Evaluating the Quality of Management's Financial Communication Policy from an Equity Valuation Perspective

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Abstract

We investigate the quality of management's financial communication policy from an equity valuation perspective. Specifically, we examine whether firms' earnings expectations (i.e., earnings forecasts) time series resulting from their communication policy exhibits greater persistence than their actual earnings realization series, and whether managers achieve persistence in the expectation series at the expense of masking equity value-relevant risk or creating expectations that lead to mis-valuation. Evidence suggests management's communication policy transforms the series of actual earnings into a more persistent series of earnings expectations, but not in ways that create artificial smoothness or inflate or deflate the mean. Further, some cross-sectional evidence suggests that firms with communication policies that are high quality from an equity valuation perspective are associated with lower cost of equity capital. Thus, our evidence based on management's long-term communication policy and long-horizon equity valuation variables is consistent with high-quality communication, on average, that provides informational benefits.

Keywords: financial communication; equity valuation; management forecasts; analyst forecasts; persistence

JEL Codes: D83, D84, G11, G17, M41

1. Introduction

In their seminal work, Ajinkya and Gift (1984) put forth the "Expectations Adjustment Hypothesis" in which they posit that managers issue earnings guidance to adjust market and analyst expectations. If analysts' expectations are incorrect, managers can either issue their own forecast to adjust expectations or indirectly influence analyst expectations through other means (e.g., by participating in conference calls and investor days, providing access to investor relations personnel, providing pro forma earnings disclosures, etc.). Therefore, managers heavily influence earnings expectations, whether they provide their own individual earnings forecasts or simply influence the process by which the market forms expectations. Thus, the time series of earnings expectations represents a key output of managers' financial communication *policy*. In this paper, we evaluate the quality of managers' financial communication policy by examining the persistence of firms' earnings expectations time series.

We examine the persistence of firms' earnings expectations series for several reasons. First, persistence is an important quality in equity valuation. Earnings expectations form the basis for expected dividends which, when divided by an appropriate discount rate, yield an estimate of the firm's stock price (Beaver 1998). The link between current and future earnings in the series, earnings persistence, is a key component of earnings relevance in equity valuation. A higher quality financial communication policy creates a more persistent series of earnings expectations, either by management issued guidance or by indirect influence on analyst forecasts.[1]

[1] For example, if, over time, managers use pro forma earnings disclosures to correctly inform analysts about transitory current earnings components in each period, then the time series of analysts' earnings expectations will exhibit higher persistence. If, on the other hand, analysts rely on managers who use pro forma earnings disclosures opportunistically, the time series of analyst expectations will be plagued by reversals of transient components and noise, both of which manifest as lower persistence.

Second, examining earnings expectations persistence provides insights that traditional approaches to assessing management's disclosure policy do not. Prior research captures management disclosure quality by measuring management forecast incidence and frequency (e.g., Francis, Nanda, and Olsson 2008; Baginski and Rakow 2012), forecast accuracy (e.g., Waymire 1984; Hassell and Jennings 1986; Williams 1996), forecast bias (e.g., Rogers and Stocken 2005; Gong, Li, and Wang 2011), or by examining the market reaction to forecast news (e.g., Ball, Jayaraman, and Shivakumar 2012). Although informative and foundational, these types of studies suffer from several problems. Management forecast frequency is content free with respect to valuation and thus measures forecast quality with significant error. Forecast accuracy and bias require a comparison benchmark (either GAAP or street earnings), and it is often unclear which construct managers are forecasting, leading to a mismatch between forecasted and actual earnings (e.g., Hutton, Lee, and Shu 2012; Ciconte, Kirk, and Tucker 2014). Further, the benchmark series itself may be low quality for valuation purposes, because of GAAP rules or because management's incentives can influence GAAP and street earnings (i.e., management controls both the forecast and the benchmark).[2] Our goal is to minimize these drawbacks and provide an alternative method to evaluate managers' disclosures of earnings expectations over a longer horizon from an equity valuation perspective.

Using a time series of 20 quarterly observations from the first quarter of 2011 through the fourth quarter of 2015, we compute firm-specific persistence factors for the time series of earnings expectations from the premier Brown and Rozeff (1979) time-series model. We characterize the time series of earnings expectations as the series of quarterly management earnings forecasts,

[2] We do not intend to imply that the prior studies are not informative and foundational, and our approach has limitations as well; for example, we also require a benchmark time series, although we have the advantage of having multiple benchmarks, some of which will be high quality and less affected by management's sphere of influence.

where a missing management forecast is replaced by the consensus analyst forecast that managers allowed to represent earnings expectations for that quarter.

We first examine whether managers' policies generate a series of earnings expectations that is more persistent than earnings prepared under (and constrained by) GAAP.[3] We find that the earnings expectation series is far more persistent than the series of GAAP realizations. We then examine whether management's financial communication policy generates a series of earnings expectations that is more persistent than non-GAAP (or "street") earnings realizations (IBES actuals), in which analysts discretionarily exclude certain revenues, expenses, gains and losses from GAAP earnings, presumably because those items are not persistent. We find that the earnings expectation series is far more persistent than the series of non-GAAP street earnings realizations. We interpret these results as evidence that managers' financial communication policies result in high-quality forward-looking disclosure.

We next consider two alternative explanations for our results. First, it is possible that the higher persistence we find in managers' expectations series is simply a result of managers artificially smoothing earnings estimates. Achieving a persistent expectations series through artificial smoothing would impact the ability of the expectations series to reflect risk (i.e., the denominator in equity valuation). This is because the variability in the time series of expectations captures the risk properties of earnings, which can help investors establish the discount rate

[3] Before examining the persistence of management's communication policy, we present baseline within-firm comparisons to gauge whether our method yields results consistent with prior literature. Our first comparison is between the persistence of GAAP earnings and the persistence of both cash flow from operations and free cash flow. This captures the effect of accrual accounting on persistence. Consistent with Beaver (1970) and Lorek and Willinger (2011), we find higher persistence for GAAP earnings. Second, to examine whether "street" exclusions of certain GAAP items yield more persistent earnings, we compare the persistence of IBES earnings to the persistence of GAAP earnings. Consistent with greater informativeness of non-GAAP earnings to investors (Bradshaw and Sloan 2002; Bhattacharya, Black, Christensen, and Larson 2003; Brown and Sivakumar 2003), we find that street earnings are more persistent than GAAP earnings. Thus, the baseline tests suggest that our approach is sufficiently powerful to document results consistent with prior literature.

(Beaver, Kettler, and Scholes 1970; Baginski and Wahlen 2003). Thus, to address the first alternative explanation, we consider the risk characteristics of the expectations series. If managers artificially smooth expectations, then we do not expect the risk characteristics of the expectations series to mirror equity risk implied by market returns. However, contrary to the expectation under the smoothing explanation, we find very little evidence to suggest that the earnings expectations series generated by management's financial communication policy differs from that of GAAP or street realizations in terms of association with risk. Specifically, we do not reject the null that each alternative earnings time series (i.e., GAAP actuals, IBES actuals, and earnings expectations) has the same association between either (1) accounting beta and market beta or (2) accounting earnings volatility and market volatility. These results suggest that managers' expectation series are not lower quality than the GAAP and IBES series in terms of association with market risk and, therefore, do not support the explanation that managers achieve higher persistence of the expectations series through artificially smoothing estimates.

Second, although the earnings expectation series is more persistent than GAAP and street actuals and it is associated with market risk, it is still possible that the expectations series is artificially inflated or deflated, which could lead to overvaluation or undervaluation, respectively. Accordingly, we consider whether managers' financial communication policies create an expectations series that is mean inflated or deflated. We find that the expectations series yields a grand earnings mean across all firms that is significantly lower than the street realizations series, but significantly higher than the GAAP realizations series. We interpret this to suggest that managers' expectations are not systematically under- or over-inflated, consistent with managers' expectation series being high-quality on average.

