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Determinants and Consequences of Management Forecasts of Key Performance Indicators: Evidence from the Airline Industry

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Determinants and Consequences of Management Forecasts of Key Performance Indicators: Evidence from the Airline Industry

A Dissertation Presented for the

Doctor of Philosophy Degree

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Andrew J. Doucet

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Abstract

In this study, I examine the determinants and consequences of quarterly management guidance of key performance indicators (KPIs). I use a novel dataset of 457 firm-quarter observations in the airline industry and hand-collect information on the existence and properties of quarterly KPI guidance. Specifically, I collect data on quarterly KPI guidance for three KPIs used in airline the industry: available seat miles, revenue per available seat mile, and cost per available seat mile. Consistent with managers using quarterly KPI guidance to reduce analyst uncertainty, I find that managers are more likely to provide quarterly KPI guidance when initial analyst earnings per share (EPS) forecasts errors are large. I also find that firms with high analyst following, high growth prospects, and low financial performance are more likely to provide quarterly KPI guidance. I next examine whether quarterly KPI guidance is associated with improvements analyst EPS forecasts and find that quarterly KPI guidance is associated with reductions in analyst EPS forecast errors which results in more accurate analyst estimates of EPS at the end of the quarter. Together, these results demonstrate that quarterly KPI guidance is an alternative form of guidance that managers can use to reduce information asymmetry with analysts by providing forward-looking information about the underlying operations of the firm.

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1. Introduction

Earnings guidance is one of the primary ways that managers convey information about future firm performance to shareholders. However, there has been considerable debate on whether managers should provide quarterly earnings guidance to investors. Proponents of quarterly earnings guidance argue that guidance is useful because it allows managers to improve investors' ability to predict future earnings, increases analyst following, and decreases the risk of litigation.[1] In contrast, critics argue that quarterly earnings guidance is costly to produce, promotes managerial myopia.[2] Although prior research finds evidence in support of both arguments, in practice, many firms are doing away with this disclosure.[3] While the provision of quarterly earnings guidance has declined, management guidance for key performance indicators (KPIs) has increased considerably.[4] Unlike financial performance measures, KPIs incorporate information about firm performance that is unique to the operations of the firm such as subscriber growth in the entertainment service industry and available seat miles in the airline industry.

While firms are increasing their guidance on KPIs, it is not clear whether quarterly KPI guidance influences expectations about future financial performance. Thus, in this study, I investigate an alternative mechanism through which managers can provide forward-looking information about future financial performance to market participants, quarterly KPI guidance.

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[1] See *The Case for Guidance* by Baruch Lev in the Wall Street Journal. Available at: https://www.wsj.com/articles/SB10001424052970203391104577124243623258110

[2] For example, in a Wall Street Journal editorial written in 2018, Warren Buffett and Jamie Dimon state "we are encouraging all public companies to consider moving away from providing quarterly earnings-per-share guidance. In our experience, quarterly earnings guidance often leads to an unhealthy focus on short-term profits at the expense of long-term strategy, growth and sustainability." *Short-Termism is Harming the Economy* available at: https://www.wsj.com/articles/short-termism-is-harming-the-economy-1528336801?ns=prod/accounts-wsj

[3] The percentage of firms in the S&P 500 providing quarterly EPS guidance dropped from 36% in 2010 to 27.8% in 2016. See *Moving Beyond Quarterly Guidance: A Relic of the Past* available at: https://www.fcltglobal.org/docs/default-source/publications/moving-past-quarterly-guidance---a-relic-of-the-past.pdf?sfvrsn=77a9268c_2

[4] I find the percentage of firms that provide quarter KPI guidance in the airline industry increased from 41% of firms in 2008 to 98% of firms in 2017.

Specifically, I examine the determinants of quarterly KPI guidance and whether KPI guidance is associated with improvements in analyst estimates of earnings in the airline industry.

Historically, KPIs were used solely for internal performance evaluation, however, public disclosure of KPIs is becoming more prevalent. For example, former SEC Commissioner Kara M. Stein states that "Alternative measures—such as non-GAAP metrics and KPIs—that were once used sparingly, now appear in a host of documents and situations, including roadshows, analyst meetings, and quarterly earnings calls."[5] In addition to the increasing use of KPIs in firm filings, managers are also starting to provide guidance on KPIs along with, or in the place of, earnings guidance. For example, in the airline industry, management KPI guidance is discussed in earnings reports alongside financial measures in both firm filings and press coverage.[6] In order to examine why firms are increasingly providing quarterly KPI guidance, I first examine the determinants of quarterly KPI guidance.

Next, I examine the consequences of firms providing quarterly KPI guidance. Specifically, I first examine whether management guidance is associated with analyst *earnings* forecasts errors. There are several reasons why quarterly KPI guidance would be useful for analysts forecasting earnings. First, prior research provides evidence that analysts incorporate information from management guidance of earnings into their earnings estimates (e.g., Waymire 1986; Baginsky and Hassell 1990; and Williams 1996). While quarterly KPI guidance does not directly provide analysts with management's expectations of realized earnings, it does provide them with management's expectations about the underlying operations of the firm that contributes to their

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[5] Available at https://www.sec.gov/news/speech/speech-stein-102318
[6] For example, in their coverage of United Airlines Holding's 3rd quarter earnings announcement, CNBC reported that "Revenue per available seat mile, a key industry metric that measures how much an airline is earning for each seat it flies a mile, rose 1.7%, in line with United's forecast over the summer. United expects this metric to rise no more than 2% in the fourth quarter." Available at https://www.cnbc.com/2019/10/15/united-airlines-q3-2019-earnings.html

ability to generate future earnings. Second, prior research shows that management has an information advantage over analysts when performance resides at the firm level (Hutton et al. 2012). Because KPIs are specific measures idiosyncratic to the firm or industry, managers should be able to form more accurate predictions of future realizations of KPIs in their quarterly KPI guidance. Third, prior literature finds that periodically reported KPIs are both value relevant to investors and useful for predicting future financial performance, which provides evidence that periodically reported KPIs provide incremental information about the underlying operations of the firm that is useful for market participants (e.g., Amir and Lev 1996; Behn and Riley 1999; Riley et al. 2003). Thus, to the degree that KPI guidance is an accurate representation of future operations, KPI guidance should influence analysts' expectations about future earnings. Finally, Givoly et al. (2019) examine *analyst* forecasts of KPIs and find that analysts revise their forecasts of earnings when periodically reported KPIs exceed analyst estimates.[7] This result provides some evidence that analysts incorporate information about realized values of KPIs in their estimates of earnings.

However, there are also reasons why quarterly KPI guidance may not be useful for analysts. First, despite prior research documenting the value relevance and predictive ability of KPIs, both investors and regulators have concerns that the subjective nature of KPIs may render them of little use or may even mislead investors in their evaluation of firm performance.[8] Because managers may have greater discretion in their measurement of reported KPIs in both guidance and periodic reports, inconsistent measurement of KPIs could limit the usefulness of quarterly KPI guidance to analysts. Second, while managers' information about operations provides them with an

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[7] Givoly et al. (2019) use publicly available data on analyst estimates of KPIs across the four most covered industries: airline, oil and gas, retail, and pharmaceutical firms.

[8] See *The Pitfalls of Non-GAAP Metrics* available at: https://sloanreview.mit.edu/article/the-pitfalls-of-non-gaap-metrics/

information advantage in forecasting KPIs, prior research documents that managers also have incentives to provide inaccurate or misleading guidance (e.g., Rogers and Stocken 2005). Thus, whether quarterly KPI guidance improves analysts' forecasts of earnings is an empirical question.

