we use these alternative approaches to measure disclosure of customer metrics.

*Third*, we examine if our conclusions change when we use alternative dependent variables. In particular, we find that our conclusions remain unchanged if we use (i) the standard deviation of abnormal stock returns from a Fama-French model (Fama and French 1992), as opposed to the raw standard deviation of stock returns (see Row 7), (ii) the median of the error of the analysts' earnings forecasts (e.g., Thomas 2002), instead of its standard deviation (see Row 8), and (iii) reported earnings as the performance metric, rather than cash-flows (see Row 9). As shown in Table 8, Rows 7-9, our conclusions remain unchanged.

*Fourth*, given concerns related to endogeneity of disclosures, we examine whether our conclusions change if we use alternative sets of instruments in the 3SLS estimation. We examine (i) the effect of removing CMO as an instrument (see Row 10), (ii) the effect of following German, Ebbes, and Grewal (2015) and using industry averages of backward- and forward-looking disclosures of customer metrics along with lagged variables as instruments, but removing CMO as an instrument (see Row 11), and (iii) a model in which we do not use the lagged variables as instruments, so that only CMO presence and the industry averages are used as instruments (see Row 12). As shown in Table 8, Rows 10-12, our substantive conclusions are robust to the choice of instrumental variables used in the 3SLS estimation.

*Fifth*, we assess the use of alternative control variables such as (i) including CEO turnover (Row 13), (ii) including abnormal returns on the day of the release of the annual report (Row 14), (iii) excluding lagged DVs as control variables (Row 15), (iv) using reported earnings as a

control variable for cash-flows (Row 16), and (v) excluding potential outliers, i.e., dropping observations with residuals beyond 1 and 99 percentile (Row 17). As shown in Table 8, our substantive conclusions remain unchanged if we use these alternative control variables.

*Sixth*, whereas the current study focuses on the quantity of disclosures of customer metrics, another dimension of disclosures is their valence, i.e., positive (“good news”) versus negative (“bad news”). The current focus on quantity of disclosures is consistent with a rich body of research that examines the effects of the quantity of disclosures but does not consider the effects of valence of such disclosures (e.g., Botosan 1997; Botosan and Plumlee 2002; Francis, Nanda, and Olsson 2008; Leone, Rock, and Willenborg 2007; Shalev 2009). Nevertheless, we follow recent research and adopt an approach for measuring and controlling for the tone of disclosures of customer metrics (see Loughran and McDonald 2011).<sup>8</sup> Reassuringly, our substantive conclusions remain unchanged if we control for the tone of disclosures (see Row 18).

In summary, across a broad array of sensitivity tests we continue to find that the quantity of forward-looking disclosures of customer metrics lowers (a) analysts’ and investors’ uncertainty in the Telecom sample, and (b) investors’ uncertainty in the Airlines sample. In contrast, we barely find any support for the effects of quantity of backward-looking disclosures of customer metrics on analysts’ uncertainty. Finally, we do not find a single instance of a negative impact of the quantity of both types of disclosures of customer metrics on future cash-flows.

[Insert Table 8 About Here]

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<sup>8</sup> Briefly, to classify individual disclosures as either positive or negative we followed prior literature and used the “word list” developed by Loughran and McDonald (2011) because it is specifically developed for analyzing corporate financial disclosures. We considered each disclosure of a customer metric individually and used the word list to classify each disclosure as either positive, negative, or neutral. Following Merkeley (2014), we calculate the tone of customer disclosures of each firm and year as:

$$\text{Tone} = (\text{Sum of Positive Disclosures} - \text{Sum of Negative Disclosures}) / (\text{Total Disclosures})$$

This variable was then included as a control variable in our focal model.

## DISCUSSION

Whereas a number of studies call for more disclosure of marketing metrics by publicly listed firms, prior literature seldom examines the impact of such disclosures. Indeed, the Marketing Accountability Standards Board (MASB) has recently launched an initiative to explore how reporting of marketing metrics can help in making financial reports more informative (see MASB 2016). Against this background, we present the first empirical investigation of the quantity of backward- and forward-looking disclosures of 34 customer metrics by manually coding annual reports of firms in two industries. The study has the following implications.

*First*, results underscore the importance of considering the backward- and forward-looking disclosures of customer metric separately. In both industries we find that managers are more likely to share information about their customer metrics if it pertains to things that have already happened (i.e., backward-looking disclosures), as compared to articulating their expectations of these metrics (i.e., forward-looking disclosures). Literature in the marketing-finance interface, however, seldom differentiates between the backward- and forward-looking disclosures of marketing metrics. Empirical literature in this domain predominantly focusses on examining investors' and analysts' response to backward-looking disclosures such as changes in customer satisfaction scores (e.g., Tuli and Bharadwaj 2009) and brand dimensions (e.g., Mizik and Jacobson 2008). Few studies focus on investors' and analysts' response to forward-looking disclosures of marketing metrics (for an exception see Sorescu, Shankar, and Kushwaha 2007).

*Second*, across several robustness tests, we find that forward-looking disclosures of customer metrics lower the uncertainty faced by investors in both industries. In addition, we find that forward-looking disclosures of customer metrics also lower analysts' uncertainty for Telecom firms. These results, therefore, provide empirical support for recommendations by MASB

and MSI that underscore the importance of greater disclosure of marketing metrics (see Gregory and Moore 2012; Mizik and Nissim 2011). In addition, the robust effects of forward-looking disclosures support the repeated efforts of SEC, FASB, and IASB that encourage firms to disclose more forward-looking information.

*Third*, the beneficial impact of forward-looking disclosures, combined with the fact that we do not find any negative effects of these disclosures on future cash-flows, presents initial empirical evidence for FASB to re-consider its 2004 decision to terminate its project encouraging disclosures of customer information by firms. A direct implication is that senior managers such as the CEO and the CMO should consider disclosing forward-looking customer information. Such forward-looking disclosures could create a richer information environment for analysts and investors that, eventually, could lead to a decrease in a firm's cost of capital (see Lev 2011).

Our results also speak for an increased role of marketing metrics, and therefore, marketing managers in managing investor relations (see Verhoef and Leeflang 2009; Skiera, Bermes, and Horn 2011). The findings are relevant for CMOs as they suggest a potential role for them in managing the firm's investor relations. Indeed, we find that the presence of a CMO significantly increases forward-looking disclosures of customer metrics for Telecom firms and backward-looking disclosures of customer metrics by Airlines (see Web Appendix D). Since the CMO plays an important role in the use of marketing metrics (see Mintz and Currim 2013), (s)he can play a vital role in collecting and communicating customer information to investors. For example, a CMO could be involved in the earnings conference calls to disclose and discuss these metrics. Such involvement underscores the CMO's importance and is crucial given the short tenure and high vulnerability of the CMO (Boyd, Chandy, and Cunha Jr. 2010). Indeed, we know little

about the disclosure of customer information in earnings conference calls or about the involvement of senior marketing managers in them. Future research, therefore, could examine these questions.

Interestingly, we see that a 1% increase in forward-looking disclosures results in a .015 percent decrease in investors' uncertainty for Telecom firms, but a much larger decrease for Airlines (.822%). One explanation for this difference in the effect size could be that forward-looking disclosures of customer metrics are more valuable in industries where the prevalence of contractual customers is lower, i.e., Airlines. The absence of contractual customers, in turn, makes it more difficult for investors and analysts to predict customer behavior, and thus future cash flows. As such, additional guidance from managers regarding their expectations about customer metrics is more valuable for both investors and analysts.

We also find that backward-looking disclosures of customer metrics are positively associated with future cash-flows for Telecom firms, while forward-looking disclosures are positively associated with future cash-flows of Airlines. These findings are important because managers have strongly opposed increased disclosure requirements arguing that such disclosure requirements are likely to be costly and provide sensitive information to competitors. However, it is not clear as to why would such disclosures have a positive impact on future financial performance. One possible explanation is that such disclosures could be useful in gaining access to credit and lower the firm's cost of capital (see [Dhaliwal et al. 2011](#)). Another reason could be that such disclosures enhance the board of directors' monitoring of managerial actions, lower instances of managerial opportunism, allow for writing more efficient contracts due to more transparency about current and future business conditions, and therefore enhance firm performance (see Arm-

strong, Guay, and Weber 2010). Also, the increased amount of oversight for investors and analysts may function as a quality signal and affect credit risk for debt issuers (Tsai, Lu, and Hung 2016). Clearly, these are preliminary conjectures and more systematic research is required.