Next, we perform multiple sets of additional analysis. First, we consider whether and how managers alter their financial communication policy over the course of the quarter. To do so, we examine the *first* expectations issued for each quarter (our primary tests use the *last* expectations issued each quarter). We continue to find that the expectation series is more persistent than both GAAP and IBES. Interestingly, the persistence of the series formed with first-of-quarter expectations is also significantly greater than the persistence of the series formed with last-of-quarter expectations. This decline in persistence throughout the period is consistent with a late-in-the-quarter change in management policy, possibly to engage in expectations management (e.g., Matsumoto 2002).

We also consider how using the first expectations for each quarter alters our tests on systematic risk and mean inflation/deflation. With respect to systematic risk, we find that a series formed from the first earnings expectations within a quarter exhibits some smoothing behavior in that its association between the raw volatility of the series and the raw volatility of market returns is smaller than that of the two benchmark series. With respect to mean inflation, we find that the first expectation series exhibits a higher mean than both GAAP and IBES actuals. In totality, these results suggest a change in management policy during a quarter from an early expectation series that has higher persistence but is slightly smoothed and mean-inflated to a later series that has lower persistence but is not smoothed or mean-inflated.

In our final set of tests, we consider the implications of a high-quality financial communication policy for firms' cost of equity capital. Although a substantial body of literature links disclosure quality to lower cost of capital (e.g., Botosan 1997; Easley and O'Hara 2004; Balakrishnan, Billings, Kelly, Ljungqvist 2014; Baginski and Hinson 2016), this link is still debated in extant work (e.g., Hughes, Liu, and Liu 2007; Cohen 2008; Eugster 2020). To shed

additional light on this debate, we identify firms with high-quality financial communication policies by defining an indicator variable equal to one for firms whose expectations series exhibits higher persistence than their GAAP and IBES actuals series. Regardless of whether we compare the expectations series to GAAP or IBES actuals, we find that firms with expectations series that are more persistent than actual earnings realizations exhibit cost of equity capital that is approximately 0.4% lower than firms without high-quality policies. In addition, we document that these results are incremental to a measure of forecast quality commonly employed in prior work – management forecast frequency.[4] However, we caveat that we only find these results when we define our expectations measure using the first expectations series issued during the quarter rather than the last expectations series issued. Nonetheless, these results are consistent with prior work linking higher quality financial disclosure to lower cost of capital.

Our study contributes to the debate about whether management guidance, in all forms, is high quality. Our findings suggest that managers' various activities to inform equity markets about firm value transform the series of GAAP earnings realizations into a more persistent series of earnings expectations, but not in a way that creates artificial smoothness or that inflates or deflates the mean of the series. However, we detect a shift in management policy within the quarter, from an initial earnings expectation series that has higher persistence but is slightly smoothed and mean-inflated to a later series that, although less persistent, is not smoothed or mean-inflated.

We also contribute to the literature on management forecasting by providing unique insights from a times series-based research design. Traditional approaches to assessing

[4] We define an indicator for a high-quality expectations series based on management forecast frequency that equals one for a firm whose expectations series contains an above median number of management forecasts (recall that we replace missing management forecasts for a given quarter with the analyst consensus forecast). We find no evidence to suggest that higher frequency management forecasting is associated with cost of capital. This result is consistent with our motivation for examining persistence – forecast frequency is content free with respect to valuation and thus measures forecast quality with significant error.

management's disclosure policy are primarily pooled time-series and cross-sectional studies that examine measures such as the probability of issuing guidance or the accuracy of individual forecasts. These measures are content free with respect to valuation and cannot speak to management's forecast policy over a longer-term horizon. We employ times series techniques to investigate the quality of management's financial communication policy over a longer horizon. Investigating quality in the context of a longer firm-specific time series is a closer conceptual match to disclosure policy, the pre-commitment to which drives the disclosure quality and cost of equity capital relation (e.g., Leuz and Verrecchia 2000), and the existence of which aligns with the multi-period disclosure game (Stocken 2000, Einhorn and Ziv 2008).

Finally, our study provides insights into *what* earnings construct managers are forecasting by comparing the properties of the time series of expectations from management's financial communication policy to the properties of alternative earnings-related series. While the forecasted construct might be GAAP earnings (or some near variant such as GAAP earnings before discontinued operations and extraordinary items), the construct could be a non-GAAP measure. Managers are typically silent about what they are forecasting, but sometimes describe it in the press release (36.5% of the time in Christensen, Merkley, Tucker, and Venkataraman 2011; and 73% of the time in a smaller subsample in Ciconte et al. 2014). Further, when managers forecast non-GAAP earnings, their exclusions appear to affect analyst forecast exclusions (Christensen et al. 2011), suggesting that non-GAAP earnings is the forecast objective of both parties. Understanding whether managers transform the GAAP earnings persistence properties by creating expectations of some form of (more persistent) non-GAAP earnings helps us understand managers' perceptions of the usefulness of GAAP earnings to investors. Our results suggest that

management's financial communication policy yields a time series that is unique in that it is more persistent than either GAAP or street earnings.

2. Background and Motivation

Managers engage in various activities to inform equity markets about firm value. Over time, managers produce an actual earnings time series under GAAP. Managers also assist analysts in forming a time series of earnings expectations by engaging in financial communication activities such as participating in conference calls and investor days, providing access to investor relations personnel, and providing pro forma earnings disclosures. Managers observe analysts' earnings expectations, which are a product of management's financial communications and analysts' own private information gathering. If analysts' earnings expectations are incorrect, managers can disclose their own earnings forecasts to adjust analysts' expectations (Ajinkya and Gift 1984; King, Pownall, and Waymire 1990). Alternatively, if analysts' and managers' expectations are aligned, the manager can remain silent. Therefore, in the broadest sense, earnings expectations represent a key output of management's financial communication policy, regardless of whether managers provide individual earnings forecasts or simply influence the process by which the market forms expectations.

Over time, a time series of earnings expectations is formed. This time series represents managers' financial communication *policy* over a long horizon. On one hand, this series could be especially valuable to equity investors because it is timely, forward-looking, and can benefit from management's private information. On the other hand, the series is largely voluntary, allegedly biased due to managerial incentives, and unconstrained by GAAP. We evaluate the quality of the financial communication policy from an equity valuation perspective by examining the persistence of managers' expectation series.

Earnings persistence is an important measure of earnings quality and consequently equity valuation. Specifically, current earnings are a summary measure of performance and are directly linked to equity prices through Beaver's (1998) model of equity valuation: current earnings – future earnings – future dividends – equity price. Because of the intertemporal link between current earnings and future earnings, earnings persistence has emerged as a key earnings quality measure. For example, Collins and Kothari (1989) and Kormendi and Lipe (1987) directly estimate the time-series persistence of GAAP earnings and test whether persistence explains the pricing of current earnings as reflected in earnings response coefficients.

Although times-series earnings persistence is a fundamental earnings quality metric, it is not the only measure of earnings quality used in the literature. For example, Francis, LaFond, Olsson, and Schipper (2004) measure characteristics of accrual accounting that could lead to higher or lower time-series persistence, such as earnings volatility and abnormal accruals and Dechow (1994) and Dechow and Dichev (2002) directly examine the accruals process itself. We use persistence as our measure of quality because of its tie to equity valuation.

Further, our analyses of time-series earnings persistence are within-firm comparisons of earnings persistence measures (e.g., comparing the expectation series to the GAAP actual series), and thus control for firm-specific economics. We benchmark the persistence of the expectations time series against the actual GAAP earnings time series and the actual IBES (i.e., street) earnings time series. We choose GAAP earnings as a benchmark because we are interested in whether managers use their private information to transform the time series of actual GAAP earnings into a higher quality time series of earnings expectations. We choose actual street earnings as a second benchmark to investigate the strength of that transformation, that is, whether that private information yields a higher quality time series than a series where analysts have witnessed the

actual earnings outcome and removed transitory items. Using firm held constant tests controls for known as well as unknown and potentially unobservable firm-specific determinants of persistence and mitigates the concern in Dechow, Ge, and Schrand (2010) that earnings quality measures often comingle the measurement system and the firm's fundamental performance. Further, time-period is held constant in the firm-specific comparisons and it is longer range in nature (5 years), removing shorter run, within-firm, time-period-specific variation as an alternative explanation for differences between the time-series persistence factors.