To examine the determinants of quarterly KPI guidance and whether quarterly KPI guidance improves analyst forecasts of earnings, I use a sample of 457 firm-quarter observations from 2008 through 2017 in the airline industry. I focus on the airline industry because unlike other industries where the decision to report periodic KPIs is voluntary, firms in the airline industry are required to provide periodic reports of actual KPIs to regulators and market participants. Thus, this setting allows me to investigate a manager's decision to provide quarterly KPI *guidance* in a setting that holds constant their decision to provide periodic reports of KPIs. In addition, the airline industry is historically difficult to evaluate due because firm performance is often both seasonal and volatile, thus, market participants are likely to benefit from increased disclosure. I identify three prominent KPIs reported in the airline industry: available seat miles (ASM), revenue per available seat mile (RASM), and costs per available seat mile (CASM). ASM are measured as the number of seats available for sale multiplied by the number of miles flown, thus, ASM provides a measure of an airline's capacity. RASM is measured as total revenues scaled by ASM and provides a measure of unit revenues while CASM is measured as total costs excluding fuel scaled by ASM which provides a measure of unit costs.[9] To construct a measure of KPI guidance for each firm-quarter observation, I hand collect quarterly KPI guidance from firm filings reported on the Security and Exchange Comission's (SEC) EDGAR website and find that 298 or 65% of firms provide quarterly KPI guidance for at least one KPI in my sample. In addition, I find that disclosure

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[9] Firms provide periodic disclosures of CASM both including fuel costs and excluding fuel costs (CASM ex-fuel). However, because fuel costs are difficult for managers to predict, managers often only provide guidance for CASM ex-fuel so I focus on CASM ex-fuel and refer to this measure as CASM throughout the manuscript. In addition, all firms in my sample that provide guidance on CASM including fuel also provide guidance for CASM ex-fuel.

of quarterly KPI guidance is increasing significantly over my sample from 41% of firms providing quarterly KPI guidance in 2008 up to 98% in 2017.

I first examine determinants of quarterly KPI guidance and determinants using two outcomes: the probability of providing quarterly guidance for at least one KPI (i.e., ASM, RASM, or CASM) and the number of KPIs that a firm provides. I find that firms are more likely to provide quarterly guidance for at least one KPI when they are smaller, experiencing low growth, and have higher analyst following. In addition, I find that firms are more likely to provide KPI guidance and provide for firms when initial analyst EPS forecast errors are large, which provides some evidence that managers provide guidance on KPIs when analyst uncertainty is high.

I next examine whether there is a reduction in analyst forecast errors for firms that provide quarterly KPI guidance. To test this, I measure the change in analyst earnings forecast errors as the difference between the absolute value of the last consensus analyst EPS forecast error prior to the end of the fiscal quarter and the absolute value initial consensus analyst EPS forecast error earnings forecast.[10] Consistent with quarterly KPI guidance providing useful information to analysts for estimating future financial performance, I find a larger reduction in analyst forecast errors for firm-quarters when management provides quarterly KPI guidance relative to firm-quarters without quarterly KPI guidance. Although this test allows me to examine whether firms that provide quarterly KPI guidance experience larger reductions in analyst EPS forecast errors, because managers are more likely to provide quarterly KPI guidance when initial analyst EPS forecast errors are large, it is not clear whether this reduction results in more accurate analyst

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[10] In my sample, all quarterly KPI guidance is announced after the initial consensus analyst EPS forecasts are made and before the last consensus analyst EPS forecasts are made.

forecasts of EPS at the end of the period.[11] Thus, I next test whether quarterly KPI guidance is associated with lower analyst EPS forecast errors at the end of the quarter and find a negative association between quarterly KPI guidance and analyst EPS forecast errors at the end of the period. Together, these results provide evidence that analyst EPS forecasts improve following quarterly KPI guidance and this improvement leads to more accurate analyst EPS forecasts at the end of the fiscal quarter.

I perform two additional tests to examine whether the properties of quarterly KPI guidance impact the association between quarterly KPI guidance and analyst EPS forecast errors. First, I examine whether the association between quarterly KPI guidance and analyst forecasts errors is more pronounced when managers provide quarterly KPI guidance alongside quarterly earnings guidance (i.e., bundled guidance) relative to firms that provide stand-alone KPI guidance. I find both bundled quarterly KPI guidance and stand-alone quarterly KPI guidance are associated with larger reductions in analyst forecast errors relative to firm-quarters without quarterly KPI guidance, however, I do not find evidence that bundled KPI guidance is associated with a larger reduction relative to stand-alone KPI guidance. In contrast, I do find evidence that analyst EPS forecast errors at the end of the quarter are lower for firms with bundled forecasts relative to firms that provide stand-alone quarterly guidance and analyst EPS forecast errors at the end of the quarter are lower for both forms of quarterly KPI guidance relative to firms that do not disclose quarterly KPI guidance.

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[11] For example, if average absolute analyst EPS forecast errors for firms that provide a quarterly KPI forecast are initially 15% of share price and are revised to 10% of share price by the end of the quarter while absolute analyst EPS forecast errors for firms that do not provide quarterly KPI forecasts are initially 10% of share price and are revised to 8% of share price by the end of the quarter, I would observe a larger reduction in analyst forecast errors for quarterly KPI guidance firms, however, the final analyst estimate would still be more accurate for firms that do not provide quarterly KPI guidance.

Second, I examine whether the association between quarterly KPI guidance and analyst forecast errors varies when managers forecast point estimates of KPIs in quarterly KPI guidance relative to range forecasts of KPIs in quarterly KPI guidance. I find no difference in analyst EPS forecast errors between the point and range KPI guidance, however, both forms of KPI guidance exhibit larger reductions in analyst EPS forecast errors and lower analyst EPS forecast errors prior to the end of the quarter relative to firms that do not provide quarterly KPI guidance.

This study contributes to the literature examining voluntary disclosure and, more specifically, to the literature examining management guidance. To date, research on management guidance has primarily focused on quarterly and annual guidance of earnings.[12] In contrast, this study focuses on an alternative form of guidance: quarterly KPI guidance and provides evidence that analyst earnings forecasts are more accurate in quarters when management provides quarterly KPI guidance. In addition, this study contributes to the debate on the value relevance of KPI in evaluating firm performance because, unlike prior studies which focus primarily on periodic reporting of KPIs (e.g., Amir and Lev 1996; Behn and Riley 1999; Hughes 2000; Rajgopal et al. 2003; Riley et al. 2003), my results provide evidence that managers may be able to use quarterly KPI guidance as a mechanism to reduce information asymmetry between insiders and analysts. Finally, given the proliferation of firms providing guidance on KPIs, my findings should be of interest to investors who follow firms that provide quarterly KPI guidance and regulators who are evaluating the relative costs and benefits of supplementing financial information with KPIs in financial statements.

The remainder of this paper is organized as follows: Section II discusses prior literature and develops my expectations. Section III describes my sample selection and variable

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[12] See Hirst et al. (2008) for a review of the management earnings guidance literature.

measurement, Section IV describes my research design, Section V discusses my empirical results, and Section IV provides a summary and conclusion.

2. Prior Literature and Development of Expectations

Determinants of Quarterly KPI Guidance

Following the release of a report by the CFA Institute and Business Roundtable Institute arguing that quarterly earnings guidance leads to managerial myopia and with continued pressure from investors and consultants to reduce quarterly earnings guidance, many firms are abandoning the practice of providing quarterly earnings guidance to market particiapnts (CFA Institute 2006). However, while quarterly *earnings* guidance is in decline, more firms are beginning to provide quarterly *KPI* guidance. Because prior studies examining voluntary disclosure typically focus on the determinants of management guidance for financial measures such as earnings, revenues, and cash flows, I first explore the determinants of management providing quarterly KPI guidance to provide insights into the types of firms that provide this disclosure.