*Which type of metrics should firms disclose?*

Results of the current study also raise an important question: for which customer metrics should firms make forward-looking disclosures? To analyze this question, for each industry, we identified forward-looking disclosures that were disclosed at least once in the sample. These metrics were then classified into firm actions and customer outcomes (see Gupta and Zeithaml 2006). Thus, forward-looking disclosures of firm actions refer to the disclosures related to managers' expectations of future actions targeted at customers, which includes disclosures such as, managers' expectations of future marketing and advertising spending, customer retention costs and service quality initiatives. Forward-looking disclosures of customer outcomes, in turn, refer to the disclosures related to managers' expectations of firm performance with customers. These disclosures include information related to managers' expectations about metrics such as, customer satisfaction, customer retention, and customer acquisitions (see Web Appendix E).

[Insert Table 9 about here]

Following the classification of forward-looking disclosures into these two types, we estimate a model that is similar to models 1-3 with one important difference. Instead of one score for forward-looking disclosures of customer metrics, we used separate scores for forward-looking disclosures of customer metrics related to firm actions and customer outcomes. We then estimated the models following the same procedure and control variables as described for models 1-3. As shown in Table 9, in both industries we find that the quantity of forward-looking disclo-

asures of customer outcome metrics has a significant negative effect on both analysts' and investors' uncertainty without any adverse effects on future cash-flows. However, the quantity of forward-looking disclosures of firms' actions does not have a significant effect on the outcome variables. A plausible reason for this result is that both analysts and investors are likely to use the customer outcome disclosures because they are "closer" to financial outcomes as compared to firms' actions (see Gupta and Zeithaml 2006). Importantly, a direct implication of these results is that marketing managers should consider making greater forward-looking disclosures of customer outcomes to reduce the uncertainty faced by analysts and investors. In addition, future research could explore other consequences (e.g., cost of capital) and the possible path to making disclosures of customer outcome metrics mandatory in the Telecom and Airlines industry.

#### *LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH*

As with any empirical exploration of a nascent area, this study has limitations that bring to fore opportunities for future research. While the present study is perhaps one of the few that uses hand coded data across two industries, it is important to note that disclosure practices and their outcomes are industry-specific. As such, future research could generalize our results by examining disclosures of customer metrics in other industries. Furthermore, as FASB outlined in its project updates, intangible assets do not only entail customer metrics on which we focus in this study, but also other assets such as R&D and innovation initiatives (FASB 2004). Thus, future research could extend this research and analyze how disclosures of other types of intangible assets influence investors' and analysts' uncertainty as well as firm's performance.

We find that forward-looking disclosures of customer metrics have a significant negative effect on investors' and analysts' uncertainty. That said, it is possible that there are diminishing returns to greater levels of disclosures. We explored this possibility in our current dataset, but did

not find support for such effects. One plausible explanation could be that the current levels of disclosures of customer metrics are not high enough to allow us to observe such effects. As such, future research in other industries could explore this possibility.

The current study does not explore as to “*how*” investors and analysts use the information provided by disclosures of customer metrics. Interestingly, in the Airlines industry we find that the quantity of forward-looking disclosures has a negative effect on investors’ uncertainty but no effect on analysts’ uncertainty. This difference is consistent with recent work which finds that managerial disclosures such as those contained in the Management Discussion & Analyses section of annual reports are more useful for investors than analysts (see Brown and Tucker 2011). One plausible reason for this result could be that analysts have greater access to more sophisticated tools for estimating future cash-flows and therefore rely less on firm disclosures of customer metrics. However, we know little in terms of analysts’ use of disclosures to update their models resulting in a lower dispersion of earnings forecasts. One potential avenue for future research, therefore, would be to conduct in-depth interviews with investors and analysts to understand as to how they use disclosures of non-financial information such as customer metrics.

This study focuses on disclosures made by firms in their annual reports. While annual reports are the most important source of information for investors (see Botosan and Plumlee 2002), firms also make disclosures through other channels such as earnings conference calls, media reports, and the use of social media at different times in a year (e.g., DeFond, Hann, and Hu 2015; [Frankel, Johnson, and Skinner 1999](#)). As such, future research could examine whether firms provide disclosures of customer metrics in earnings conference calls or through media reports, and whether the timing (e.g., just before or after earnings release; relatively early or late disclosures) of these reports is likely to have an impact on analysts’ and investors’ reactions.



Consistent with a large body of prior literature (e.g., Botosan 1997; Botosan and Plumlee 2002; Francis, Nanda, and Olsson 2008; Shalev 2009), this study examines the effects of the quantity of backward- and forward-looking disclosures of customer metrics. An important avenue for future research, therefore, could be to develop a method to identify disclosures of customer metrics that are interpreted as positive or negative news by investors and analysts. However, developing such a method is not straightforward and recent studies recommend caution in using broad-based approaches for doing so (see Muslu et al. 2015). Consider for example the statement “*We project our revenue per customer to increase to \$150 in the next year*”. It is not clear if this statement reveals positive or negative information. On one hand an “increase” could be viewed as a positive signal. On the other hand, if the average increase in the industry is higher, then it is a negative signal. Clearly, more research is required in this domain.

Whereas the current study focusses on the impact of disclosures of customer metrics on analysts and investors, there are other potential outcomes that future studies could explore. For example, recent studies show that the financial disclosures can have an impact on consumer perceptions of firms and their brands (see Tian and Zhou 2015). Also, it can be argued that higher disclosure of customer metrics could function as a signal of transparency and therefore increase confidence in the firms’ potential conduct with key accounts and/or alliance partners.

The current study finds that prior disclosure of customer metrics and the presence of a CMO have significant effects on current disclosures of customer metrics. Future research, therefore, can build on our initial findings to systematically identify factors that drive disclosures of customer metrics. Addressing this and similar questions could provide valuable insights into the important but under-researched domain of disclosures of customer metrics.

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**Table 1**  
**CUSTOMER METRICS DISCUSSED IN MARKETING LITERATURE AND ACCOUNTING REGULATIONS**

<b>Metrics</b>	<b>Examples of Supporting Literature</b>	<b>Metrics</b>	<b>Examples of Supporting Literature</b>
Marketing Spending	Kim and McAlister (2011); Luo (2008)	Customer Satisfaction	Anderson, Fornell, and Mazvancheryl (2004); Fornell et al. (2006)
Advertising Spending	McAlister, Srinivasan, and Kim (2007); Srinivasan et al. (2009)	Perceived Quality	Aaker and Jacobson (1994); Rego, Billett, and Morgan (2009)
Customer Acquisition Costs	Gupta, Lehmann, and Stuart (2004); Schulze, Skiera, and Wiesel (2012)	Customer Loyalty	Chen and Xie (2007); Vogel, Evanschitzky, and Ramaseshan (2008)
Customer Retention Costs	Gupta and Zeithaml (2006); Reinartz, Thomas, and Kumar (2005)	Purchase Intention	Srinivasan, Vanhuele, and Pauwels (2010); Tellis (1988)
Customer Base Size	Gupta, Lehmann, and Stuart (2004); Schulze, Skiera, and Wiesel (2012)	Brand Equity	Ailawadi, Lehmann, and Neslin (2003); Rego, Billett, and Morgan (2009)
Customers Acquired	Gupta, Lehmann, and Stuart (2004); Schulze, Skiera, and Wiesel (2012)	Commitment	Gupta and Zeithaml (2006); Palmatier (2008)
Customers Lost	Thomas, Blattberg, and Fox (2004); Wiesel, Skiera, and Villanueva (2008)	Perceived Value	Rust, Lemon, and Zeithaml (2004); Sirdeshmukh, Singh, and Sabol (2002)
Customer Retention Rate	Gupta, Lehmann, and Stuart (2004); Schulze, Skiera, and Wiesel (2012)	Trust	Gupta and Zeithaml (2006); Palmatier (2008)
Customer Profitability	Gupta, Lehmann, and Stuart (2004); Schulze, Skiera, and Wiesel (2012)	Awareness	Keller and Lehmann (2006); Srinivasan, Vanhuele, and Pauwels (2010)
Average Revenue per Customer	Iyengar, Ansari, and Gupta (2007); Wiesel, Skiera, and Villanueva (2008)	Interest	Keller and Lehmann (2006); Mizik and Jacobson (2008)
Word of Mouth / Referrals	Luo (2009); Villanueva, Yoo, and Hanssens (2008)	Knowledge	Mizik and Jacobson (2008); Rust et al. (2004)
Cross Selling Rate	Schmitz, Lee, and Lilien (2014)	Desire	Keller and Lehmann (2006)
Customer Lifetime Value (CLV)	Gupta, Lehmann, and Stuart (2004); Schulze, Skiera, and Wiesel (2012)	Liking	Srinivasan, Vanhuele, and Pauwels (2010)
Customer Equity	Kumar and Shah (2009); Vogel, Evanschitzky, and Ramaseshan (2008); Srinivasan and Hanssens (2009)	Associations	Krasnikov, Mishra, and Orozco (2009)
Customer Engagement Value	Kumar et al. (2010)	Attitude	Lane and Jacobson (1995); Park et al. (2010)
Customer Segments	FASB (1997)	Attachment	Park et al. (2010)
Major Customers	FASB (1997)		
Major Contracts	AICPA (1994)		