3. Sample and Research Design

3.1 Sample

We collect all firms from Compustat that have 20 quarterly GAAP earnings realizations observations from the first quarter of 2011 through the fourth quarter of 2015. We begin the sample in 2011 to avoid major regulatory changes (i.e., PSLRA and SOX), the financial crisis, and the time when management forecast databases were less complete (Chuk, Matsumoto, and Miller 2013). We end the sample in 2015 in order to use a five-year period of earnings, as using a longer period to create firm-specific time series of earnings would lead to additional sample attribution. However, in Section 3.2 we discuss the robustness of our results to using 40 quarters (i.e., a ten-year period).

We then access IBES to collect and construct several time series:

EXP = the series of earnings expectations for the quarter. The observations in this series are the most recent (i.e., last) available management EPS forecasts for the quarter (*MF*) if available and the median of the most recent analyst forecasts for the quarter (*AF*) if not. We use the midpoint for range management forecasts.

ACT_{GAAP} = the actual GAAP EPS before discontinued operations and extraordinary items for the quarter.

ACT_{IBES} = the actual EPS for the quarter from IBES (i.e., "street" actuals).

CFO = cash flow from operations per share for the quarter.

FCF = free cash flow per share for the quarter defined as cash flow from operations minus cash flows from investing activities.

Table 1 shows the sample distribution. The number of firms with all 20 quarters in the ACT_{GAAP} series is 2,806. Necessary data to compute cash flows from operations and free cash flows yields 2,706 and 2,655 firms in the CFO and FCF series, respectively. The expectations series (EXP) has complete data for 2,047 firms and the street actuals series (ACT_{IBES}) has data for 1,950 firms. When we perform comparisons of the persistence of various time series, we perform these tests on samples that hold the firm constant. For example, if we compare the ACT_{IBES} to the ACT_{GAAP} series, we would have 1,950 firms in this test because even though the ACT_{GAAP} series has 2,806 complete series, we only have 1,950 firms with complete series for *both* ACT_{IBES} and ACT_{GAAP}. Accordingly, our number of sample firms varies throughout the paper based on the comparison of interest.

3.2 Research Design

To capture earnings persistence, we use 20 quarterly observations from 2011 – 2015 to estimate the premier Brown-Rozeff (1979) ARIMA model for each firm. Specifying the time series length involves a trade-off between estimation efficiency and sample size reduction given that many firms do not have complete time series for longer periods for the alternative earnings measures we examine. Longer time series mitigate Dechow et al.'s (2010) concern that, in the short run, managers are able to create an artificially high earnings persistence by managing

earnings. However, longer series strain the assumption of a stable management financial communication policy.[5]

Denoting x_t as the time t observation in the series of interest (e.g., EXP, ACT_{GAAP}, etc.) and a_t as the disturbance term at time t, the Brown-Rozeff model is as follows: [6]

$$x_t = x_{t-4} + \varphi(x_{t-1} - x_{t-5}) + a_t - \theta(a_{t-4}) \quad (1)$$

The autoregressive parameter (φ, denoted *AR* hereafter) and the seasonal moving-average parameter (θ, denoted *SMA* hereafter) are the estimated model parameters which capture serial correlation. Several studies have demonstrated the descriptive validity of the Brown-Rozeff model for quarterly earnings time series and for cash flow from operations as well (Lorek and Willinger 2011).

Prior research derives persistence factors from various ARIMA structures for annual earnings (e.g., Beaver, Lambert, and Morse 1980; Flavin 1981; Miller and Rock 1985; Kormendi and Lipe 1987; Easton and Zmijewski 1989; Collins and Kothari 1989). Baginski, Branson, Lorek, and Willinger (2003) derive the persistence factor from the quarterly Brown-Rozeff model in an analogous fashion:

$$PER = \left(\frac{AR}{1+r-AR} + \frac{(1+r)(1-SMA)}{(1+r-AR)[(1+r)^4-1]}\right)a_t \quad (2)$$

where r is the quarterly discount rate and a_t is the shock in a given period. We also tabulate values of *AR* and *SMA* for each series.[7] We use the form *time-series (AR,SMA,PER)* to denote the

[5] We examine the reasonableness of a 20-quarter time series in two ways. First, we estimate the Spearman rank-order correlation between persistence factors derived from our 20-quarter expectation series and a 40-quarter expectation series from 2006 to 2015 for a smaller sample. We find that the persistence factors from the two series of different lengths are highly and significantly correlated (0.591; $p < 0.01$), indicating that the use of a 20-quarter series is reasonable. Second, and more importantly, if estimation using a shorter series unacceptably increases noise, then we will not have sufficient power to reject the null of no difference in persistence between series. We reject the null in every case. Most notably, we reject the null in the expected direction for baseline tests that confirm results in past research.

[6] In Box-Jenkins notation, the Brown-Rozeff model is denoted (1,0,0) x (0,1,1).

[7] Given that we evaluate all series over the same time frame and wish to measure persistence independent of a firm-specific discount rate, we set r equal to 2%. We also set a_t to 1 (i.e., a one dollar shock) for all series.

parameter estimates for each series. For example, ACT_{GAAP} *(SMA)* is the seasonal moving-average parameter estimated from the ACT_{GAAP} series.

We make several within-firm comparisons of the *AR*, *SMA*, and *PER* parameters between alternative time series to understand the relative persistence of the series. We are particularly interested in the EXP series because it captures the effects of management's financial communication policy. To be complete, the tests that follow report the autoregressive parameter *AR*, the seasonal moving-average parameter *SMA*, and the persistence factor *PER* from equation (2). From inspection of equation (2), persistence is increasing in *AR* and decreasing in *SMA*. Therefore, *AR* and *SMA* results indicate a higher *PER* when *AR* is high and/or *SMA* is low.

Table 2 presents our estimates of the persistence factors for the Brown-Rozeff model. We compare the descriptive statistics to prior literature where possible. Specifically, Lorek and Willinger (2003) report *AR* and *SMA* estimates from roughly 700 firms during 1989 – 2007 for quarterly GAAP earnings and quarterly CFO that can be compared to ours. They report GAAP earnings mean *AR* and *SMA* estimates of 0.366 and 0.635, respectively (we report 0.32 and 0.55, respectively). They report a much lower CFO mean *AR* estimate (0.109) and an *SMA* estimate (0.578) that is closer to the GAAP earnings *SMA* estimate. We also find a much lower *AR* value for CFO (-0.12) and an *SMA* value (0.51) that is closer to the GAAP earnings *SMA* value.

Table 2 also shows that the number of firms with available data varies depending on the series. In subsequent tables with comparisons of time series, the tests are based on the smallest number of firms in the comparison to hold firm constant. In addition, *PER* is highly skewed, so we use tests of differences in medians rather than means. Based on the results in Table 2 and the tables that follow, we discuss only the summary persistence factor (*PER*) results because the results on the components of persistence (*AR* and *SMA*) are consistent with the persistence factor results.

4. Results

4.1 Baseline Results: GAAP Actuals Earnings Persistence and Prior Research

Before examining the persistence of management's communication policy using the expectation series, we examine baseline within-firm comparisons of various actual realizations numbers to gauge whether our method yields results consistent with prior literature. Specifically, we compare the persistence of (1) GAAP actual earnings to the persistence of both cash flow from operations and free cash flow, and (2) GAAP actual earnings to IBES actual earnings. We compare the persistence of GAAP actuals to the persistence of cash flow measures because Beaver (1970) argues that accrual accounting conventions (e.g., depreciation) smooth the GAAP earnings time series and thus increase persistence, and because Lorek and Willinger (2011) document higher persistence for GAAP earnings relative to cash flow from operations. We compare the persistence of GAAP actual earnings to IBES actuals because prior research suggests that "street" exclusions of certain GAAP items from the computation of accrual accounting earnings result in higher-quality earnings, which should yield more persistent earnings (e.g., Bradshaw and Sloan 2002; Bhattacharya et al. 2003; Brown and Sivakumar 2003).