First, I identify factors external to the firm that may influence a manager's decision to provide quarterly KPI guidance. Prior research provides evidence that a firm's voluntary disclosures are influenced by analysts' demands for information (Chapman and Green 2018). For example, Chapman and Green (2018) use textual analysis of conference calls and find that managers are more likely to provide continued forward-looking guidance on items that analysts request in the conference call. In addition. Thus, to the extent that managers use quarterly KPI guidance to reduce analyst uncertainty, I expect a positive association between quarterly KPI guidance and initial analyst EPS forecast errors. Next, I examine whether analyst following is associated with quarterly KPI guidance because prior studies document that analysts are more likely to follow firms with a transparent reporting environment (Healy et al. 1999; Graham et al. 2005; Hutton, Lee, and Shu 2012). Thus, to the extent that KPI guidance provides useful information to analysts in forming expectations about future firm performance, I expect a positive

association between quarterly KPI guidance and analyst following. Next, I examine whether institutional ownership is associated with quarterly KPI guidance. While prior studies generally find that institutional ownership is higher for firms that provide earnings guidance (e.g., Healy et al. 1999; Anilowski et al. 2007), Bushee and Noe (2000) find that only ownership by transient institutions and quasi-indexers is higher for guiding firms. Therefore, I do not make a prediction on the association between institutional ownership and quarterly KPI guidance.

I next identify firm-level characteristics that may influence a manager's decision to provide quarterly KPI guidance. First, I examine whether managers' decision to provide quarterly earnings guidance is associated with a managers' decision to provide quarterly KPI guidance. There may be a positive association between quarterly earnings guidance and quarterly KPI guidance because managers may supplement forward-looking financial information with KPIs to provide additional context to investors and analysts about the underlying operations of the firm that contribute to management's expectations of future earnings. However, given the downward trend of quarterly KPI guidance and the increasing trend of quarterly KPI guidance, firms may be substituting quarterly KPI guidance in the place of quarterly earnings guidance. Thus, I make no prediction for the association between quarterly earnings guidance and quarterly KPI guidance.

Next, I examine whether firm growth is associated with quarterly KPI guidance. On one hand, managers of growing firms may be more likely to provide quarterly KPI guidance because prior literature documents that managers are more forthcoming with voluntary disclosure when growth prospects are high (Atiase et al. 2005; Hollander et al. 2010). On the other hand, prior research also provides evidence that firms with high growth also face higher proprietary costs for providing quarterly earnings guidance (Verrecchia 1983; Ajinkya et al. 2005). However, to the extent that quarterly KPI guidance has a lower proprietary cost to managers relative to quarterly

earnings guidance, I expect there will be a positive association between firm growth and quarterly KPI guidance. Finally, I examine whether prior period performance is associated with a manager's decision to provide quarterly KPI guidance. While prior literature generally finds that firm performance is positively associated with the managers' decision to provide quarterly earnings guidance (e.g., Miller 2002; Houston et al. 2010), however, managers be more likely to provide quarterly KPI guidance in an effort to contextualize poor prior performance or use quarterly KPI guidance to emphasize the relative importance of periodic KPI reporting relative to earnings in upcoming periods, therefore I do not make a prediction for the association between firm performance and quarterly KPI guidance.

Quarterly KPI Guidance and Analyst Forecasts

In my second set of tests, I examine whether quarterly KPI guidance results in improvements in quarterly analyst EPS forecasts. Quarterly KPI guidance should provide useful information for analysts in forming their estimates of quarterly earnings for several reasons. First, prior research finds evidence that analysts incorporate information from management earnings guidance in their estimates. For example, Waymire (1986) finds evidence that annual earnings guidance by managers is more accurate than the consensus analyst forecast preceding management guidance, however, following the release of management earnings guidance, analyst earnings forecast errors are reduced and analyst earnings forecast errors are no different than management earnings guidance errors. In addition, Baginsky and Hassell (1990) find that analysts revise their annual earnings forecasts in response to management earnings guidance and the magnitude of their revision is associated with the returns around the release of the management earnings guidance. In addition, Williams (1996) finds that analyst earnings forecast revisions following management earnings guidance are higher when management earnings guidance in prior periods is more

accurate. Thus, to the extent that quarterly KPI guidance is useful for predicting future earnings and management provides accurate estimates of future realizations of KPIs, quarterly KPI guidance should improve analyst estimates of earnings.

Second, prior research provides evidence that managers have an information advantage over analysts when reported performance is driven by firm operations rather than macroeconomic shocks (Hutton et al. 2012). Specifically, Hutton et al. (2012) argue that because managers are able to observe the daily operations of a firm, managers will provide more accurate forecasts than analysts when a firm's future financial performance is more directly tied to the internal operations of the firm. Consistent with this, Hutton et al. (2012) find that management earnings guidance is more accurate relative to analyst forecasts when firms experience shocks to their operations in the prior period such as excess capacity or increases in abnormal inventory. Because quarterly KPI guidance provides analysts with management's expectations about the firm's internal operations, quarterly KPI guidance should lower any information asymmetry between managers and analysts resulting in improved analyst estimates of earnings.

Third, although my study is the first to examine forward-looking disclosures of KPIs, prior research examines periodically reported KPIs and find evidence that periodically reported KPIs are value relevant to investors and are useful for predicting future financial performance. For example, Amir and Lev (1996) examine periodic disclosures of KPIs in the telecommunications industry and find that, while there is no association between stand-alone financial performance and returns for these firms, there is an association between population coverage and market penetration (two prominent KPIs in the telecommunications industry) and returns. Furthermore, subsequent research finds that periodically reported KPIs are also value relevant for firms in the electric utility industry (Hughes 2000), the e-commerce industry (Trueman et al. 2000), the

manufacturing industry (Rajgopal et al. 2003), and the airline industry (Riley et al. 2003; Francis et al. 2003).

In addition to the value relevance of KPIs, prior research also finds that periodically reported KPIs are useful for predicting future financial performance. Most related to my study, Behn and Riley (1999) examine periodic reports of KPIs in the airline industry and find that ASM, on-time arrival rates, mishandled baggage, and customer satisfaction are associated with future earnings and revenue.[13] Similar to the literature examining the value relevance of periodically reported KPIs, prior research documents that reported KPIs are useful for predicting future financial performance across a variety of industries. For example, prior research finds that periodically reported KPIs are useful for predicting future financial performance in the retail industry (Ittner and Larcker 1998), the internet industry (Rajgopal et al. 2002), and the manufacturing industry (Rajgopal et al. 2003). Finally, Brazel et al. (2009) find evidence that inconsistencies between financial performance and KPIs are a leading indicator of fraud. Thus, to the extent that quarterly KPI guidance provides analysts with accurate estimates of future realizations of KPIs, quarterly KPI guidance should improve analyst estimates of earnings.

Finally, prior research documents that analysts use KPIs in forming their expectations of future earnings. Chandra et al. (1999) examine the semiconductor industry and find evidence that analysts revise their sales forecasts in response to an industry-wide KPI provided by a trade association, consistent with analysts incorporating information from KPIs in their estimates of future financial performance. In addition, Givoly et al. (2019) examine *analyst* KPI forecasts in the airline, oil and gas, retail, and pharmaceutical industries and find evidence that analysts revise

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[13] Because firms in my sample do not provide forward-looking guidance for on-time arrival rates, mishandled baggage, and customer satisfaction, I focus on three measures managers commonly provide guidance on in my analyses (i.e., ASM, RASM, and CASM).

their earnings forecasts in response to KPI surprises, consistent with analysts incorporating information from realized KPIs in their earnings forecasts.

However, there are also reasons why quarterly KPI guidance may not be useful for analysts in forming expectations of future financial performance. First, although prior research generally documents a positive association between periodically reported KPIs and future financial performance, a common criticism of KPIs is that management discretion in measuring KPIs reduces the informativeness of the disclosure. For example, SEC Chairman Jay Clayton stated that "A point of investor frustration that we can be cognizant of is when non-GAAP numbers and KPIs move around in terms of how they are calculated".[14] Thus, inconsistent measurement of KPIs over time and across firms could limit the usefulness of KPI disclosures. Furthermore, if managers use inconsistent measures of KPIs in their quarterly KPI guidance, then quarterly KPI guidance could be of limited use to analysts in forecasting earnings. Second, although managers are in a position to more accurately forecast KPIs relative to analysts, prior research provides evidence that, in certain situations, managers have incentives to provide inaccurate or misleading guidance (Rogers and Stocken 2005). Together, the increased management discretion in measuring KPIs in quarterly KPI guidance along with incentives to provide inaccurate guidance could contribute to there being no association between quarterly KPI guidance and analyst forecast errors.