Table 2  
EXAMPLES OF BACKWARD- AND FORWARD-LOOKING DISCLOSURES OF CUSTOMER METRICS

Customer Metric	Backward-Looking Disclosures	Forward-Looking Disclosures
Customer Retention Rate (Telecommunications)	<p style="text-align: center;"><i>Alamosa Holdings Inc (2002)</i></p> <p>Monthly churn for 2002 was approximately <u>3.4 percent</u> compared to approximately 2.7 percent for 2001.</p>	<p style="text-align: center;"><i>Alamosa Holdings Inc (2003)</i></p> <p>The rate of churn experienced in 2002 was the highest that we have experienced on an annual basis since the inception of the Company. <u>We expect that in the near term churn may increase</u> as a result of the implementation of the FCC's WLNP mandate in all of our markets during 2004.</p>
Customer Segments (Telecommunications)	<p style="text-align: center;"><i>Intermedia Communications Inc (1999)</i></p> <p>The major accounts unit focuses on <u>Fortune 2000 companies</u>. The mid-market/Web centric unit addresses the large and growing number of <u>mid-size businesses</u> requiring mission-critical hosting services. The alternate channel sales group works closely with Digex's extensive network of <u>business alliance partners</u>.</p>	<p style="text-align: center;"><i>Pacific Gateway Exchange Inc (1998)</i></p> <p>The Company expects that its <u>bandwidth and internet operations will become its fourth business segment</u>.</p>
Customer Acquisition Costs (Telecommunications)	<p style="text-align: center;"><i>Metro PCS (2009)</i></p> <p>Cost Per Gross Addition (CPGA) increased to \$145.79 for the year ended December 31, 2009 from \$127.21 for the year ended December 31, 2008.</p>	<p style="text-align: center;"><i>Ubiquitel Inc. (2003)</i></p> <p>Cost Per Gross Addition (CPGA) was approximately \$450 for the year ended December 31, 2003 which is comparable to approximately \$444 for the year ended December 31, 2002. We believe that CPGA will <u>remain at approximately current levels</u> in the near-term due to significant competition coupled with our commitment to quality subscriber additions.</p>
Customer Base Size (Airlines)	<p style="text-align: center;"><i>Delta Air Lines Inc (2001)</i></p> <p>This year, <u>over 104 million passengers</u> chose to fly Delta (including its wholly owned subsidiaries Atlantic Southeast Airlines, Inc. and Comair, Inc.) - more than any other airline.</p>	<p style="text-align: center;"><i>Alaska Air Group Inc (2011)</i></p> <p>If these efforts* are unsuccessful or they <u>negatively affect our reputation with our existing customer base</u>, we <u>may experience an adverse impact</u> on our business and financial results.</p> <p style="text-align: center;"><small>*(i) online purchasing portal (alaskaair.com), (ii) social media, and (iii) customer loyalty programs.</small></p>
Perceived Quality (Airlines)	<p style="text-align: center;"><i>Airtran Holdings Inc (2009)</i></p> <p>In January 2010, AirTran Airways was <u>awarded the prestigious 2009 Market Leadership Award</u> from leading industry publication, Air Transport World, for AirTran's innovative combination of low-cost, <u>high-quality service</u> and response to the global financial crisis.</p>	<p style="text-align: center;"><i>Continental Airlines Inc (1995)</i></p> <p>Management <u>has targeted improved customer service</u> (as evidenced by standard measures such as on-time performance, mishandled bags and customer complaints) as a major priority. [...] Continental's <u>goal for 1996 is to be ranked monthly in the top three in each of these DOT</u> (Department of Transportation; added by authors) performance metrics.</p>
Customer Segments (Airlines)	<p style="text-align: center;"><i>Continental Airlines Inc (2004)</i></p> <p><u>We have two reportable segments: mainline and regional</u>. The mainline segment consists of flights to cities with jets with a capacity of greater than 100 seats while the regional segment consists of flights with jets with a capacity of 50 or fewer seats.</p>	<p style="text-align: center;"><i>Jetblue Airways Corp (2003)</i></p> <p>In 2004, we plan to launch Company Blue, a corporate travel booking program, which should allow us to <u>penetrate the managed business travel segment</u> by offering corporate managers the ability to better track, record and report on their company's travel expenses.</p>

Notes: Emphasis added in the text.

Table 3  
MEASURES, SOURCES, AND SUPPORTING LITERATURE OF VARIABLES USED IN THE MODEL

Variable	Measure	SOURCE	Supporting Literature
Analysts' Uncertainty <sub>i,t</sub>	Standard deviation of earnings forecast made by analysts following the release of firm's annual report (10-K) and before the release of the quarterly report (10-Q), scaled by the stock price at the end of fiscal year (PRCC_F)	I/B/E/S & CRSP	Jones (2007)
Investors' Uncertainty <sub>i,t</sub>	Standard deviation of daily stock returns following the release of firm's annual report (10-K) and before the release of the quarterly report (10-Q)	CRSP	Sorescu and Spanjol (2008)
Cash-flows <sub>i,t</sub>	Net operating cash-flows (OANCF), scaled by total assets (AT)	COMPUSTAT	Gruca and Rego (2005);
General Disclosure Score <sub>i,t</sub>	General disclosure score calculated using prior literature in accounting (see the Web Appendix B)	10-K Reports	Jones (2007)
Earnings Surprise <sub>i,t</sub>	Difference between the mean earnings estimate by analysts and the actual earnings reported by the firm.	I/B/E/S & COMPUSTAT	Loughran and McDonald (2011)
Volatility <sub>i,t</sub>	Standard deviation of monthly stock returns during the fiscal year of the firm	CRSP	Sorescu and Spanjol (2008)
Firm Size <sub>i,t</sub>	Market value of equity (PRCC_F×CSHO)	COMPUSTAT	Prabhu, Chandy, and Ellis (2005)
Leverage <sub>i,t</sub>	Ratio of total long-term debt (DLTT) and market value of equity (PRCC_F×CSHO)	COMPUSTAT	Bhojraj, Blacconiere, and D'Souza (2004)
Liquidity <sub>i,t</sub>	Ratio of current assets (ACT) and current liabilities (LCT)	COMPUSTAT	Tuli and Bharadwaj (2009)
Advertising Spending <sub>i,t</sub>	Total reported advertising expenses (XAD) scaled by total sales (REVT)	COMPUSTAT	Current Study
Number of Estimates <sub>i,t</sub>	Number of earnings forecast made by analysts following the release of firm's annual report (10-K) and before the release of the quarterly report (10-Q),	I/B/E/S	Current Study
Number of Operating Segments <sub>i,t</sub>	Number of operating business segments identified by the firm	10-K Reports	Jones (2007)
Institutional Holding <sub>i,t</sub>	Percentage of outstanding shares held by institutional investors	COMPUSTAT	Bhojraj, Blacconiere, and D'Souza (2004)
Industry Concentration <sub>t</sub>	Sum of squares of market-shares of all firms present in an industry in year t	COMPUSTAT	Gasper and Massa (2006)
REC <sub>t</sub>	A dummy variable that is = 0 if year is before 2008, else = 1	Manual Coding	Current Study
GDP <sub>t</sub>	Growth in the Gross Domestic Product of the US Economy	BEA Website	Current Study
Trend <sub>it</sub>	Panel specific time trend	Manual Coding	Current Study

Table 4  
 FREQUENCY OF BACKWARD-LOOKING & FORWARD-LOOKING DISCLOSURES OF  
 CUSTOMER METRICS IN THE TELECOMMUNICATIONS AND AIRLINES INDUSTRY