Table 3, Panel A presents the results. With respect to GAAP versus CFO persistence, the median *PER* for the ACT_{GAAP} series equals 7.76, which is significantly greater than the median *PER* for the CFO series of 4.17 ($p < 0.01$). With respect to GAAP versus FCF persistence, the median *PER* for the ACT_{GAAP} series equals 7.80, which is significantly greater than the median *PER* for the FCF series of 4.61 ($p < 0.01$). These results are consistent with the findings in Lorek and Willinger (2011), which provides evidence that our methods are sufficiently powerful to capture differences in persistence across earnings metrics.

Our second baseline test examines whether "street" exclusions of certain GAAP items from the computation of accrual accounting earnings yield more persistent earnings. We compare the persistence of IBES (i.e., street) earnings with the persistence of GAAP earnings. Consistent with the findings that non-GAAP earnings are more informative to investors (Bradshaw and Sloan 2002; Bhattacharya et al. 2003; Brown and Sivakumar 2003), we find that our street earnings measure is more persistent than GAAP earnings. Specifically, in Table 3, Panel B, the median *PER* for the ACT_{IBES} series of 15.97 is twice as large as the median *PER* for the ACT_{GAAP} series of 7.97 ($p < 0.01$). Although we motivate this test as a means of validating the power of our persistence approach, this is the first evidence to our knowledge of the relatively higher persistence of street earnings using a time-series approach.

Overall, the results in Table 3 suggest that using the premier Brown-Rozeff (1979) ARIMA model results in inferences consistent with prior work. Given that our methods appear sufficiently powerful to generate inferences similar to prior research, we move on to our primary tests – examining the persistence of managers' expectations series relative to the persistence of other earnings metrics produced by the firm.

4.2 The Persistence of the Earnings Expectations Time Series

Our primary goal is to investigate the persistence of the time series of managers' earnings expectations. We view this series as the result of management's financial communication policy. That policy consists of indirect assistance to analysts in forming earnings expectations (e.g., conference calls, investor days, investor relations, pro forma earnings disclosures) and direct assistance via management's disclosure of its own earnings forecasts. The direct assistance is unnecessary if analysts' expectations are aligned with the manager's expectations. Therefore, in our view, manager silence when expectations are aligned is a part of management's financial

communication policy. Thus, in the broadest sense, the time series of observable earnings expectations represents the output of the financial communication policy, regardless of whether individual earnings expectations in the series are directly provided by management or simply influenced and allowed to remain outstanding by management.

As noted earlier, we form the time series of earnings expectations (EXP) using available management forecasts and supplementing with existing consensus analyst forecasts when the management forecast is missing.[8] This series is valuable to equity investors because it is timely, forward-looking, and can benefit from management's private information. On the other hand, the series might be heavily influenced by incentives to distort, and it is not constrained by GAAP.

Table 4 presents our main results on the persistence of the expectations series that is generated by management's financial communication policy. Panel A reports that the median *PER* for the expectations series (EXP) is 25.79, which is substantially larger than the median ACT_{GAAP} *PER* of 7.94 ($p < 0.01$). Therefore, management's communication policy transforms a less persistent GAAP series into a more persistent series of earnings expectations for equity valuation (i.e., a higher quality series on the persistence dimension). Importantly, these firm-held-constant comparisons mitigate the concern expressed by Dechow et al. (2010) that the time-series persistence approach is confounded by cross-sectional differences in economics.

Table 4 panel B compares the persistence of the expectations series to street earnings (i.e., IBES actuals). The median *PER* for the expectations series (EXP) in this slightly smaller sample is 26.07, which is substantially larger than the median ACT_{IBES} *PER* of 15.97 ($p < 0.01$). The

[8] Direct issuance of management guidance represents one of many financial communication channels. Nevertheless, we examine whether our primary findings hold in a sample of firms that uses the management guidance option at least once during the sample period. We find consistent results in the sample of firms that issue at least one EPS forecast during the period over which the EXP series is measured (i.e., the persistence of the EXP series is higher than both the GAAP series and the street earnings series). We choose not to use this sample throughout our paper because this sample requirement reduces our sample by 71% percent.

finding that the earnings expectation series is substantially more persistent than street earnings is especially interesting. It suggests that the "one off" items that analysts regularly exclude from street earnings due to their transitory nature fall far short of the set of transitory earnings that actually exist. The expectations series excludes more of the transitory items and thus is of a higher quality.

Overall, the results in Table 4 suggest that managers' expectation series is more persistent than both the actual earnings realization measured by GAAP or by "the street" (i.e., IBES actuals). Under the equity valuation perspective, this evidence is consistent with management financial communication policies that are high quality, on average. However, it is possible that managers achieved the increased persistence of the expectation series by artificially smoothing the series or by inflating/deflating earnings expectations. For this reason, we examine the association of the alternative series with market risk as well as the inflation or deflation of the series' mean EPS in the sections that follow.

5. Potential Alternative Explanations

5.1 Do Managers Artificially Smooth Earnings Expectations? Evidence from Systematic Risk

It is possible that the higher persistence we find in managers' expectations series is simply a result of managers artificially smoothing their earnings expectation estimates over time. However, achieving a persistent expectations series through artificial smoothing would impair investors' estimation of risk (i.e., the denominator in equity valuation) because the (lack of) variation in the expectations series would not reflect equity value-relevant systematic risk. Thus, we investigate the association between the expectations series' risk properties and market risk properties as a check on *how* the persistence of the expectations series was achieved. If managers

achieve a persistent expectation series through artificial smoothing, then the risk characteristics of the expectations series will not mirror equity risk implied by market returns.

5.1.1 Measuring Market Beta and Accounting Beta

To perform this test, we examine how a measure of systematic risk implied from the accounting earnings series correlates with a measure of risk implied by market returns. This requires a measure of risk imputed from the accounting earnings series as well as a measure of risk implied by market returns. This method follows Beaver (1998) who notes that earnings play another role under a mean/variance capital asset pricing model (CAPM) approach (see Sharpe 1995) by facilitating the *assessment of systematic risk*, and Beaver, Kettler, and Scholes (1970) and Beaver and Manegold (1975) who operationalize the systematic risk assessment role of earnings as the ability of accounting beta, based on the time-series association between firm and market earnings, to explain CAPM beta.

First, we compute each firm's market-based measure of risk, market beta (*MBETA*), using a market model estimated over the 20 quarters that encompass our earnings time series. In an analogous fashion, we measure each firm's accounting beta (*ABETA*), as the covariance of a given firm's earnings for the quarter with aggregate market earnings (i.e., mean earnings for all firms in the same quarter) for a given time series. For example, accounting beta for the EXP series equals the covariance of a given firm's expected EPS with the sample-wide mean of the expected EPS over the 20 quarters in our sample.

5.1.2 Does the Earnings Expectations Time Series Capture Systematic Market Risk?

Table 5, Panel A presents cross-sectional Spearman rank-order correlations between accounting beta *(ABETA)* estimated from a given time-series and market beta *(MBETA)*. We

discuss results from the firm held constant samples; however, we present results for the firm held constant samples as well as the full samples of each time series to show that the firm held constant samples are representative.

A higher cross-sectional correlation indicates that a given time series provides a better relative ranking of firms in the cross-section on the systematic risk dimension. The street earnings (ACT_{IBES}) accounting beta has the highest association with market beta (rank-order correlation of 0.090), followed by the accounting beta of the earnings expectations series (EXP; rank-order correlation of 0.077), and finally the accounting beta of the actual GAAP earnings (ACT_{GAAP}; rank-order correlation of 0.074).[9] The correlation for the street earnings series is not significantly greater than the correlation for the expectations series (test of differences p = 0.296 in the Full Sample and p = 0.274 in the Firm Held Constant Sample).[10]

In Table 5, Panel B, we investigate the ability of the alternative series to capture raw return volatility. While the CAPM does not view total return volatility as relevant in equity valuation (absent its effect on systematic risk), total return volatility does capture an important market phenomenon and possibly pricing effects in a non-CAPM framework. Further, examining how given EPS time series volatility captures (or informs) return volatility can provide insights into potential smoothing behavior reflected in the earnings time series. Smoothing behavior could lead to greater persistence but possibly at the expense of failure to capture return volatility.