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[14] See *SEC Urges Consistency in Non-GAAP Reporting* available at:
https://www.journalofaccountancy.com/news/2018/dec/sec-urges-consistency-non-gaap-reporting-201820253.html

3. Sample and Research Setting

I begin my sample with all public firms in the airline industry (SIC code 4512) available from Compustat for the fiscal years 2008 through 2017. I use the Compustat Industry Specific Quarterly database to obtain data on KPIs for the airline industry and restrict the sample to firms with non-missing values for ASMs, CASM, and RASM. In addition, because I examine analyst forecast revisions to quarterly KPI guidance, I obtain data on analyst forecasts from IBES and require firms have at least two analyst earnings forecasts for each quarter.[15]

Next, I hand-collect data on quarterly guidance of ASM, RASM, and CASM from Form 8-K disclosures reported on the SEC's EDGAR website. I examine every 8-K filing filed between the fiscal quarter-end date and one year prior to the fiscal quarter-end to identify the most recent quarterly ASM, RASM, and CASM guidance for each firm if available.[16] Because I am interested in examining the impact of quarterly KPI guidance on analyst forecast errors, for firm-quarters that provide quarterly KPI guidance, I require there be a consensus analyst forecast of EPS prior to the announcement of KPI guidance and a consensus analyst forecast of EPS following the announcement of quarterly KPI guidance. In addition, for each firm-quarter with quarterly KPI guidance, I collect management's estimates for ASM, RASM, and CASM if available. I find that quarterly KPI guidance is most often disclosed in monthly traffic reports and earnings announcements for prior quarters.[17] In addition, firms sometimes provide quarterly KPI guidance

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[15] The results are qualitatively similar for all other variables when I remove analyst forecast errors and analyst forecast horizon from my determinants test and do not restrict the sample to firms with at least two analyst forecasts.

[16] Although I search up to one year prior to the fiscal quarter end for the existence of quarterly KPI guidance, the longest forecast horizon in my sample is 101 days between the announcement of quarterly KPI guidance and the fiscal-quarter end.

[17] Monthly traffic reports are an industry-specific disclosure for firms in the airline industry. Firms are required to file monthly traffic reports disclosures to the Department of Transport and the Bureau of Transportation Statistics. In addition, I find that airline firms also regulary file monthly traffic reports on the SEC EDGAR website in a Form 8-K disclosure.

in a standalone press release or as part of a Reg FD disclosure following an investor meeting, however, these methods of disclosure are less common.

I examine quarterly KPI guidance in the airline industry for several reasons. First, prior to the passage of the Airline Deregulation Act in 1978, the U.S. Department of Transportation (DOT) began requiring that all airlines operating aircraft designed for 60 passengers or more to periodically report their actual air traffic (e.g., ASM and cargo capacity) on a monthly basis. This data were initially used by the Civil Aeronautics Board (a predecessor to the Federal Aviation Administration) to evaluate the capabilities of U.S. airlines and to allocate routes and set fares for domestic travel. However, following the Airline Deregulation Act of 1978, airlines were allowed to compete in a free market and these KPIs were then used by investors and creditors in evaluating the operating performance of airlines.[18]

Second, unlike industries where actual KPIs are reported on a voluntary basis, historical data on KPIs are required to be filed with the DOT for firms in the airline industry, thus, I am better able to isolate the impact of quarterly KPI guidance rather than evaluating firms that voluntarily provide quarterly KPI guidance conditional on also voluntarily providing actual KPIs for prior periods. Finally, the DOT requires that airlines measure actual KPIs reported in historical traffic reports using a specified criterion, which lowers management's discretion in reporting realized KPIs to investors. Together, these factors allow me to evaluate the determinants and consequences of quarterly KPI guidance in an industry where there is a consistent measurement of actual KPIs across firms.

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[18] For example, in the Standard & Poor's Corporate Rating Criteria, they list ASM, RASM, and CASM as important rating factors that they consider when evaluating the operating performance of airlines. Available at: https://www.standardandpoors.com/en_US/web/guest/article/-/view/sourceId/8450161

Table 1 Panel A provides descriptive statistics for firms in my sample.[19] Across my sample period, I find that 67% of firms provide quarterly KPI guidance. Figure 1 presents the percentage of observations that provide quarterly KPI guidance by year. I find that the percentage of firms providing KPI guidance increase over my sample period from 44% of firm-quarters in 2008 to 98% of firm quarters in 2017. Table 1 Panel B compares firm characteristics for firm-quarters with quarterly KPI guidance relative to firm-quarters without quarterly KPI guidance. Univariate tests reveal that quarterly KPI guidance firm-quarters have lower analyst forecast errors, are less likely to provide earnings guidance, have higher analyst following, higher institutional ownership, higher growth prospects, higher prior operating performance, lower leverage, and are larger. While these descriptive statistics provide some insight on the cross-sectional attributes of firms that provide quarterly KPI guidance, in subsequent analyses, I include year fixed effects to control for industry-wide changes in KPI guidance activity over time and quarter fixed effects to control for seasonality. I also include firm fixed effects to control for time-invariant firm characteristics that could impact a firm's decision to issue quarterly KPI guidance.

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[19] All variables are defined in Appendix A.

4. Research Design

Determinants of Quarterly KPI Guidance

In order to examine the determinants of quarterly KPI guidance, I first estimate the following model:

$KPIGuidance_{it} = \alpha_0 + \alpha_1 Abs(Initial\ Analyst\ EPS\ Error)_{it} + \alpha_2 Earnings\ Guidance_{it}$

$\qquad + \alpha_3 Log(Analyst\ Following)_{it-1} + \alpha_4 InstOwn_{it-1} + \alpha_5 BtM_{it-1} + \alpha_6 ROA_{it-1}$

$\qquad + \alpha_7 Loss_{it-1} + \alpha_8 Leverage_{it-1} + \alpha_9 Size_{it-1} + \alpha_{10} Initial\ Analyst\ Horizon_{it}$

$\qquad + \alpha_i FirmFE_i + \alpha_s YearFE + \alpha_t QuarterFE + \varepsilon_{it}$ (1)

Where *KPIGuidance* is an indicator variable equal to one when a firm provides quarterly KPI guidance for quarter *t*. The coefficients of interest in Equation (1) are α_1 through α_7 which represent the coefficients on the variables identified in Section II as potential determinants of quarterly KPI guidance. In addition to the variables identified in Section II, I also control for leverage, firm size, and the initial analyst forecast horizon.

Next, to examine the determinants of the number of KPIs that firms provide in their quarterly KPI guidance, I estimate the following model:

$Num\ KPIGuidance_{it} = \beta_0 + \beta_1 Abs(Initial\ Analyst\ EPS\ Error)_{it} + \beta_2 Earnings\ Guidance_{it}$

$\qquad + \beta_3 Log(Analyst\ Following)_{it-1} + \beta_4 InstOwn_{it-1} + \beta_5 BtM_{it-1} + \beta_6 ROA_{it-1}$

$\qquad + \beta_7 Loss_{it-1} + \beta_8 Leverage_{it-1} + \beta_9 Size_{it-1} + \beta_{10} Initial\ Analyst\ Horizon_{it}$

$\qquad + \beta_i FirmFE_i + \beta_s YearFE + \beta_t QuarterFE + v_{it}$ (2)

Where *Num KPIGuidance* is measured as the number of unique KPIs that a firm forecasts in its quarterly KPI guidance. This variable ranges from 0, if a firm provides no quarterly KPI guidance, to 3 if a firm provides guidance for all three KPIs in their quarterly KPI guidance (i.e., ASM, RASM, and CASM). The coefficients of interest in Equation (2) are β_1 through β_7 which allows

me to examine whether the same factors that influence a firm's decision to provide quarterly KPI guidance also influence the number of items that a firm forecasts in its quarterly KPI guidance.