<i>Customer Metric</i>	Telecommunications Industry (N=365)		Airlines Industry (N=146)	
	<i>Backward- Looking</i>	<i>Forward- Looking</i>	<i>Backward- Looking</i>	<i>Forward- Looking</i>
Customer Base Size	87.12%	45.21%	68.85%	3.83%
Customer Acquisition Costs	64.93%	17.81%	12.57%	.00%
Customer Segments	61.10%	9.59%	20.77%	.55%
Perceived Quality	56.44%	21.37%	26.78%	5.46%
Major Customers	55.62%	59.45%	26.23%	.55%
Advertising Spending	52.60%	4.93%	60.66%	.00%
Customers Acquired	48.49%	21.10%	6.01%	2.73%
Customer Satisfaction	44.93%	17.26%	20.77%	14.21%
Average Revenue per Customer	42.19%	16.16%	35.52%	.00%
Marketing Spending	42.19%	13.97%	29.51%	.55%
Customer Retention Rate	41.37%	31.51%	.00%	1.09%
Customer Retention Costs	37.26%	12.60%	12.57%	1.09%
Major Contracts	34.79%	15.89%	43.72%	9.29%
Customers Lost	25.75%	13.97%	1.09%	.00%
Brand Equity	19.45%	3.56%	7.65%	.55%
Awareness	19.18%	10.96%	1.64%	.00%
Customer Equity	16.99%	9.59%	2.19%	.00%
Customer Loyalty	15.89%	14.79%	27.32%	6.56%
Cross Selling Rate	13.70%	11.23%	18.58%	.00%
Knowledge	8.49%	.82%	.00%	.00%
Customer Profitability	5.75%	1.10%	9.84%	.00%
Commitment	5.75%	.27%	1.09%	.00%
Perceived Value	4.66%	1.92%	2.73%	.00%
Interest	3.56%	.00%	.55%	.00%
Associations	3.29%	.00%	.00%	.00%
Attachment	2.47%	.82%	.00%	.00%
Desire	2.19%	.00%	.00%	.00%
Word of Mouth / Referrals	1.37%	1.37%	.00%	.00%
Trust	1.37%	.00%	.00%	.00%
Purchase Intention	1.10%	.00%	.00%	.00%
Customer Lifetime Value (CLV)	.82%	.00%	.00%	.00%
Customer Engagement Value	.00%	.00%	.00%	.00%
Liking	.00%	.00%	2.73%	.00%
Attitude	.00%	.00%	.00%	.00%

Notes: To be read as X percentage of the firm-year observations exhibit disclosure about this metric. For example, we see backward-looking disclosures of customer base size in 87.12% of all firm-year observations in the Telecommunications industry.

Table 5  
DESCRIPTIVE STATISTICS

Variables	Telecommunications (n = 192)				Airlines (n = 95)			
	Mean	SD	Min	Max	Mean	SD	Min	Max
1 Analysts' Uncertainty <sub>i,t</sub>	.06	.25	.00	3.03	.05	.18	.00	1.66
2 Investors' Uncertainty <sub>i,t</sub>	.03	.02	.00	.10	.03	.02	.01	.14
3 Cash-flows <sub>i,t</sub>	.11	.08	-.21	.30	.09	.08	-.14	.26
4 BD <sub>i,t</sub>	12.04	5.94	2.00	26.00	5.64	2.34	1.00	11.00
5 FD <sub>i,t</sub>	2.89	2.59	.00	12.00	.61	1.02	.00	5.00
6 General Disclosure <sub>i,t</sub>	59.25	15.68	17.00	89.00	64.93	9.44	48.00	85.00
7 Volatility <sub>i,t</sub>	.13	.09	.02	.59	.15	.08	.05	.51
8 Size <sub>i,t</sub>	22237.14	46385.43	10.13	251169.70	2370.65	3428.07	30.05	16904.55
9 Earnings Surprise <sub>i,t</sub>	.01	.25	-1.92	1.93	.05	.53	-.69	5.10
10 Leverage <sub>i,t</sub>	.44	.26	.00	1.15	.31	.16	.01	.64
11 Liquidity <sub>i,t</sub>	1.44	1.02	.06	5.71	1.27	.75	.44	4.41
12 Marketing Spending <sub>i,t</sub>	.11	.14	.00	1.55	.08	.07	.00	.34
13 Number of Estimates <sub>i,t</sub>	13.14	9.66	2.00	41.00	9.61	3.98	3.00	23.00
14 Number of Segments <sub>i,t</sub>	3.33	2.01	1.00	11.00	2.12	1.49	1.00	7.00
15 Institutional Holding <sub>i,t</sub>	47.24	35.42	.00	100.00	.84	.14	.43	1.00
16 Industry Concentration <sub>t</sub>	.311	.046	.241	.424	.20	.12	.11	.55
17 REC <sub>t</sub>	.69	.46	.00	1.00	.60	.49	.00	1.00
18 GDP <sub>t</sub>	2.15	1.88	-2.80	4.80	2.15	1.88	-2.80	4.80

Notes: BD<sub>i,t</sub> = Quantity of Backward-Looking Disclosures of Customer Metrics; FD<sub>i,t</sub> = Quantity of Forward-Looking Disclosures of Customer Metrics. REC = recession dummy variable; GDP = US Gross Domestic Product Growth

Table 6  
CORRELATION MATRIX

<b>Telecom (n = 192)</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 Analysts' Uncertainty <sub>i,t</sub>	1.00																	
2 Investors' Uncertainty <sub>i,t</sub>	.28	1.00																
3 Cash-flows <sub>i,t</sub>	-.32	-.47	1.00															
4 BD <sub>i,t</sub>	-.11	.03	-.01	1.00														
5 FD <sub>i,t</sub>	-.05	.12	-.25	.59	1.00													
6 General Disclosure <sub>i,t</sub>	-.02	.25	-.03	.60	.46	1.00												
7 Volatility <sub>i,t</sub>	.35	.77	-.47	.03	.14	.25	1.00											
8 Size <sub>i,t</sub>	-.09	-.28	.16	-.34	-.22	-.67	-.28	1.00										
9 Earnings Surprise <sub>i,t</sub>	.22	-.04	-.14	-.06	-.01	-.04	.01	-.02	1.00									
10 Leverage <sub>i,t</sub>	.18	.13	-.17	.36	.18	.34	.10	-.37	.15	1.00								
11 Liquidity <sub>i,t</sub>	.00	.20	-.02	.01	-.03	.24	.24	-.31	.03	-.11	1.00							
12 Marketing Spending <sub>i,t</sub>	.12	.34	-.18	.01	-.09	.03	.26	-.09	-.10	.03	.10	1.00						
13 Number of Estimates <sub>i,t</sub>	-.06	-.29	.14	-.06	-.04	-.44	-.28	.69	.01	-.27	-.33	-.09	1.00					
14 Number of Segments <sub>i,t</sub>	.00	.00	.17	-.33	-.34	-.19	-.11	.18	.00	-.04	-.06	-.21	-.07	1.00				
15 Institutional Holding <sub>i,t</sub>	-.23	-.18	.35	.34	.11	.18	-.18	-.07	-.11	.13	.16	-.03	.13	-.26	1.00			
16 Industry Concentration <sub>i,t</sub>	-.03	.19	-.10	.09	.18	.13	.20	.02	-.05	-.14	-.08	-.08	.06	-.03	-.30	1.00		
17 REC <sub>t</sub>	.05	.10	-.11	-.22	.03	.03	.13	.02	-.01	-.21	-.02	-.03	-.10	.04	-.27	.15	1.00	
18 GDP <sub>t</sub>	-.02	.06	-.03	-.01	.13	.10	-.02	.01	-.10	-.18	.04	-.07	.05	.01	-.18	.33	.36	1.00
<b>Airlines (n = 95)</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 Analysts' Uncertainty <sub>i,t</sub>	1.00																	
2 Investors' Uncertainty <sub>i,t</sub>	.44	1.00																
3 Cash-flows <sub>i,t</sub>	-.42	-.43	1.00															
4 BD <sub>i,t</sub>	.01	.19	-.10	1.00														
5 FD <sub>i,t</sub>	-.04	.00	.12	.50	1.00													
6 General Disclosure <sub>i,t</sub>	.18	.12	.07	.63	.28	1.00												
7 Volatility <sub>i,t</sub>	.28	.72	-.51	.31	.05	.16	1.00											
8 Size <sub>i,t</sub>	-.13	-.16	.18	-.51	-.17	-.62	-.29	1.00										
9 Earnings Surprise <sub>i,t</sub>	.87	.40	-.29	-.03	-.06	.08	.20	-.06	1.00									
10 Leverage <sub>i,t</sub>	-.11	.15	-.46	.02	.06	-.14	.26	-.26	-.09	1.00								
11 Liquidity <sub>i,t</sub>	.02	-.05	.17	-.15	.13	.17	-.13	-.21	.06	.01	1.00							
12 Advertising <sub>i,t</sub>	.54	.27	-.36	.31	.08	.31	.32	-.23	.32	-.07	.04	1.00						
13 Number of Estimates <sub>i,t</sub>	-.26	-.19	.11	-.40	-.11	-.69	-.27	.55	-.15	-.02	-.24	-.32	1.00					
14 Number of Segments <sub>i,t</sub>	.24	.06	-.20	.16	-.08	.25	.03	-.34	.15	-.06	-.13	.04	-.33	1.00				
15 Institutional Holding <sub>i,t</sub>	-.13	-.11	-.06	.10	.33	-.12	-.16	-.06	-.14	.49	.00	-.15	.10	-.11	1.00			
16 Industry Concentration <sub>i,t</sub>	-.15	-.19	.47	-.26	-.22	-.10	-.18	.09	-.06	-.40	-.13	-.40	.28	-.08	-.40	1.00		
17 REC <sub>t</sub>	-.15	-.34	.30	-.29	-.35	-.07	-.27	.04	-.14	-.26	.01	-.19	.09	.05	-.32	.40	1.00	
18 GDP <sub>t</sub>	-.30	-.13	.58	-.07	-.12	-.03	-.32	.09	-.23	-.34	-.03	-.30	.17	-.06	-.22	.58	.37	1.00

Notes: BD<sub>i,t</sub> = Quantity of Backward-Looking Disclosures of Customer Metrics; FD<sub>i,t</sub> = Quantity of Forward-Looking Disclosures of Customer Metrics. REC = recession dummy variable; GDP = US Gross Domestic Product Growth; For the Telecom, all correlations greater than |.14| are significant at p < .05. For the Airlines, all correlations greater than |.20| are significant at p < .05.