Again, we discuss the Firm Held Constant column. The volatility of actual GAAP earnings (ACT_{GAAP}) has the highest association with raw return volatility (rank-correlation of 0.482),

[9] All of the Spearman rank-order correlations are statistically greater than zero, indicating a positive association between accounting and market beta regardless of the series. We calculate significance using the method in Williams (1959) given its superior performance in Monte Carlo simulations (Hittner, May, and Silver 2003).

[10] The Full Sample tests of differences are performed on the subset of observations that contain data from both series. For this reason, the differences presented for the Full Sample are not calculable from the presented Spearman correlations (e.g., the Spearman correlation for ACT_{IBES} of 0.090 minus the 0.075 for the EXP series is 0.015, but we present the difference in Table 5 Panel A as 0.012).

followed by the earnings expectations series (EXP), and finally the street earnings series (ACT_{IBES}). The difference between the ACT_{GAAP} correlation and the EXP correlation is marginally statistically significant ($p < 0.10$). The difference between the two actual series, street vs GAAP, is also statistically significant ($p < 0.05$). Overall, the results in Table 5 provide no or little evidence that the expectation series has a lower correlation with systematic risk than either street earnings or GAAP earnings. Together, Table 4 and 5 results suggest that the earnings expectations series exhibits higher persistence than the benchmark GAAP and street earnings series, yet the expectations series' correlation with market beta is not significantly different from the benchmark series' correlations. Thus, we conclude that the greater persistence of the earnings expectations series has not been achieved at the expense of creating a series that does not reflect systematic risk, on average.

5.2 Is the Mean of the Expectations Series Inflated or Deflated?

Although the earnings expectation series is more persistent than GAAP and street actuals and it is associated with market risk, it is still possible that the expectations series is artificially inflated or deflated. Artificially inflated or deflated expectations can be both persistent and highly associated with equity risk but will lead to overvaluation or undervaluation, respectively. However, if managers' financial communication policy is high quality, it should create a series of earnings expectations where the mean expectation is not inflated or deflated. To examine whether the expectation series is inflated or deflated, we calculate the grand mean of the return on common equity (MROE) for the earnings expectation series, GAAP earnings, and street earnings over the sample period. We benchmark the MROE of the expectation series to that of GAAP earnings and street earnings to measure whether the expectation series is artificially inflated or deflated, as this

within-firm comparison allows us to compare the level of earnings reported by each series for the same firm-period.

Table 6 reports the grand means of each of the accrual-based time series. Focusing again on the firm held constant tests, the street earnings series exhibits the highest grand mean (MROE = 0.031), followed by the expectation series (MROE = 0.029), and finally the GAAP earnings series (MROE = 0.022). The differences between all three series are statistically significant. Accordingly, the expectations series yields a grand earnings mean across all firms that is significantly lower than the street realizations series, but significantly higher than the GAAP realizations series. We interpret this to suggest that managers' expectations are not systematically under- or over-inflated, consistent with managers' expectation series being high quality on average.

Overall, our findings suggest that management's financial communication policy to inform equity markets about firm value transforms the series of GAAP earnings realizations into a more persistent series of earnings expectations, but not in a way that creates artificial smoothness or in a way that inflates or deflates the mean of the series.

6. Additional Analyses

In this section, we first consider an alternative measure of the expectation series. We construct the alternative expectation series using the *first* management forecast (or analyst consensus forecast if missing) issued for each period rather than using the last forecast for each period as in our primary analysis. Second, we explore cross-sectional tests of cost of equity capital

consequences using various proxies of a high-quality management financial communication policy.

6.1 Alternative Expectation Series Using the Earliest-Issued Forecasts

In our primary analyses, we construct the expectation series by using the most recent management forecast (or analyst forecast if no management forecast is given) for each period. However, prior literature suggests that managers have incentives to walk down analysts during the period, suggesting the possibility of an intra-quarter change in firms' disclosure policies (Matsumoto 2002; Cotter, Tuna, and Wysocki 2006). In other words, it is possible that managers' early forecasts for a period do not exhibit the same properties as the later forecasts for that period. Accordingly, we examine the implications for our results if we instead measure the expectation series using the first forecast provided for each quarter (EXP_{FIRST}). We re-examine our tests of persistence, as well as our tests that address alternative explanations (i.e., correlation with systematic risk and whether the series is inflated/deflated).

Table 7, Panels A and B reproduce our persistence tests using the EXP_{FIRST} series (i.e., a replication of Table 4). Panel A reports median *PER* for the EXP_{FIRST} series of 31.64, which is significantly greater than the median *PER* for the ACT_{GAAP} series of 7.94 ($p < 0.01$). In Panel B, the median *PER* for the EXP_{FIRST} series of 32.88 is significantly greater than the median *PER* for the ACT_{IBES} series of 15.97 ($p < 0.01$). Thus, the Table 7 results using the first-in-the-quarter expectations are consistent with the results in Table 4 using last-of-the-quarter expectations. Management's communication policy results in a time series that is more persistent than time series of both GAAP and street earnings.

However, an interesting pattern emerges when we compare the EXP series to the EXP_{FIRST} series in Table 7 Panel C. The persistence factor for the first expectations series of 31.64 is

significantly greater than the persistence factor for the last expectations series of 25.79. This result is consistent with a management policy that varies within a period, potentially due to the expectations management game (Matsumoto 2002). That is, the expectations series is altered as the actual earnings realization approaches.

Next, we consider implications of using the EXP_{FIRST} series for our tests of correlation with systematic risk (i.e., a replication of Table 5). Table 7 Panels D and E present the results. In both Panels D and E, the EXP_{FIRST} series exhibits the lowest correlation between the measures of risk. In Panel D (where we examine the correlation between accounting beta and market model beta), the EXP_{FIRST} series has a significantly lower correlation than that of the IBES series, but not that of the GAAP series. However, in Panel E (where we examine the correlation between accounting earnings volatility and market return volatility), the EXP_{FIRST} series has a significantly lower correlation than that of both the IBES and GAAP series. These results suggest that the relatively higher persistence of the expectations series documented in Table 7 Panels A through C may have been achieved by masking some equity value-relevant risk. [11]

Finally, we consider whether the EXP_{FIRST} series exhibits evidence of mean inflation. Table 7 Panel F reproduces the results in Table 6 using the EXP_{FIRST} series. The series formed from the first earnings expectations within a quarter yields a grand earnings mean across all firms that is significantly higher than both GAAP and street realizations. Again, this intraperiod behavior of the mean expectation suggests a change in management forecast policy during a quarter. This evidence on the series mean expectation is consistent with the analyst walk-down documented by Matsumoto (2002) and Cotter et al. (2006) in that early expected earnings are inflated, later

[11] The greater smoothing behavior early is consistent with Baginski, Campbell, Ryu, and Warren (2022), who find smoothing behavior by management in their annual forecasts bundled with earnings releases, which are generally early in the quarter. They also find that the smoothing behavior is less as the forecast horizon decreases.

expected earnings are lower, and in the end, a positive unexpected earnings is realized when street earnings realizations exceed expectations, on average.

Overall, the results in Table 7 using the *first* forecast issued for each quarter suggest a significant shift in management's communication policy within the quarter. Namely, although the series using first-of-quarter forecasts exhibits higher persistence than the series using last-of-quarter forecasts, evidence suggests that this higher persistence is at least partially achieved by masking some equity value-relevant risk and by inflating the forecasted earnings number. Overall, these results are consistent with the analyst walk down literature in which managers issue inflated forecasts early in the period and then walk them down to more reasonable levels as the actual earnings announcement date approaches.

6.2 Financial Communication Policy and Cost of Capital

In our primary tests, we find that managers use their financial communication policy in a way that produces a persistent long-run earnings expectations series, without creating a series that masks systematic risk and inflates the mean expectation (at least as the forecast horizon becomes shorter). We conclude that management's financial communication policy is relatively high quality, on average. A follow-up question naturally arises from this finding. Given that the quality of the earnings expectations series varies in the cross-section, is it associated with a firm's cost of equity capital? Although a substantial body of literature links disclosure quality to lower cost of capital (e.g., Botosan 1997; Easley and O'Hara 2004; Balakrishnan et al. 2014; Baginski and Hinson 2016), this link is still debated in extant work (e.g., Hughes et al. 2007; Cohen 2008; Eugster 2020).