Quarterly KPI Guidance and Analyst Forecast Errors

In order to test whether quarterly KPI guidance is associated with reductions in analyst forecast errors, I estimate the following model:

$\Delta Abs(Analyst\ EPS\ Error) = \theta_0 + \theta_1 KPIGuidance\ /\ Num\ KPIGuidance + \theta_2 Earnings\ Guidance_{it}$

$\qquad + \theta_3 Log(Analyst\ Following)_{it-1} + \theta_4 InstOwn_{it-1} + \theta_5 BtM_{it-1} + \theta_6 ROA_{it-1}$

$\qquad + \theta_7 Loss_{it-1} + \theta_8 Leverage_{it-1} + \theta_9 Size_{it-1} + \theta_{10}\ Last\ Analyst\ Horizon_{it}$

$\qquad + \theta_{10}\ Initial\ Analyst\ Horizon_{it} + \theta_{10} Analyst\ Forecast\ Distance_{it}$

$\qquad + \theta_i FirmFE_i + \theta_s YearFE + \theta_t QuarterFE + \mu_t \qquad\qquad\qquad (3)$

Where $\Delta Abs(Analyst\ EPS\ Error)$ is measured as the difference between the absolute value of the last analyst EPS forecast error and the absolute value of the initial analyst EPS forecast error. Because analysts can incorporate more information into their EPS forecast when I include *Last Analyst Horizon* to control for the number of days between the last consensus analyst EPS forecast and the fiscal quarter end, *Initial Analyst Horizon* to control for the number of days between the initial consensus analyst EPS forecast and the fiscal quarter end date, and *Analyst Forecast Distance* to control for the number of days between the initial consensus analyst EPS forecast and the last analyst EPS forecast. The coefficient of interest in Equation (3) is θ_1, which captures the association between the presence of quarterly KPI guidance (*KPIGuidance*) or the number of KPIs forecasted in quarterly KPI guidance (*Num KPIGuidance*) and the change in analyst forecast errors for EPS.

Although Equation (3) allows me to examine whether firms that provide quarterly KPI guidance experience greater reductions in analyst EPS forecast errors, it is not clear whether this reduction results in more accurate analyst forecasts of EPS. For example, if managers provide

quarterly KPI guidance in response to inaccurate initial analyst EPS estimates of future earnings then a reduction in analyst forecast errors may not result in more accurate anlyst EPS estimates. Thus, in order to examine whether quarterly KPI guidance is associated with lower analyst forecast errors following the release of quarterly KPI guidance, I estimate the following model:

$Abs(Last\ Analyst\ EPS\ Error) = \delta_0 + \delta_1 KPIGuidance\ /\ Num\ KPIGuidance$

$\qquad + \delta_2 Earnings\ Guidance_{it} + \delta_3 Log(Analyst\ Following)_{it-1} + \delta_4 InstOwn_{it-1}$

$\qquad + \delta_5 BtM_{it-1} + \delta_6 ROA_{it-1} + \delta_7 Loss_{it-1} + \delta_8 Leverage_{it-1} + \delta_9 Size_{it-1}$

$\qquad + \delta_{10} Last\ Analyst\ Horizon_{it} + \delta_i FirmFE_i + \delta_s YearFE + \delta_t QuarterFE + \eta_t$ (4)

Where *Abs(Last Analyst EPS Error)* is the absolute value of actual EPS less the last consensus analyst EPS prior to the end of the fiscal quarter.[20] The coefficient of interest in Equation (4) is δ_1, which captures the association between the presence of quarterly KPI guidance and the level of the consensus analyst EPS forecast errors. Because initial analyst EPS errors are larger for firms that provide quarterly KPI guidance, this test allows me to examine whether the reduction in analyst forecast errors following quarterly KPI guidance documented in Equation (3) is large enough to overcome these initially higher analyst EPS forecast errors and whether it results in more accurate analyst EPS forecasts at the end of the fiscal quarter relative to firm-quarters without KPI guidance.

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[20] I use the consensus prior to the end of the quarter rather than the earnings announcement date to avoid including analyst estimates that are made after earnings or KPI preannouncements by management following the end of the fiscal quarter.

5. Empirical Results

Determinants of Quarterly KPI Guidance

Table 2 presents the results from estimating Equation (1) to examine the determinants of quarterly KPI guidance. In Column (1), where the dependent variable is an indicator variable equal to one when a firm provides quarterly KPI guidance for at least one KPI, the coefficient on *Abs(Initial Analyst EPS Error)* is positive and significant ($\alpha_1 = 0.258$ p = 0.004), indicating that firms are more likely to provide quarterly KPI guidance following inaccurate initial analyst estimates of earnings. This result provides some evidence that managers may use quarterly KPI guidance to provide analysts with additional information about the operations of the firm to reduce analyst earnings forecast errors.[21] Consistent with managers providing quarterly KPI guidance when there is a greater demand for information from analysts, the coefficient on *Log(Analyst Following)* is positive and significant ($\alpha_3 = 0.275$ p = 0.000). I also find that the coefficient on *BtM* is negative and significant ($\alpha_5 = -0.046$ p = 0.001), indicating that firms are more likely to provide quarterly KPI guidance when growth prospects are high. While the coefficient on *ROA* is not significant ($\alpha_6 = 0.102$ p = 0.818), the coefficient on *Loss* is positive and significant ($\alpha_7 = 0.157$ p = 0.000). Thus, while I find no evidence of an association between the level of prior period earnings and a firm's quarterly KPI guidance decision, firms are more likely to provide quarterly KPI guidance when they experience a loss in the prior quarter.

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[21] This is consistent with anecdotal observations of management providing quarterly KPI guidance following analyst stock upgrades. For example, on August 29th, analysts at Deutche Bank state that JetBlue had "[a] good balance sheet, solid market position, primarily domestic operator and costs under control as it is on track to achieve it flat to 1% 2018 - 2020 CASM CAGR goal." See Here are the biggest analyst calls of the day:Monster, JetBlue & More Available at: https://www.cnbc.com/2019/08/28/monster-jetblue-papa-johns-autodesk-are-analyst-calls-of-the-day.html. However, on September 4th, JetBlue released quarterly KPI guidance that showed that while CASM growth was expected to be in line with Deutche Bank's expectations, RASM was expected to fall below expectations. See *JetBlue slides after lowing guidance on Dorian impact, demand concerns* Available at: https://www.cnbc.com/2019/09/04/jetblue-slides-after-lowering-guidance-on-dorian-demand-concerns.html.

Table 2 Column (2) presents the results from estimating Equation (2), which examines the determinants of the number of KPIs that a firm forecasts in its KPI guidance. In general, the results are consistent with the results documented in Table 2 Column (1) where I examine the determinants of firms providing quarterly KPI guidance for at least one KPI. Specifically, I find a positive association for *Abs(Initial Analyst EPS Error)* (β_1 = 0.308 p = 0.050), *Log(AnalystFollowing)* (β_3 = 0.779 p = 0.000), and *Loss* (β_7 = 0.267 p = 0.001) and a negative association for *BtM* (β_5 = -0.085 p = 0.002) and the number of items forecasted in a firm's quarterly KPI guidance. Together, these results indicate that the same determinants that influence a manager's decision to issue quarterly KPI guidance also influence the number of items that managers forecast in their quarterly KPI guidance.

Quarterly KPI Guidance and Analyst Forecast Errors

Table 3 presents the results from estimating Equation (3), which investigates the association between quarterly KPI guidance and changes in absolute analyst EPS forecast errors. In Column (1), where the variable of interest is *KPIGuidance*, I find a negative and significant coefficient on *KPIGuidance* (θ_1 = -0.026 p = 0.005), consistent with larger reductions in analyst EPS forecast errors when firms provide quarterly KPI guidance in the period between the initial analyst EPS forecast and the last analyst EPS forecast. Consistent with the results in Column (1), I also find a negative and significant coefficient on *Num KPIGuidance* (θ_1 = -0.006 p = 0.041). This result indicates that not only is the presence of quarterly KPI guidance associated with reductions in analyst EPS forecast errors but the number of items that managers forecast in their quarterly KPI guidance is also associated with reductions in analyst EPS forecast errors.