Table 7  
CONSEQUENCES OF DISCLOSURES OF CUSTOMER METRICS

	Telecom (n = 192)						Airlines (n = 95)					
	Analysts' Uncertainty <sub>i, t+1</sub>		Investors' Uncertainty <sub>i, t+1</sub>		Cash-Flows <sub>i, t+1</sub>		Analysts' Uncertainty <sub>i, t+1</sub>		Investors' Uncertainty <sub>i, t+1</sub>		Cash-Flows <sub>i, t+1</sub>	
	Coeff	S.E.	Coeff	S.E.	Coeff	S.E.	Coeff	S.E.	Coeff	S.E.	Coeff	S.E.
<i>Hypothesized Variables</i>												
BD <sub>i, t</sub>	.021	.034	-.014	.009 *	.052	.025 **	.095	.065	.140	.686	-.066	.089
FD <sub>i, t</sub>	-.125	.029 ***	-.014	.007 **	-.015	.020	-.043	.046	-.822	.449 **	.105	.040 ***
<i>Control Variables</i>												
DV <sub>i, t</sub>	.192	.071 ***	-.128	.089	.296	.074 ***	.580	.112 ***	-.169	.113	.112	.153
General Disclosure <sub>i, t</sub>	.096	.062	.018	.017	.053	.044	-.153	.445	.219	4.834	-.300	.625
Earnings Surprise <sub>i, t</sub>	-.027	.020	-.012	.005 **			-.099	.022 ***	.231	.224		
Cash-flows <sub>i, t</sub>	-.487	.099 ***	-.010	.026			-.396	.098 ***	-2.831	1.051 ***		
Volatility <sub>i, t</sub>	.286	.088 ***	.067	.027 **	.051	.064	.009	.010	.287	.115 **	-.018	.015
Size <sub>i, t</sub>	-.052	.008 ***	.004	.002 *			-.012	.016	.117	.152		
Leverage <sub>i, t</sub>	-.136	.077 *	.034	.020 *	-.071	.056	-.280	.159 *	.303	1.640	-.018	.186
Liquidity <sub>i, t</sub>	-.057	.019 ***	-.007	.005	.026	.013 *	-.019	.024	-.412	.277	-.042	.037
Marketing Spending <sub>i, t</sub>	.049	.112	-.010	.030	.070	.080	.098	.111	2.979	1.239 **	-.281	.171 *
Number of Estimates <sub>i, t</sub>	.021	.010 **	.003	.002			-.069	.018 ***	-.321	.186 *		
Number of Segments <sub>i, t</sub>	.009	.010	.005	.003 *	.012	.007	-.021	.017	-.257	.186	-.049	.022 **
Institutional Holding <sub>i, t</sub>	.008	.006	.000	.002	.005	.004	.017	.066	-.073	.698	-.046	.082
Industry Concentration <sub>t</sub>	-.324	.226	-.096	.059	-.079	.162	.094	.097	-1.706	1.039	.059	.141
REC <sub>t</sub>	.003	.022	-.027	.006 ***	.003	.016	-.017	.015	-1.051	.155 ***	.043	.020 **
GDP <sub>t</sub>	.001	.003	.000	.001	-.002	.002	-.010	.003 ***	.012	.028	.017	.004 ***
Trend <sub>it</sub>	.001	.003	-.004	.001 ***	.000	.002	-.005	.003	-.149	.031 ***	.007	.004
Constant	.343	.177 *	-.010	.047	-.164	.123	.930	1.991	-1.252	21.776	1.396	2.747
Chi-Square (df)	(55) = 1000.110 ***		(55) = 339.52 ***		(51) = 738.17 ***		(32) = 736.89 ***		(32) = 198.34 ***		(28) = 206.67 ***	
Hansen Test (df)	(1) = 2.834 *		(1) = 2.132		(1) = .848		(1) = .626		(1) = 1.154		(1) = .166	

Notes: Each model contains firm-specific fixed effects. Coeff = Coefficient; SE = Standard Error; BD<sub>i, t</sub> = Quantity of Backward-Looking Disclosures of Customer Metrics; FD<sub>i, t</sub> = Quantity of Forward-Looking Disclosures of Customer Metrics; DV = Dependent Variable; REC = recession dummy variable; GDP = US Gross Domestic Product Growth; df = Degrees of Freedom. \* =  $p < .10$ ; \*\* =  $p < .05$ ; \*\*\* =  $p < .01$  (1-tailed for hypothesized variables, else 2-tailed). Consistent with Muslu et al. (2015), all variables were log-transformed.

Table 8:  
SENSITIVITY ANALYSES

	Telecom			Airlines		
	$AU_{i,t+1}$	$IU_{i,t+1}$	$CF_{i,t+1}$	$AU_{i,t+1}$	$IU_{i,t+1}$	$CF_{i,t+1}$
<b>Aggregated Measure of Disclosure</b>						
(1) Total Disclosure of Customer Metrics $_{i,t}$	-.059 **	-.021 **	.025	-.011	-.160	.123 *
<b>Alternative Measures of Disclosures</b>						
<i>(2) Measured Relative to Industry Average</i>						
BD $_{i,t}$	.050	-.009	.051 **	.061	.573	-.037
FD $_{i,t}$	-.111 ***	-.012 **	-.010	-.006	-.747 *	.080 *
<i>(3) Measured as a Proportion of Industry Average</i>						
BD $_{i,t}$	.112	-.022	.129 **	-.199	1.322	.070
FD $_{i,t}$	-.160 ***	-.015 *	-.020	.013	-.231 ***	.009
<i>(4) Weighted Measure</i>						
BD $_{i,t}$	-.001	-.014 **	.039 **	.108	-.368	-.058
FD $_{i,t}$	-.109 ***	-.011 **	-.016	-.059 *	-.546 *	.099 ***
<i>(5) Scaling By Total Possible Score</i>						
BD $_{i,t}$	.067	-.029 *	.115 **	.174	.879	-.205
FD $_{i,t}$	-.067 ***	-.008 **	-.006	-.005	-.319 **	.033 ***
<i>(6) Scaling By General Disclosure</i>						
BD $_{i,t}$	.093	-.095 **	.324 **	.797	3.680	-.335
FD $_{i,t}$	-1.609 ***	-.163 *	-.468	-2.342	-37.686 **	3.706 ***
<b>Alternative Dependent Variables</b>						
<i>(7) Alternative Measure of Investors' Uncertainty</i>						
BD $_{i,t}$	.037	-.004	.043 **	.096	-.036	-.108
FD $_{i,t}$	-.122 ***	-.018 **	-.011	-.047	-.049 *	.087 **
<i>(8) Alternative Measure of Analysts' Uncertainty</i>						
BD $_{i,t}$	-.227	-.012	.037 *	.214	-.193	-.030
FD $_{i,t}$	-.655 ***	-.014 **	-.008	-.385	-.492 *	.097 ***
<i>(9) Using ROA to Measure Financial Performance</i>						
BD $_{i,t}$	.019	-.015 *	.035 *	.055	-.053	.042
FD $_{i,t}$	-.124 ***	-.014 **	.008	-.021	-.649 *	.087 **

$AU_{i,t+1}$  = Analysts' Uncertainty for firm  $i$  at time  $t+1$ ;  $IU_{i,t+1}$  = Investors' Uncertainty for firm  $i$  at time  $t+1$ ;  $CF_{i,t+1}$  = Cash-flows of firm  $i$  at time  $t+1$ ;  $BD_{i,t}$  = Quantity of Backward-Looking Disclosures of Customer Metrics;  $FD_{i,t}$  = Quantity of Forward-Looking Disclosures of Customer Metrics; \* =  $p < .10$ ; \*\* =  $p < .05$ ; \*\*\* =  $p < .01$  (1-tailed).