In the tests that follow, we define a higher quality management financial communication policy as one that yields a greater persistence relative to actual GAAP or street earnings. Our

independent variable measuring high quality related to persistence is *HQ_PER*, an indicator variable equal to one if the persistence of the expectations series is greater than the persistence of the actual earnings series, and zero otherwise. We measure *HQ_PER* using GAAP earnings (ACT_{GAAP}) as well as street earnings (ACT_{IBES}) as the benchmarks.

We next depart from the equity valuation perspective of quality and create a second independent variable based on management forecast frequency. Prior literature finds that management forecast frequency is associated with lower cost of equity capital (Baginski and Rakow 2012; Baginski and Hinson 2016). Thus, we measure *HQ_MFFREQUENCY*, an indicator variable equal to one if the expectations time series contains an above median number of management forecasts, and zero otherwise.[12] Including this variable in some specifications allows us to examine whether quality based on persistence provides benefits that are incremental to that of forecast frequency.

Our dependent variable is cost of equity capital. We use *ex ante* or implied cost of equity, calculated using four different models: Claus and Thomas (2001), Gebhardt, Lee, and Swaminathan (2001), Ohlson and Juetter-Nauroth (2005), and the PEG ratio from Easton (2004). The mean of the four implied cost of capital measures, *ICC*, is our proxy for the cost of equity capital.[13]

We estimate the following purely cross-sectional model (i.e., one observation per firm estimated at a fixed point in time):

$$ICC_i = \delta_0 + \delta_1 HQ\_PER_i + \delta_2 HQ\_MFFrequency_i + Controls_i + \varepsilon_i \qquad (3)$$

[12] We calculate management forecast frequency as the number of quarterly management forecasts during the five-year period. *HQ_MFFREQUENCY* equals one when management forecast frequency is above its sample-wide median value and zero otherwise.

[13] Our results are qualitatively similar using each of the four individual implied cost of equity capital measures, although results are statistically insignificant for the measure based on Gebhardt et al. (2001).

where *Controls* is a vector of control variables measured at December 31, 2015: firm size (*MVE*), market beta (*Beta*), market-to-book (*MB*), leverage (*Debt*), return on equity (*ROE*) to control for performance, and analyst coverage (*Analyst*) (Frankel and Li 2004). The coefficient on δ_0 is the cost of capital estimate, for which we expect to find a positive and significant value. The coefficients δ_1 and δ_2 capture the effect of the quality proxy on cost of equity capital, with the expectation that the coefficients will be negative.

For these tests, we consider quality definitions based both on the expectation series defined using the most recent forecast for each period (similar to our primary analyses), as well as a definition based on the first forecast issued for each period, consistent with our first additional analysis.

We first consider the expectation series defined using last-of quarter forecasts (EXP). In Table 8, Panel A, the quality measures (*HQ_PER* and *HQ_MFFrequency*) compare the EXP series to GAAP actuals (ACT_{GAAP}). In Table 8, Panel B, the quality measures compare the EXP series to street actuals (ACT_{IBES}). In each of the panels, we estimate results using just *HQ_PER* (column 1), just *HQ_MFFrequency* (column 2), and both *HQ_PER* and *HQ_MFFrequency* together (column 3).

In both Panels A and B, we find a positive and significant coefficient on the intercept, consistent with a positive estimate for firms' cost of capital. However, we find insignificant coefficients on both quality measures (i.e., *HQ_PER* and *HQ_MFFrequency*). This suggests that relatively high persistence in the last-of-quarter expectation series and relatively more frequent management forecasts do not significantly reduce a firm's cost of capital.

Next, we consider the expectation series defined using first-of-quarter forecasts. In Panel C (i.e., comparing the EXP_{FIRST} series to ACT_{GAAP}), the coefficient on *HQ_PER* is negative and

significant at the $p < 0.10$ level, which suggests that firms with communication policies that form expectations series that are more persistent than the GAAP actual earnings series experience lower cost of equity capital. The coefficient on *HQ_MFFrequency* is insignificant. Importantly, however, the negative coefficient on *HQ_PER* is significant even after including the more traditional measure of communication policy quality based on management forecast frequency. This is consistent with incremental cost of capital benefits when management's communication policy is high quality from an equity valuation perspective. In Table 8, Panel D (i.e., comparing the EXP_{FIRST} series to ACT_{IBES}), the coefficient on *HQ_PER* is negative and highly significant ($p < 0.01$).

Overall, the cross-sectional evidence in Table 8 provides some evidence that the quality of the earnings expectations series is associated with a firm's cost of equity capital. Firms with management communication policies that result in series of earnings expectations, particularly first-of-quarter expectations, that are higher quality from an equity valuation perspective have lower cost of equity capital, on average. The lower cost of equity capital associated with the equity valuation quality measures is incremental to any association with the traditional measure of communication quality that is based on management forecast frequency.

7. Conclusion

Management's financial communication policy informs earnings expectations directly through issuance of management earnings forecasts or indirectly through influencing analyst earnings forecasts. We investigate the quality of management's communication policy from an equity valuation perspective. An important factor in the equity valuation task is the link between current earnings and future earnings, i.e., earnings persistence. We examine whether the earnings expectations time series resulting from management's communication policy exhibits greater

persistence than actual earnings realization series based on GAAP and street earnings. Further, we investigate whether managers achieve persistence at the expense of other relevant factors in the equity valuation task: risk properties and earnings expectations that could lead to overvaluation or undervaluation.

Our evidence suggests that management's financial communication policy generates a series of earnings expectations that is more persistent than both GAAP and non-GAAP street earnings realizations. This is consistent with expectations series that exclude more of the transitory items and thus are of a higher quality. Alternatively, it could be consistent with expectations series that are artificially smoothed and inflated or deflated and thus of lower quality. For this reason, we examine the alternative series' association with market risk and mean inflation/deflation.

We find little evidence that earnings expectations series generated by management's financial communication policy differ from GAAP and street realizations series in terms of the association of systematic risk properties and systematic market risk. We find evidence that a series formed from the first earnings expectations within a quarter yields an earnings mean across all firms that is significantly higher than both GAAP and street realizations. However, in the last earnings expectations series within the quarter, the earnings expectations mean falls below street earnings. Our findings suggest that management's financial communication policy to inform equity markets about firm value transforms the series of earnings realizations into a more persistent series of earnings expectations, but not in a way that creates artificial smoothness or in a way that consistently inflates the mean of the series. However, we detect a shift in management policy within the quarter, from creating an initial earnings expectation series that has higher persistence but is slightly smoothed and mean-inflated to creating a later series that, although less persistent, is not smoothed or mean-inflated.

In additional analyses, we investigate whether firms with earnings expectations series that are of higher quality from a valuation perspective experience lower cost of equity capital in the cross-section. Evidence suggests that firms with first-of-quarter expectations series with high persistence relative to the series of actual earnings expectations are associated with lower cost of capital. These results persist even after including the more traditional measure of communication policy quality based on management forecast frequency. This is consistent with incremental cost of capital benefits when management's communication policy is high quality from an equity valuation perspective.

We contribute to the literature on the quality of management guidance, in all its forms. Measures of quality in the extant literature include management earnings forecast incidence, frequency, accuracy, and bias as well as market reactions to management forecasts. Studies using these measures have formed a foundational body of literature; however, the measures have downsides in that they are content free with respect to valuation, require a benchmark, and/or capture individual disclosures instead of a long-term communication policy. We extend prior literature by focusing on equity valuation constructs and longer-run management forecast behavior, which provides insights that traditional approaches to assessing the outcomes of management's disclosure policy do not. Our study also provides insights into *what* earnings construct managers are forecasting. While the construct might be GAAP earnings (or some near variant such as GAAP earnings before discontinued operations and extraordinary items), the construct could be a non-GAAP measure. Our results suggest that management's financial communication policy yields a time series that is unique in that it is more persistent than either GAAP or street earnings.