Table 4 presents the results from estimating Equation (4), which investigates whether quarterly KPI guidance is associated with the absolute value of the last consensus analyst EPS estimate prior to the end of the fiscal quarter. In Column (1), the coefficient on *KPIGuidance* is

negative and significant (δ_1 = -0.025 p = 0.053). Although firms are more likely to provide quarterly KPI guidance when initial analyst EPS forecast errors are larger, this result indicates that the reduction in analyst forecast errors quarter for firms that provide quarterly KPI guidance documented in Table 3 is large enough to overcome these higher initial analyst EPS forecast errors which results in more accurate analyst forecasts of EPS at the end of the fiscal quarter. Consistent with the results documented in Column (1) the coefficient on *Num KPIGuidance* is also negative and significant (δ_1 = -0.007 p = 0.023) in Column (2).

Additional Analyses

Bundled Quarterly KPI and Earnings Guidance and Analyst Forecast Errors

Prior literature finds that the value relevance of management guidance varies with the amount of additional information accompanying earnings guidance. For example, Hutton et al. (2003) find that there is a larger market reaction to upward revisions in management earnings guidance when the guidance is accompanied by qualitative narrative disclosures. Thus, I next test whether the association between quarterly KPI guidance and analyst forecast errors varies when managers provide quarterly KPI guidance alongside quarterly earnings guidance (i.e., bundled KPI guidance). Specifically, because quarterly KPI guidance provides analysts with information about management decisions that contribute to future financial performance, bundled KPI guidance may be incrementally informative to stand-alone quarterly KPI guidance in helping analysts revise their forecasts.[22] To test this, I estimate Equations (3) and (4) including an interaction between *KPIGuidance* (*Num KPIGuidance*) and *Earnings Guidance*.

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[22] For example, a firm in the airline industry that supplements quarterly earnings guidance with quarterly KPI guidance can provide analysts with information about whether they plan to meet this target through increasing ASM, increasing RASM, or decreasing CASM.

Table 5 presents the results from estimating Equation (3) including the interaction term, *KPIGuidance(Num KPIGuidance)*Earnings Guidance*. While I continue to find a significant association between quarterly KPI guidance and reductions in analyst EPS forecast errors in Columns (1) and (2) (θ_1 = -0.026 p = 0.007; θ_1 = -0.006 p = 0.043), I do not find a significant association between the interaction term *KPIGuidance(Num KPIGuidance)*Earnings Guidance* and changes in analyst EPS forecast errors (θ_2 = -0.005 p = 0.383; θ_2 = -0.003 p = 0.296). This test reveals that the reduction in analyst EPS forecast errors for firms that provide quarterly KPI guidance does not vary between firm-quarters when managers provide stand-alone quarterly KPI guidance and firm-quarters when managers provide bundled KPI and earnings guidance.

Table 6 presents the results from estimating Equation (4) including the interaction term, *KPIGuidance*(*Num KPIGuidance*)*Earnings Guidance*. The coefficient on *KPIGuidance* (*Num KPIGuidance*) is negative and significant (δ_1 = -0.023 p = 0.073; δ_1 = -0.007 p = 0.026), consistent lower analyst EPS forecast errors at the end of the fiscal quarter for firm-quarters when management provides stand-alone quarterly KPI guidance. In addition, the coefficient on the interaction term, *KPIGuidance*(*Num KPIGuidance*)*Earnings Guidance* is also negative and significant (δ_2 = -0.021 p = 0.066; δ_2 = -0.009 p = 0.070). This result indicates that while the reduction in analyst EPS forecast errors is no different for stand-alone KPI guidance and bundled KPI guidance, analyst EPS forecast errors are lower at the end of the quarter in firm-quarters when management provides bundled KPI and earnings guidance.

Quarterly KPI Guidance Form and Analyst Forecast Errors

Prior literature finds evidence that management earnings guidance is more informative when managers provide forecasts of point estimates of earnings relative to when they provide a range forecast (Baginski et al. 1993; Hughes and Pae 2004). Thus, to the extent that managers are

more likely to report point estimates in quarterly KPI guidance when they are more certain that the KPI target will be realized in the future, the association between quarterly KPI guidance and reductions in analyst EPS forecast errors should be greater for point forecasts relative to range forecasts of KPIs. To test this, I create two indicator variables, *KPIGuidance_Point (KPIGuidance_Range)*, set equal to one when managers provide point estimates (range forecasts) in their quarterly KPI guidance. Next I estimate Equations (3) and (4) and replace *KPIGuidance* with the *KPIGuidance_Point* and *KPIGuidance_Range*. In untabulated results, I find a negative and significant coefficient on both *KPIGuidance_Point* and *KPIGuidance_Range* in both models. Furthermore, although the magnitude of the negative coefficient is larger for *KPIGuidance_Point* relative to *KPIGuidance_Range*, an F-test reveals that the coefficients are not statistically different in either model.

6. Conclusion

In this study, I examine the determinants and consequences of management guidance of KPIs in the airline industry. Using a sample of 457 firm-quarter observations from 2008 through 2017, I find that, on average, firms are more likely to provide quarterly KPI guidance and a larger number of KPIs in quarterly KPI guidance when initial analyst EPS forecast errors are large, when there is higher analyst following, when a firm has higher growth prospects, and when a firm experiences a loss in the prior quarter. Together, these results provide evidence that managers issue quarterly KPI guidance in response to analyst uncertainty and when there is a greater demand for information by analysts. In subsequent tests, I examine whether quarterly KPI guidance is associated with improvements in analyst forecasts and find that quarterly KPI guidance is associated with larger reductions in analyst EPS forecast errors relative to firms that do not provide quarterly KPI guidance which results in lower analyst EPS forecast errors at the end of the fiscal quarter for firms that provide quarterly KPI guidance. Finally, I find that the negative association between quarterly KPI guidance and analyst EPS forecast errors at the end of the period is more pronounced when firms provide bundled quarterly KPI guidance (i.e., quarterly KPI guidance accompanied by quarterly earnings guidance) relative to stand-alone quarter KPI guidance.

Together, these results provide evidence that managers provide quarterly KPI guidance in response to inaccurate initial analyst EPS forecasts and, after providing quarterly KPI guidance, firms experience improvements in analyst forecasts of earnings. In addition, this study provides evidence that quarterly KPI guidance is a complimentary forward-looking disclosure that managers can use to improve analyst estimates of earnings. However, I also acknowledge that because my analyses are conducted in the airline industry, the results may not be generalizable to

firms in industries without periodic reporting of KPIs or in industries where KPIs are not well defined.

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Appendix A: Variable Definitions:

Variable	Description
Abs(Initial Analyst EPS Error)	The absolute value of the difference between Actual EPS and the first consensus analyst EPS forecast for quarter *t* scaled by stock price. The first consensus analyst EPS forecast is measured as the first consensus analyst EPS forecast made in the year preceding the fiscal quarter end date.
Abs(Last Analyst EPS Error)	The absolute value of the difference between Actual EPS and the last consensus analyst EPS forecast for quarter *t* scaled by stock price. The last consensus analyst EPS forecast is measured as the last consensus analyst EPS forecast made prior to the end of the fiscal quarter.
Log(Analyst Following)	The natural log of the number of unique analysts that forecast firm *i*'s EPS for quarter *t-1*.
Analyst Forecast Distance	The number of days between the initial consensus analyst EPS forecast and the last consensus analyst EPS forecast for firm *i* for quarter *t*.
BtM	The book value of equity divided by the market value of equity in quarter *t-1*.
Earnings Guidance	An indicator variable equal to one if firm *i* provides guidance for at least one KPI (i.e., ASM, RASM, or CASM) for quarter t in the previous year, and zero otherwise.
Initial Analyst Horizon	The number of days between the initial consensus analyst EPS forecast and the fiscal quarter end date for firm *i* for quarter *t*.
InstOwn	The percentage of outstanding shares owned by institutional owners.
KPIGuidance	An indicator variable equal to one if firm *i* provides guidance for at least one KPI (i.e., ASM, RASM, or CASM) for quarter *t*.
Last Analyst Horizon	The number of days between the last consensus analyst EPS forecast made prior to the end of the fiscal quarter and the fiscal quarter end date for firm *i* for quarter *t*.
Leverage	Long term debt divided by the book value of equity in quarter *t-1*.
Loss	An indicator variable set equal to one when ROA is negative in quarter *t-1*, and 0 otherwise.