Table 8 (Cntd):  
SENSITIVITY ANALYSES

	Telecom			Airlines		
	$AU_{i,t+1}$	$IU_{i,t+1}$	$CF_{i,t+1}$	$AU_{i,t+1}$	$IU_{i,t+1}$	$CF_{i,t+1}$
<b>Using Alternative Instruments</b>						
<b>(10) Removing CMO as an Instrument</b>						
BD <sub>i,t</sub>	.027	-.014 *	.050 **	-2.121	2.910	-.183
FD <sub>i,t</sub>	-.101 ***	-.013 **	-.021	.979	-1.910 **	.128 ***
<b>(11) Replacing CMO by Industry Averages</b>						
BD <sub>i,t</sub>	.027	-.009	.047 **	-2.890 *	1.432	-.144
FD <sub>i,t</sub>	-.087 ***	-.015 **	-.027	1.306	-1.615 **	.129 ***
<b>(12) Using ONLY CMO &amp; Industry Averages</b>						
BD <sub>i,t</sub>	-.057	.084	-.054	.011	-1.084	.092
FD <sub>i,t</sub>	-.155 ***	-.049 **	-.007	-.148 **	-2.799 **	.140 ***
<b>Using Additional Controls</b>						
<b>(13) Including CEO Turnover</b>						
BD <sub>i,t</sub>	.020	-.014 *	.053 **	.079	.159	-.070
FD <sub>i,t</sub>	-.124 ***	-.014 **	-.015	-.040	-.811 **	.100 ***
<b>(14) Including 10-K Abnormal Returns</b>						
BD <sub>i,t</sub>	.023	-.009	.040 *	.067	-.106	-.074
FD <sub>i,t</sub>	-.134 ***	-.021 ***	-.005	-.026	-.533 *	.082 **
<b>(15) Excluding the Lagged DVs</b>						
BD <sub>i,t</sub>	.034	-.010	.059 **	.002	-.122	-.039
FD <sub>i,t</sub>	-.108 ***	-.011 *	.006	.027	-.742 *	.095 ***
<b>(16) Using ROA as an Additional Control Variable for Cash-flows Model</b>						
BD <sub>i,t</sub>	.021	-.014 *	.051 **	.055	-.018	-.031
FD <sub>i,t</sub>	-.125 ***	-.015 **	-.011	-.033	-.786 **	.092 ***
<b>(17) Removing Outliers</b>						
BD <sub>i,t</sub>	-.009	-.019 **	.053 **	.066	.041	-.052
FD <sub>i,t</sub>	-.146 ***	-.024 ***	-.013	-.034	-.687 *	.110 ***
<b>(18) Controlling for Tone of Disclosure of Customer Metrics</b>						
BD <sub>i,t</sub>	.020	-.014 *	.050 **	.079	-.131	.009
FD <sub>i,t</sub>	-.118 ***	-.011 *	-.008	-.020	-.794 **	.105 ***

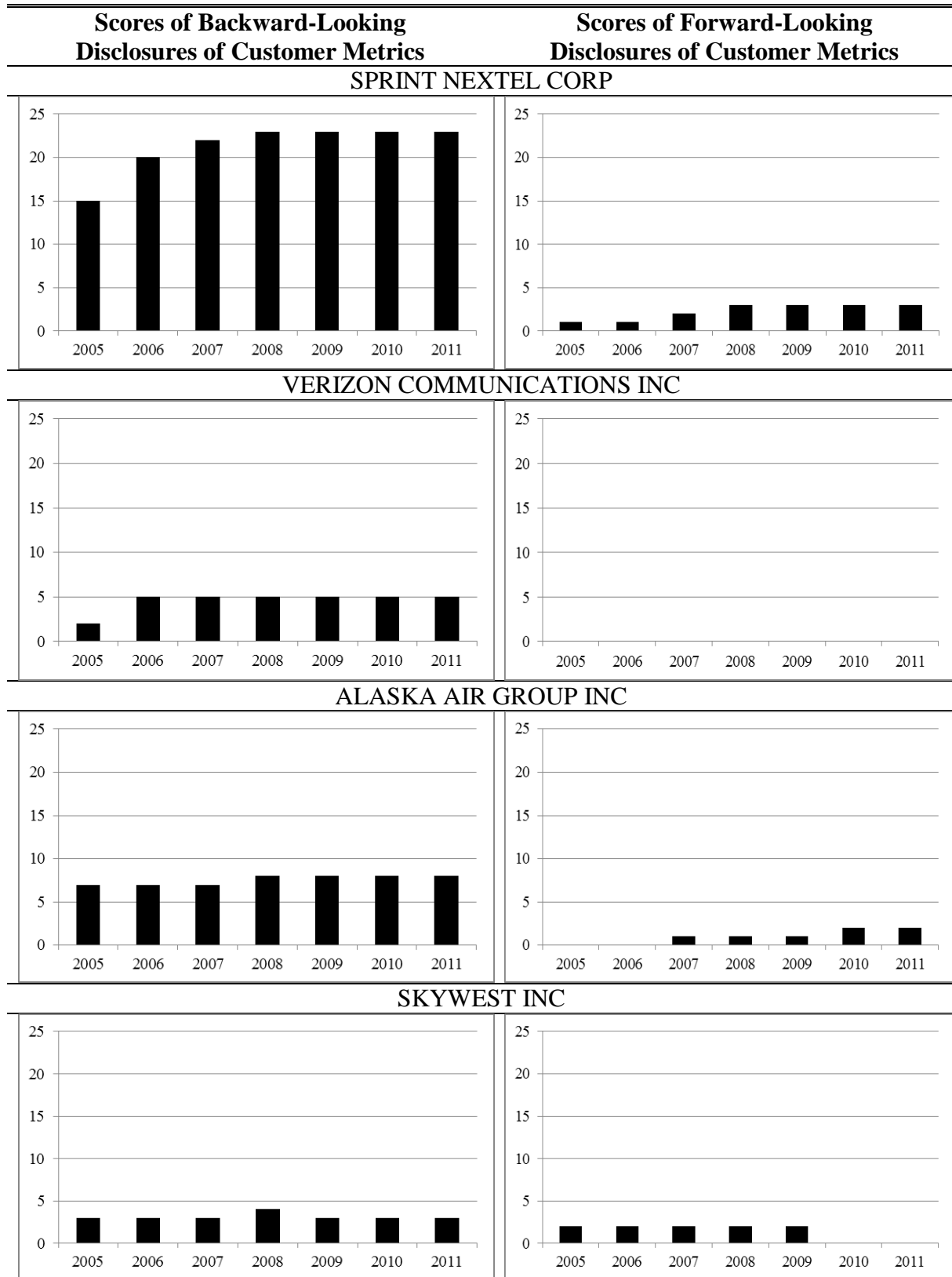
$AU_{i,t+1}$  = Analysts' Uncertainty for firm i at time t+1;  $IU_{i,t+1}$  = Investors' Uncertainty for firm i at time t+1;  $CF_{i,t+1}$  = Cash-flows of firm i at time t+1;  $BD_{i,t}$  = Quantity of Backward-Looking Disclosures of Customer Metrics;  $FD_{i,t}$  = Quantity of Forward-Looking Disclosures of Customer Metrics; \* = p < .10; \*\* = p < .05; \*\*\* = p < .01 (1-tailed).