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APPENDIX A

Variable Definitions

Variable	Definition
ACT_{GAAP}	The actual GAAP EPS before discontinued operations and extraordinary items for the quarter.
ACT_{IBES}	The actual EPS for the quarter from *IBES* (i.e., "street" actuals).
Analysts	The log of 1 plus the number of analysts forecasting EPS for firm *i* during year *t*. In regressions, *Analysts* equals 1 for above median values and 0 otherwise.
Beta	Market beta for firm *i* estimated using the market model over the 60 months ended in year *t* with a minimum of 30 out of 60 monthly returns and a market index equal to the value weighted market return. In regressions, *Beta* equals 1 for above median values and 0 otherwise.
CFO	Cash flow from operations per share for the quarter.
EXP	The earnings expectations for the quarter. The observations in this series are the last available management EPS forecasts for the quarter, and if the manager does not provide a forecast, the median of the last analyst forecasts for the quarter. We use the midpoint for a range management forecast.
EXP_{FIRST}	The earnings expectations for the quarter. The observations in this series are the first available management EPS forecasts for the quarter, and if the manager does not provide a forecast, the median of the first analyst forecasts for the quarter. We use the midpoint for a range management forecast.
FCF	Free cash flow per share for the quarter defined as *CFO* minus cash flows from investing activities.
HQ_PER	Higher quality of the earnings expectations series (*EXP*) captured by higher persistence relative to the GAAP or IBES series. Equals one when $EXP(PER) > ACT_{GAAP}(PER)$, and zero otherwise.
HQ_MFFrequency	Higher quality of the earnings expectations series (EXP) captured by the frequency of management forecasts making up the series (as opposed to analyst forecasts due to a lack of management forecast). *HQ_MFFrequency* equals one (zero) when the EXP series contains an above (below) median number of management forecasts in the series.
ICC	Implied cost of capital calculated as the mean of four implied cost of capital measures from Ohlson and Juetter-Nauroth (2005), the PEG ratio in Easton (2004), Claus and Thomas (2001), and Gebhardt, Lee, and Swaminathan (2001).
MB	The log of the ratio of market value of equity to book value of equity for firm *i* at the end of year *t*. In regressions, *MB* equals 1 for above median values and 0 otherwise.
MBETA	Market beta (i.e., systematic risk) estimated using a market model estimated over the 20 quarters that encompass our earnings time series.
MVE	The log of the market value of equity for firm *i* at the end of year *t*. In regressions, *MVE* equals 1 for above median values and 0 otherwise.
ROE	Firm *i*'s earnings before extraordinary items during year *t* divided by firm *i*'s book value of equity at the end of year *t*. In regressions, *ROE* equals 1 for above median values and 0 otherwise.

time-series(AR,SMA)	For a given time series, the estimated autoregressive parameter φ (also denoted *AR*) and the seasonal moving-average parameter θ (also denoted *SMA*) from the Brown-Rozeff (1979) quarterly time-series model $x_t = x_{t-4} + \varphi(x_{t-1} + x_{t-5}) + a_t - \theta(a_{t-4})$.
time-series(PER)	For a given series, the persistence factor from the Brown-Rozeff (1979) quarterly time-series model: $$PER = \left(\frac{AR}{1+r-AR} + \frac{(1+r)(1-SMA)}{(1+r-AR)[(1+r)^4-1]}\right)a_t$$
ABETA	Accounting beta, the covariance of a given firm's earnings for the quarter with aggregate market earnings (i.e., mean earnings for all firms in the same quarter) for a given time series. For example, accounting beta for the EXP series equals the covariance of a given firm's expected EPS of the period with the sample-wide mean of the expected EPS of the period.
MROE	The grand mean return on equity over 20 quarters for a given series. For example, *MROE* for the EXP series is the grand mean ROE from the firm's series of expectations.

TABLE 1

Distribution of Alternative Earnings Measures

	Number of Firms				
Number of quarters	***EXP***	***ACT_{IBES}***	***ACT_{GAAP}***	***CFO***	***FCF***
20	2,047	1,950	2,806	2,706	2,655
15 - 19	286	311		20	58
10 - 14	96	107		5	9
5 - 9	81	96		11	11
0 - 4	296	342		64	73
Total	2,806	2,806	2,806	2,806	2,806

Table 1 presents distributions of the number of quarters for which earnings information is available for each earnings series used in the analyses. All earnings series are defined in Appendix A.

TABLE 2

Serial Correlation in and Persistence of Alternative Quarterly Earnings Series

Series (Parameter)	Firms	Mean	Min	Q1	Median	Q3	Max
EXP(AR)	2,047	0.71	-0.90	0.58	0.81	0.95	1.00
EXP(SMA)	2,047	0.47	-1.00	0.14	0.53	1.00	1.00
EXP(PER)	2,047	52.99	-0.43	11.70	31.65	72.41	578.25
ACT_{IBES}*(AR)*	1,950	0.55	-0.65	0.30	0.62	0.85	1.00
ACT_{IBES}*(SMA)*	1,950	0.48	-1.00	0.15	0.53	1.00	1.00
ACT_{IBES}*(PER)*	1,950	32.75	-0.38	5.68	15.97	40.98	749.20
ACT_{GAAP}*(AR)*	2,806	0.32	-1.00	0.06	0.30	0.57	1.00
ACT_{GAAP}*(SMA)*	2,806	0.55	-1.00	0.23	0.61	1.00	1.00
ACT_{GAAP}*(PER)*	2,806	15.35	-0.49	0.91	7.81	16.82	507.72
CFO(AR)	2,706	-0.12	-0.95	-0.29	-0.12	0.04	1.00
CFO(SMA)	2,706	0.51	-1.00	0.18	0.59	1.00	1.00
CFO(PER)	2,706	5.53	-0.47	0.02	4.17	8.85	65.91
FCF(AR)	2,655	-0.07	-0.99	-0.25	-0.08	0.10	1.00
FCF(SMA)	2,655	0.51	-1.00	0.19	0.59	1.00	1.00
FCF(PER)	2,655	5.96	-0.49	0.06	4.61	9.64	69.16

Table 2 presents serial correlation and persistence of alternative earnings series. *AR* and *SMA* are the estimated model parameters from the Brown-Rozeff ARIMA model, (1,0,0) x (0,1,1) in Box-Jenkins notation: $x_t = x_t\text{-}4 + AR(x_t\text{-}1 + x_t\text{-}5) + a_t - SMA(a_t\text{-}4)$, where, x_t = time t observation in the series of interest, *AR* = autoregressive parameter, *SMA* = seasonal moving-average parameter, and at = disturbance term at time t. *PER* = persistence = $[AR \div (1 + r - AR)] + [(1 + r)(1 - SMA)] \div [(1 + r - AR)(1 + r)4 - 1]$.

TABLE 3

Baseline Tests of Difference in Serial Correlation and Persistence across Alternative EPS Time Series

Panel A: What is the effect of accrual accounting on persistence?

Time Series Parameter	N	ACT_{GAAP}	CFO	Difference	p-value
AR	2,706	0.30	-0.12	0.42***	0.00
SMA	2,706	0.62	0.59	0.02	0.48
PER	2,706	7.76	4.17	3.59***	0.00

	N	ACT_{GAAP}	FCF	Difference	p-value
AR	2,655	0.30	-0.08	0.37***	0.00
SMA	2,655	0.62	0.59	0.02	0.37
PER	2,655	7.80	4.61	3.19***	0.00

Panel B: Are "street earnings" more persistent than GAAP earnings?