Num KPIGuidance	The count of the number of unique KPIs forecasted by firm *i* in quarterly KPI guidance for quarter *t* ranging from 0 (i.e., firm *i* does not provide quarterly KPI guidance for quarter *t*) to 3 (i.e., firm *i* provides quarterly KPI guidance for ASM, RASM, and CASM for quarter *t*).
ROA	Income before extraordinary items divided by average total assets in quarter *t-1*.
Size	The natural log of total assets in quarter *t-1*.
ΔAbs(Analyst EPS Error)	Change in absolute analyst EPS forecast errors measured as the *Abs(Last Analyst EPS Error)* - *Abs(Initial Analyst EPS Error)*.

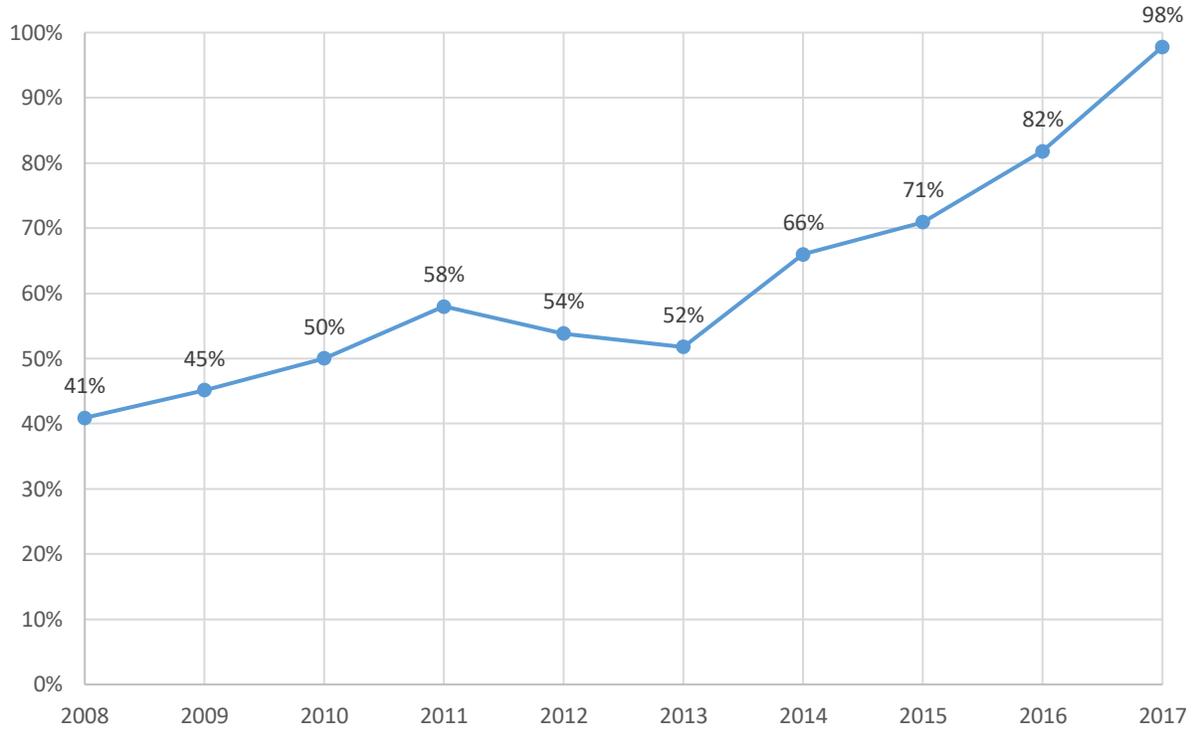Figure 1: Percentage of Airline Firms Providing Quarterly KPI Guidance

<center>**Table 1**</center>

Panel A: Summary Statistics

Variable	Mean	Std Dev	1%	Median	99%
KPIGuidance	0.652	0.477	0.000	1.000	1.000
Num KPIGuidance	1.560	1.271	0.000	2.000	3.000
Abs(Initial Analyst EPS Error)	0.050	0.139	0.000	0.009	0.976
Abs(Last Analyst EPS Error)	0.025	0.104	0.000	0.002	0.788
ΔAbs(Analyst EPS Error)	-0.026	0.072	-0.496	-0.005	0.060
Earnings Guidance	0.066	0.248	0.000	0.000	1.000
Analyst Following	10.972	4.556	1	12	18
InstOwn	0.809	0.192	0.000	0.843	1.000
BtM	0.987	1.644	0.021	0.469	12.412
ROA	0.009	0.027	-0.118	0.008	0.084
Loss	0.212	0.409	0.000	0.000	1.000
Leverage	0.336	0.157	0.013	0.346	0.672
Size	8.683	1.508	2.964	8.675	10.884
Initial Analyst Horizon	307.302	47.395	42	317	350
Last Analyst Horizon	19.009	15.647	11	16	105
Number of Observations	457				

Table 1 Panel A reports the summary statistics for variables in Equations (1) through (4). All continuous variables are winsorized at the 1st and 99th percentiles.

Panel B: Differences in Means

Variable	KPIGuidance = 1 Mean	KPIGuidance = 0 Mean	Difference	p-value
Abs(Initial Analyst EPS Error)	0.034	0.080	-0.046***	(0.005)
Abs(Last Analyst EPS Error)	0.008	0.058	-0.050***	(0.000)
ΔAbs(Analyst EPS Error)	-0.025	-0.026	0.001	(0.931)
Earnings Guidance	0.027	0.138	-0.112***	(0.000)
Analyst Following	12.399	8.296	4.104***	(0.000)
InstOwn	0.854	0.723	0.131***	(0.000)
BtM	0.563	1.782	-1.220***	(0.000)
ROA	0.013	0.002	0.011**	(0.016)
Loss	0.208	0.220	-0.012	(0.766)
Leverage	0.311	0.382	-0.071***	(0.000)
Size	8.951	8.182	0.769***	(0.000)
Initial Analyst Horizon	317.560	288.075	29.485***	(0.001)
Last Analyst Horizon	16.406	23.887	-7.481**	(0.026)
Number of Observations	298	159		

Table 1 Panel B reports univariate statistics for variables in Equations (1) through (4). All continuous variables are winsorized at the 1st and 99th percentiles. ***, **, and * indicate significant at $p < 0.01$, 0.05, and 0.10, respectively.

Table 2

Determinants of quarterly KPI Guidance

	Predicted Sign	(1) KPIGuidance	(2) Num KPIGuidance
Abs(Initial Analyst EPS Error)	(+)	0.258***	0.308**
		(0.004)	(0.050)
Earnings Guidance	(?)	0.056	-0.041
		(0.345)	(0.596)
Log(AnalystFollowing)	(+)	0.275***	0.779***
		(0.000)	(0.000)
InstOwn	(?)	0.135	-0.279
		(0.309)	(0.304)
BtM	(-)	-0.046***	-0.085***
		(0.001)	(0.002)
ROA	(?)	0.102	0.939
		(0.818)	(0.387)
Loss	(?)	0.157***	0.267***
		(0.000)	(0.001)
Leverage		-0.075	0.463
		(0.652)	(0.331)
Size		-0.216***	0.300*
		(0.004)	(0.084)
Initial Analyst Horizon		0.000	0.000
		(0.388)	(0.690)
Constant		2.000***	-3.853**
		(0.007)	(0.024)
Year Fixed Effects		Yes	Yes
Quarter Fixed Effects		Yes	Yes
Firm Fixed Effects		Yes	Yes
Observations		457	457
Adjusted R-squared		0.761	0.817

Table 2 Columns 1 and 2 reports the results from estimating Equations (1) and (2), respectively. p-values are in parentheses below the coefficient estimates and are one-tailed for variables with a signed prediction and two-tailed otherwise. ***, **, and * indicated significance at the $p < 0.01$, 0.05, and 0.10 levels, respectively. t-tests are estimated using cluster robust standard errors clustered at the firm level.