Table 9  
SPLITTING FORWARD-LOOKING DISCLOSURES OF CUSTOMER METRICS INTO FIRM ACTIONS & CUSTOMER OUTCOMES

	Telecom (n = 192)						Airlines (n = 95)					
	Analysts' Uncertainty <sub>i, t+1</sub>		Investors' Uncertainty <sub>i, t+1</sub>		Cash-flows <sub>i, t+1</sub>		Analysts' Uncertainty <sub>i, t+1</sub>		Investors' Uncertainty <sub>i, t+1</sub>		Cash-flows <sub>i, t+1</sub>	
	Coeff	S.E.	Coeff	S.E.	Coeff	S.E.	Coeff	S.E.	Coeff	S.E.	Coeff	S.E.
<i>Forward-Looking Disclosures</i>												
Firm-Actions <sub>i, t</sub>	-.147	.130	.005	.027	.025	.063	.004	.067	.266	.713	.043	.084
Customer-Outcomes <sub>i, t</sub>	-.083	.035 ***	-.015	.007 **	-.010	.019	-.132	.100 *	-2.365	.848 ***	.129	.060 **
<i>Control Variables</i>												
BD <sub>i, t</sub>	.022	.043	-.015	.010	.043	.026 *	.086	.073	-.958	.810	-.007	.087
DV <sub>i, t</sub>	.149	.096	-.102	.093	.308	.078 ***	.625	.156 ***	-.036	.131	.156	.130
General Disclosure <sub>i, t</sub>	.101	.084	.025	.018	.063	.048	.068	.362	-1.974	3.518	-.129	.413
Earnings Surprise <sub>i, t</sub>	-.025	.024	-.013	.005 ***			-.085	.028 ***	.648	.313 **		
Cash-flows <sub>i, t</sub>	-.512	.127 ***	-.010	.028			-.397	.107 ***	-3.496	1.085 ***		
Volatility <sub>i, t</sub>	.318	.120 ***	.058	.030 *	.039	.068	.009	.011	.257	.133 *	-.017	.015
Size <sub>i, t</sub>	-.047	.011 ***	.003	.002			.007	.021	.358	.180 **		
Leverage <sub>i, t</sub>	-.133	.102	.041	.023 *	-.051	.062	-.154	.138	.472	1.387	.063	.150
Liquidity <sub>i, t</sub>	-.068	.025 ***	-.007	.006	.025	.014 *	-.041	.037	-.894	.396 **	-.030	.044
Marketing Spending <sub>i, t</sub>	.118	.209	-.029	.045	.028	.104	.202	.163	5.361	1.792 ***	-.359	.202 *
Number of Estimates <sub>i, t</sub>	.025	.013 **	.002	.003			-.066	.019 ***	-.416	.207 **		
Number of Segments <sub>i, t</sub>	.003	.017	.007	.004 *	.014	.009	-.006	.015	-.189	.164	-.050	.020 **
Institutional Holding <sub>i, t</sub>	.001	.009	.001	.002	.006	.005	.005	.071	.386	.773	-.083	.087
Industry Concentration <sub>t</sub>	-.434	.329	-.086	.073	-.025	.187	.162	.108	-.907	1.191	.057	.148
REC <sub>t</sub>	.009	.028	-.028	.006 ***	.003	.016	-.026	.019	-1.165	.185 ***	.044	.021 **
GDP <sub>t</sub>	.001	.004	.000	.001	-.002	.002	-.011	.003 ***	-.002	.032	.017	.004 ***
Trend <sub>it</sub>	.002	.004	-.003	.001 ***	.000	.003	-.007	.003 **	-.157	.033 ***	.007	.004
Constant	.314	.229	-.029	.050	-.200	.139	-.129	1.556	8.827	15.660	.575	1.794
Chi-Square (df)	(56) = 669.45 ***		(56) = 325.14 ***		(52) = 702.48 ***		(33) = 552.81 ***		(33) = 148.86 ***		(29) = 194.34 ***	
Hansen Test (df)	(1) = 1.706		(1) = 1.171		(1) = .024		(1) = 1.176		(1) = .361		(1) = .200	

Notes: Each model contains firm-specific fixed effects. Coeff = Coefficient; SE = Standard Error; BD<sub>i,t</sub> = Quantity of Backward-Looking Disclosures of Customer Metrics; DV = Dependent Variable; REC = recession dummy variable; GDP = US Gross Domestic Product Growth; df = Degrees of Freedom. \* =  $p < .10$ ; \*\* =  $p < .05$ ; \*\*\* =  $p < .01$  (1-tailed for hypothesized variables, else 2-tailed). Consistent with Muslu et al. (2015), all variables were log-transformed.

Figure 1  
 EXAMPLES OF DISCLOSURE BEHAVIOR OF FIRMS OVER TIME



# Do Disclosures of Customer Metrics Lower Investors' and Analysts' Uncertainty, But Hurt Firm Performance?

Emanuel Bayer, Kapil R. Tuli, and Bernd Skiera

## WEB APPENDIX A FIRMS USED IN THE STUDY<sup>+</sup>

Telecommunications				Airlines	
Firm	n	Firm	n	Firm	n
Alamosa Holdings, Inc.	5	Leap Wireless International, Inc.*	8	AirTran Holdings, Inc.	10
Alaska Communications Systems Group, Inc.	13	Level 3 Communications, Inc.	14	Alaska Air Group Inc.	17
Asia Global Crossing Ltd.*	1	MCI, Inc.*	1	Allegiant Travel Co.	5
A&T, Inc.	18	McLeodUSA, Inc.	6	Atlantic Southeast Airlines	4
Bellsouth Corp.	12	MetroPCS Communications, Inc.	5	Continental Airlines, Inc.	13
Boston Communications Group, Inc.	10	Network Plus Corp.*	2	Delta Air Lines, Inc.	9
CenturyLink, Inc.	18	NII Holdings, Inc.	9	ExpressJet Holdings	7
Cincinnati Bell, Inc.	9	North Pittsburgh Systems, Inc.*	4	Great Lakes Aviation, Ltd.*	2
Cogent Communications Group, Inc.	6	NTELOS Holdings Corp.	6	Hawaiian Holdings, Inc.	7
Commonwealth Telephone Enterprises, Inc.	10	OmniSky Corp.*	1	JetBlue Airways Corp.	9
Consolidated Communications Holding, Inc.	7	Pacific Gateway Exchange, Inc.	4	Midwest Air Group, Inc	11
Covad Communications Group, Inc.	3	Paging Network, Inc.	4	Northwest Airlines Corp.*	1
CT Communications, Inc.	8	Rural Cellular Corp.	12	Reno Air, Inc*	2
Cypress Communications, Inc.*	1	Shared Technologies Cellular, Inc.*	2	Republic Airways Inc.	8
Dobson Communications Corp.	8	Shenandoah Telecom Corp.	10	SkyWest, Inc.	11
Elephant Talk Communications, Inc.*	1	Sprint Nextel Corp.	7	Southwest Airlines Co.	15
Embarq Corp.	3	Star Telecommunications, Inc.	3	United Inc.	9
FairPoint Communications, Inc.	8	Talk America Holdings, Inc.	10	US Airways Group Inc.	6
FiberNet Telecom Group, Inc.*	8	Telephone and Data Systems, Inc.	18		
Firstcom Corp.*	1	TW Telecom, Inc.	4		
Frontier Communications Corp.	4	UbiquiTel, Inc.	5		
Global Crossing Ltd.*	7	US LEC Corp.	8		
Hawaiian Telcom Holdco, Inc.*	1	US Unwired, Inc.	5		
HickoryTech Corp.	14	USA Mobility, Inc.*	4		
Illuminet Holdings, Inc.*	2	USCI, Inc.*	3		
Intermedia Communications, Inc.	5	Verizon Communications, Inc.	12		
Iowa Telecommunications Services, Inc.	6	Virgin Mobile USA, Inc.*	2		
ITXC Corp.	5	World Access, Inc.*	2		
<b>Total</b>			<b>365</b>	<b>Total</b>	<b>146</b>

<sup>+</sup>This table outlines all firms for which annual reports were available at [www.sec.gov](http://www.sec.gov). As such, we were able to measure backward- and forward-looking disclosures of customer metrics for each of these firms. However, to estimate the 3SLS model for testing the hypotheses we required (a) at least 3 years of firm-year data, and (b) the firms to be covered at least for 3 years in COMPUSTAT, CRSP, and IBES. As a result, firms marked with \* were not used in the empirical model because they could not fulfill the requirements of either (a) or (b).

**WEB APPENDIX B**  
**CONTROLLING FOR GENERAL FINANCIAL DISCLOSURES**

To control for the overall openness of a firm's disclosure policy, we coded general disclosures, captured in the general disclosure score ( $GD_{i,t}$ ). Following Botosan (1997) and Jones (2007), the general disclosure score reflected the American Institute of Certified Public Accountants' (AICPA) Jenkins Committee Report (1994), which contains reports on a study on the information needs of investors and creditors when they attempt to value firms. The general disclosure score thus comprises several subcategories: management and shareholders, background information, financial and nonfinancial data, financial data over multiple years, and management's analysis of financial and nonfinancial data. In line with Jones (2007), we award 2 points for disclosures made for the whole firm or at least segments comprising 75% of a firm's sales. For disclosures about segments comprising less than 75% of a firm's sales, we award 1 point. The complete list of items constituting the subcategories of the general disclosure score appears in the following table:

<i>Management and Shareholders</i>	<i>Financial Data – Multiple Years of Information</i>
Major shareholders	Return on assets or sufficient information to compute return
Executive management	Net profit margin or sufficient information to compute net
Transactions with related parties	Asset turnover or sufficient information to compute asset
<i>Background Information</i>	Return on equity or sufficient information to compute return
Statement of corporate goals or objectives	Summary of sales and net income for most recent eight
Barriers to entry discussed	Separation of unusual or non-recurring items
Competitive environment	<i>Management's Analysis</i>
Description of industry including technological and regulatory en-	Change in sales
General description of business	Change in operating income
Business risks and how/if those risks are hedged	Change in cost of goods sold
<i>Financial and Non-financial Data</i>	Change in gross profit
Principle products	Change in selling and administrative expenses
Description of process used to make product including key inputs	Change in interest expense
Principle markets	Change in interest income
Location, nature, and extent of use of property and equipment	Change in net income
Planned capital expenditures	Change in inventory
Number of employees	Change in accounts receivable
Average compensation per employee	Change in capital expenditures
Volume and prices of materials	Change in market share
Time to produce or deliver goods	Change in liquidity and financial flexibility
Changes in rate of production	Discussion of trends affecting liquidity
Order backlog	Identification of funding sources
Percentage of sales in products designed in last five years	Comparison of current performance to previously discussed
Market share	Discussion of opportunities and risks associated with key
Units sold	General expectation about coming year results
Unit selling price	
Growth in units sold	
Employee satisfaction and/or relations with union	
R&D spending	
Research in progress	
Development-stage of R&D projects	

## WEB APPENDIX C

We first determine the average number of reversals across all customer metrics between two fiscal years for each firm separately. Then, we calculate the average number of reversals between two fiscal years and across all customer metrics per firm. Finally, we divide this number by the total number of customer metrics (= 34), to yield the average share of actually implemented reversals out of all possible reversals in disclosures of customer metrics between two fiscal years and per firm. Formally,

$$(W1) \quad CS^{BD} = \frac{\sum_{i \in I} \frac{\sum_{t \in T_i \setminus \{t_{\max_i}\}} \sum_{c \in C} |v_{ict+1}^{BD} - v_{ict}^{BD}|}{(T_i' - 1)}}{C' \times I'}, \text{ and}$$

$$(W2) \quad CS^{FD} = \frac{\sum_{i \in I} \frac{\sum_{t \in T_i \setminus \{t_{\max_i}\}} \sum_{c \in C} |v_{ict+1}^{FD} - v_{ict}^{FD}|}{(T_i' - 1)}}{C' \times I'}.$$

where:

- $CS^{BD}$  = Consistency Score of backward-looking disclosures of customer metrics,
- $CS^{FD}$  = Consistency Score of forward-looking disclosures of customer metrics,
- $v_{ict}^{BD}$  = Binary variable that reflects if firm  $i$  discloses backward-looking information about customer metric  $c$  in year  $t$ ,
- $v_{ict}^{FD}$  = Binary variable that reflects if firm  $i$  discloses forward-looking information about customer metric  $c$  in year  $t$ ,
- $I$  = Index set of firms,
- $C$  = Index set of customer metrics,
- $T_i$  = Index set of years that are available for firm  $i$ ,
- $t_{\max_i}$  = Highest year in index set  $T$  of firm  $i$ ,
- $I'$  = Number of elements in  $I$ , i.e., number of firms,
- $C'$  = Number of elements in  $C$ , i.e., number of customer metrics,
- $T_i'$  = Number of elements in  $T_i$ , i.e. number of years that are available for firm  $i$ .



WEB APPENDIX D  
FIRST STAGE RESULTS

	Telecom (n = 192)						Airlines (n = 95)					
	BD <sub>i,t</sub>		FD <sub>i,t</sub>		General Disclosure <sub>i,t</sub>		BD <sub>i,t</sub>		FD <sub>i,t</sub>		General Disclosure <sub>i,t</sub>	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
<i>Exclusion Restrictions</i>												
CMO <sub>i,t</sub>	.01	.05	.15	.08 **	-.03	.03	.12	.04 ***	-.05	.09	.00	.01
BD <sub>i,t-1</sub>	.60	.07 ***	.00	.12	.02	.05	.17	.10 *	.42	.24 **	-.01	.03
FD <sub>i,t-1</sub>	-.01	.05	.44	.08 ***	.07	.03 **	.16	.06 ***	.18	.14 *	.00	.01
General Disclosure <sub>i,t-1</sub>	.22	.10 **	-.10	.16	.39	.06 ***	-.83	.48 **	.21	1.11	.32	.12 ***
<i>Other Controls</i>												
Analysts' Uncertainty <sub>i,t</sub>	.01	.27	.77	.44 *	.02	.17	-.20	.40	.76	.93	.00	.10
Investor' Uncertainty <sub>i,t</sub>	-2.17	1.31	-1.90	2.17	-.06	.83	.03	.04	.05	.09	.00	.01
Cash-flows <sub>i,t</sub>	-.41	.37	-.25	.62	.23	.24	-.19	.29	-.44	.67	-.12	.07 *
Earnings Surprise <sub>i,t</sub>	.00	.07	-.11	.12	.02	.05	.16	.08 **	.22	.18	-.01	.02
Volatility <sub>i,t</sub>	-.13	.39	.76	.64	.35	.24	.01	.04	.04	.10	.00	.01
Size <sub>i,t</sub>	.02	.03	.03	.05	.01	.02	-.01	.04	.24	.09 ***	-.01	.01
Leverage <sub>i,t</sub>	.34	.28	-.34	.46	.19	.18	-1.00	.32 ***	1.54	.75 **	-.16	.08 **
Liquidity <sub>i,t</sub>	-.16	.06 **	-.08	.11	-.02	.04	.03	.10	-.11	.22	-.01	.02
Marketing Spending <sub>i,t</sub>	-.28	.34	.77	.56	.85	.21 ***	.00	.45	.18	1.04	-.02	.11
Number of Estimates <sub>i,t</sub>	.00	.04	.01	.06	.03	.02	.07	.07	.11	.16	-.01	.02
Number of Segments <sub>i,t</sub>	-.03	.03	-.04	.06	-.07	.02 ***	-.03	.04	.03	.10	-.02	.01 **
Institutional Holding <sub>i,t</sub>	.01	.02	.01	.04	-.02	.01	.41	.22 *	-.55	.52	-.01	.05
Industry Concentration <sub>t</sub>	.70	.80	-1.52	1.32	.54	.51	-.33	.35	.57	.82	-.02	.09
pre2008 <sub>t</sub>	.03	.08	-.11	.13	.06	.05	-.02	.05	-.17	.11	.00	.01
GDP <sub>t</sub>	.01	.01	.02	.02	.00	.01	.01	.01	-.03	.02	.00	.00
Trend <sub>it</sub>	.00	.01	-.02	.02	.00	.01	.01	.01	-.01	.02	.00	.00
Constant	-.29	.50	.36	.83	1.34	.32 ***	5.05	2.05 **	-2.92	4.74	3.03	.50 ***
<i>Fit Statistics</i>												
F-Stat	(57, 134) = 31.28 ***		(57, 134) = 19.65 ***		(57, 134) = 38.54 ***		(34, 60) = 53.13 ***		(34, 60) = 1.23 ***		(34, 60) = 106.80 ***	
Adj R-Square	.90		.85		.92		.95		.77		.98	

Notes: Each model contains firm-specific fixed effects. Coeff = Coefficient; SE = Standard Error; CMO<sub>i,t</sub> = Chief Marketing Officer Presence for firm 'i' at year 't' (=1 if the firm has a Chief Marketing Officer, else =0); BD<sub>i,t</sub> = Quantity of Backward-Looking Disclosures of Customer Metrics; FD<sub>i,t</sub> = Quantity of Forward-Looking Disclosures of Customer Metrics; \* =  $p < .10$ ; \*\* =  $p < .05$ ; \*\*\* =  $p < .01$  (1-tailed for hypothesized variables, else 2-tailed). Consistent with Muslu et al. (2015), all variables were log-transformed.

WEB APPENDIX E  
 FORWARD-LOOKING DISCLOSURES OF CUSTOMER METRICS:  
 CONSIDERING FIRM ACTIONS AND CUSTOMER OUTCOMES SEPERATELY

	<i>Telecommunications Industry</i>	<i>Airlines Industry</i>
<i>Firm Actions</i>	Marketing Spending Perceived Quality Customer Retention Costs Cross Selling Rate Advertising Spending Customer Acquisition Costs Customer Segments	Marketing Spending Perceived Quality Customer Retention Costs Customer Segments
<i>Customer Outcomes</i>	Customer Satisfaction Brand Equity Customer Loyalty Customer Base Customers Acquired Customer Retention Rate Major Customers Major Contracts Customers Lost Customer Profitability Average Revenue Per User Word of Mouth Customer Equity Commitment Awareness Knowledge Attention Perceived Value	Customer Satisfaction Brand Equity Customer Loyalty Customer Base Customers Acquired Customer Retention Rate Major Customers Major Contracts