Table 3

Quarterly KPI Guidance and Changes in Absolute Analyst EPS Forecast Error

	(1) *ΔAbs(Analyst EPS Error)*	(2) *ΔAbs(Analyst EPS Error)*
KPIGuidance	-0.026***	
	(0.005)	
Num KPIGuidance		-0.006**
		(0.041)
Earnings Guidance	0.007	0.005
	(0.506)	(0.620)
Log(AnalystFollowing)	-0.010	-0.013
	(0.623)	(0.553)
InstOwn	-0.029	-0.034
	(0.485)	(0.426)
BtM	-0.020**	-0.019**
	(0.022)	(0.026)
ROA	0.226	0.228
	(0.363)	(0.358)
Loss	-0.009	-0.012
	(0.367)	(0.246)
Leverage	-0.047	-0.042
	(0.282)	(0.337)
Size	0.040*	0.048**
	(0.089)	(0.050)
Last Analyst Horizon	-0.001**	-0.001**
	(0.019)	(0.015)
Initial Analyst Horizon	-0.001*	-0.001*
	(0.057)	(0.057)
Analyst Forecast Distance	0.001*	0.001*
	(0.051)	(0.055)
Constant	-0.279	-0.353*
	(0.171)	(0.090)
Year Fixed Effects	Yes	Yes
Quarter Fixed Effects	Yes	Yes
Firm Fixed Effects	Yes	Yes
Observations	457	457
Adjusted R-squared	0.376	0.371

Table 3 reports the results from estimating Equation (3). p-values are in parentheses below the coefficient estimates and are one-tailed for my variable of interest and two-tailed otherwise. ***, **, and * indicated significance at the $p < 0.01$, 0.05, and 0.10 levels, respectively. t-tests are estimated using cluster robust standard errors clustered at the firm level.

Table 4

Quarterly KPI Guidance and Last Absolute Analyst EPS Forecast Error

	(1) Abs(Last Analyst EPS Error)	(2) Abs(Last Analyst EPS Error)
KPIGuidance	-0.025*	
	(0.053)	
Num KPIGuidance		-0.007**
		(0.023)
Earnings Guidance	0.017	0.016
	(0.106)	(0.153)
Log(AnalystFollowing)	0.035	0.033
	(0.152)	(0.195)
InstOwn	-0.149**	-0.155**
	(0.016)	(0.016)
BtM	0.005	0.006
	(0.676)	(0.664)
ROA	-0.584	-0.583
	(0.213)	(0.215)
Loss	-0.020*	-0.022**
	(0.068)	(0.035)
Leverage	-0.011	-0.006
	(0.814)	(0.901)
Size	-0.001	0.007
	(0.981)	(0.775)
Last Analyst Horizon	-0.001	-0.001
	(0.112)	(0.107)
Constant	0.082	0.005
	(0.684)	(0.978)
Year Fixed Effects	Yes	Yes
Quarter Fixed Effects	Yes	Yes
Firm Fixed Effects	Yes	Yes
Observations	457	457
Adjusted R-squared	0.396	0.393

Table 4 Columns 1 and 2 reports the results from estimating Equation (4), respectively. p-values are in parentheses below the coefficient estimates and are one-tailed for my variable of interest and two tailed otherwise. ***, **, and * indicated significance at the $p < 0.01$, 0.05, and 0.10 levels, respectively. t-tests are estimated using cluster robust standard errors clustered at the firm level.

Table 5

Quarterly KPI Guidance with Eearnings Guidance and Changes in Absolute Analyst EPS Forecast Error

	(1)	(2)
	ΔAbs(Analyst EPS Error)	*ΔAbs(Analyst EPS Error)*
KPIGuidance	-0.026***	
	(0.007)	
*KPIGuidance*Earnings Guidance*	-0.005	
	(0.383)	
Num KPIGuidance		-0.006**
		(0.043)
*Num KPIGuidance*Earnings Guidance*		-0.003
		(0.296)
Earnings Guidance	0.009	0.008
	(0.582)	(0.599)
Log(AnalystFollowing)	-0.010	-0.013
	(0.615)	(0.546)
InstOwn	-0.029	-0.034
	(0.489)	(0.431)
BtM	-0.020**	-0.019**
	(0.022)	(0.027)
ROA	0.226	0.229
	(0.363)	(0.357)
Loss	-0.009	-0.011
	(0.370)	(0.252)
Leverage	-0.047	-0.042
	(0.287)	(0.333)
Size	0.040*	0.048**
	(0.094)	(0.050)
Last Analyst Horizon	-0.001**	-0.001**
	(0.019)	(0.016)
Initial Analyst Horizon	-0.001*	-0.001*
	(0.058)	(0.057)
Analyst Forecast Distance	0.001*	0.001*
	(0.051)	(0.055)
Constant	-0.277	-0.353*
	(0.176)	(0.090)
Year Fixed Effects	Yes	Yes
Quarter Fixed Effects	Yes	Yes
Firm Fixed Effects	Yes	Yes
Observations	457	457
Adjusted R-squared	0.374	0.369

Table 5 reports the results examining quarterly KPI guidance as a compliment to earnings guidance for the last analyst forecast error. p-values are in parentheses below the coefficient estimates and are one-tailed for my variable of interest and two-tailed otherwise. ***, **, and * indicated significance at the $p < 0.01$, 0.05, and 0.10 levels, respectively. t-tests are estimated using cluster robust standard errors clustered at the firm level.

Table 6

Quarterly KPI Guidance with Earnings Guidance and Last Absolute Analyst EPS Forecast Error

	(1) Abs(Last Analyst EPS Error)	(2) Abs(Last Analyst EPS Error)
KPIGuidance	-0.023*	
	(0.073)	
KPIGuidance*Earnings Guidance	-0.021*	
	(0.066)	
Num KPIGuidance		-0.007**
		(0.026)
Num KPIGuidance*Earnings Guidance		-0.009*
		(0.070)
Earnings Guidance	0.027*	0.022
	(0.092)	(0.126)
Log(AnalystFollowing)	0.034	0.032
	(0.163)	(0.202)
InstOwn	-0.148**	-0.154**
	(0.017)	(0.017)
BtM	0.005	0.006
	(0.671)	(0.661)
ROA	-0.583	-0.581
	(0.215)	(0.217)
Loss	-0.020*	-0.022**
	(0.071)	(0.038)
Leverage	-0.009	-0.006
	(0.842)	(0.890)
Size	-0.002	0.007
	(0.944)	(0.774)
Last Analyst Horizon	-0.001	-0.001
	(0.112)	(0.108)
Constant	0.093	0.006
	(0.645)	(0.976)
Year Fixed Effects	Yes	Yes
Quarter Fixed Effects	Yes	Yes
Firm Fixed Effects	Yes	Yes
Observations	457	457
Adjusted R-squared	0.396	0.392

Table 6 reports the results examining quarterly KPI guidance as a compliment to earnings guidance for the last analyst forecast error. p-values are in parentheses below the coefficient estimates and are one-tailed for my variable of interest and two tailed otherwise. ***, **, and * indicated significance at the $p < 0.01$, 0.05, and 0.10 levels, respectively. t-tests are estimated using cluster robust standard errors clustered at the firm level.