Time Series Parameter	N	ACT_{IBES}	ACT_{GAAP}	Difference	p-value
AR	1,950	0.62	0.3	0.32***	0.00
SMA	1,950	0.53	0.61	-0.08***	0.00
PER	1,950	15.97	7.97	7.99***	0.00

Table 3 presents results for comparisons of serial correlation and persistence of various earnings series. Panel A compares (1) the series of actual GAAP earnings to the series of cash flow from operations, and (2) the series of actual GAAP earnings to the series of free cash flow. Panel B compares the series of actual IBES earnings to the series of actual GAAP earnings. *AR* and *SMA* are the estimated model parameters from the Brown-Rozeff ARIMA model, (1,0,0) x (0,1,1) in Box-Jenkins notation: $x_t = x_t\text{-}4 + AR(x_t\text{-}1 + x_t\text{-}5) + a_t - SMA(a_t\text{-}4)$, where, x_t = time t observation in the series of interest, *AR* = autoregressive parameter, *SMA* = seasonal moving-average parameter, and a_t = disturbance term at time t. *PER* = persistence = [AR ÷ (1 + r – AR)] + [(1 + r)(1 – SMA)] ÷ [(1 + r – AR)(1 + r)4 – 1]. In both panels, p-values are two-tailed and computed using a K-sample test of differences in medians.

TABLE 4

Management's Financial Communication Policy and Persistence

Panel A: Comparison of the Expectations Series with GAAP Actuals

Time Series Parameter	N	EXP	ACT_{GAAP}	Difference	p-value
AR	2,047	0.76	0.3	0.46***	0.00
SMA	2,047	0.53	0.61	-0.08***	0.00
PER	2,047	25.79	7.94	17.85***	0.00

Panel B: Comparison of the Expectations Series with IBES Actuals

Time Series Parameter	N	EXP	ACT_{IBES}	Difference	p-value
AR	1,950	0.77	0.62	0.15***	0.00
SMA	1,950	0.53	0.53	0.00	0.90
PER	1,950	26.07	15.97	10.11***	0.00

Table 4 presents results for comparisons of serial correlation and persistence of various earnings series. Panel A compares the series of actual GAAP earnings to the series of management expectations. Panel B compares the series of actual IBES earnings to the series of management expectations. *AR* and *SMA* are the estimated model parameters from the Brown-Rozeff ARIMA model, (1,0,0) x (0,1,1) in Box-Jenkins notation: $x_t = x_t\text{-}4 + AR(x_t\text{-}1 + x_t\text{-}5) + a_t - SMA(a_t\text{-}4)$, where, x_t = time t observation in the series of interest, *AR* = autoregressive parameter, *SMA* = seasonal moving-average parameter, and a_t = disturbance term at time t. *PER* = persistence = $[AR \div (1 + r - AR)] + [(1 + r)(1 - SMA)] \div [(1 + r - AR)(1 + r)4 - 1]$. In both panels, p-values are two-tailed and computed using a K-sample test of differences in medians.

TABLE 5

Cross-sectional Correlations Between Accounting Beta and Market Beta and Between Accounting Earnings Volatility and Market Return Volatility Derived from Alternative Time Series

Panel A: Alternative time series ranked on cross-sectional correlation of accounting beta and market model beta

	Full Sample		*Firm Held Constant*	
Time series	**N**	**Spearman Correlation**	**N**	**Spearman Correlation**
ACT_{IBES}	1,948	0.090	1,936	0.090
EXP	2,048	0.075	1,936	0.077
ACT_{GAAP}	2,788	0.068	1,936	0.074
Tests of differences:	*Difference*	*p-value*	*Difference*	*p-value*
ACT_{IBES} *vs. EXP*	0.012	(0.296)	0.013	(0.274)
EXP vs. ACT_{GAAP}	0.009	(0.631)	0.040	(0.341)
ACT_{IBES} *vs.* ACT_{GAAP}	0.016	(0.389)	0.016	(0.389)

Panel B: Alternative time series ranked on cross-sectional correlation of accounting earnings volatility and market return volatility

	Full Sample		*Firm Held Constant*	
Time series	**N**	**Spearman Correlation**	**N**	**Spearman Correlation**
ACT_{GAAP}	2,788	0.519	1,936	0.482
EXP	2,048	0.465	1,936	0.455
ACT_{IBES}	1,948	0.456	1,936	0.456
Tests of differences:	*Difference*	*p-value*	*Difference*	*p-value*
ACT_{IBES} *vs. EXP*	0.001	(0.855)	0.001	(0.898)
EXP vs. ACT_{GAAP}	0.028**	(0.042)	0.027*	(0.056)
ACT_{GAAP} *vs.* ACT_{IBES}	0.026**	(0.046)	0.026**	(0.046)

Table 5 presents Spearman correlations between measures of accounting measures and market measures. Panel A presents Spearman correlations between accounting beta and market model beta for alternative time series. Panel B presents Spearman correlations between accounting earnings volatility and market return volatility for alternative time series. For each panel, the time series are ranked based on the magnitude of these Spearman correlations. For tests of differences, p-values are calculated from the Williams (1959) test of significant differences in Spearman rank-order correlation between time series. For the Full Sample, the tests of differences are conducted on the sample that contains data for both of the series in the comparison.

TABLE 6

Time-series Mean Return on Equity (MROE) and Tests of Significant Differences Between Series

	Full Sample			*Firm Held Constant*		
Time series	**N**	**Firms**	**Mean ROE**	**N**	**Firms**	**Mean ROE**
ACT_{IBES}	39,240	1,962	0.031	39,000	1,950	0.031
EXP	41,240	2,062	0.028	39,000	1,950	0.029
ACT_{GAAP}	56,120	2,806	0.020	39,000	1,950	0.022
Tests of differences:					*Difference*	*p-value*
ACT_{IBES} *vs. EXP*					0.002***	(0.000)
EXP vs. ACT_{GAAP}					0.007***	(0.000)
ACT_{IBES} *vs.* ACT_{GAAP}					0.009***	(0.000)

Table 6 presents each time series' mean return on equity (MROE) and tests of differences between the series. The times series are listed in order of the magnitude of MROE.

TABLE 7

Reproduction of Primary Results using the First Earnings Expectations Number for Each Quarter

Panel A: Comparison of the First Expectations Series with GAAP Actuals

Time Series Parameter	N	EXP_{FIRST}	ACT_{GAAP}	Difference	p-value
AR	2,047	0.81	0.30	0.51***	0.00
SMA	2,047	0.53	0.61	-0.08***	0.00
PER	2,047	31.64	7.94	23.7***	0.00

Panel B: Comparison of the First Expectations Series with IBES Actuals

Time Series Parameter	N	EXP_{FIRST}	ACT_{IBES}	Difference	p-value
AR	1,950	0.81	0.62	0.20***	0.00
SMA	1,950	0.53	0.53	-0.01	0.80
PER	1,950	32.88	15.97	16.91***	0.00

Panel C: Comparison of the First Expectations Series with the Expectations Series

Time Series Parameter	N	EXP_{FIRST}	EXP	Difference	p-value
AR	2,047	0.81	0.76	0.05***	0.00
SMA	2,047	0.53	0.53	0.00	0.98
PER	2,047	31.64	25.79	5.85***	0.00

Panel D: Alternative Time-series Ranked on Cross-sectional Correlation of Accounting Beta and Market Model Beta

Time series	*Full Sample*		*Firm Held Constant*	
	N	**Spearman Correlation**	**N**	**Spearman Correlation**
ACT_{IBES}	1,948	0.090	1,936	0.090
ACT_{GAAP}	2,788	0.068	1,936	0.074
EXP_{FIRST}	2,048	0.047	1,936	0.050
Tests of differences (p-values):				
ACT_{IBES} *vs.* ACT_{GAAP}	0.016	(0.389)	0.016	(0.389)
ACT_{GAAP} *vs.* EXP_{FIRST}	0.017	(0.499)	0.024	(0.341)
ACT_{IBES} *vs.* EXP_{FIRST}	0.042**	(0.020)	0.040**	(0.026)

Panel E: Alternative Time-series Ranked on Cross-sectional Correlation of Accounting Earnings Volatility and Market Return Volatility

Time series	*Full Sample*		*Firm Held Constant*	
	N	**Spearman Correlation**	**N**	**Spearman Correlation**
ACT_{IBES}	2,788	0.519	1,936	0.482
ACT_{GAAP}	1,948	0.456	1,936	0.456
EXP_{FIRST}	2,048	0.446	1,936	0.434
Tests of differences (p-values):				
ACT_{IBES} *vs.* ACT_{GAAP}	0.026**	(0.046)	0.026**	(0.046)
ACT_{GAAP} *vs.* EXP_{FIRST}	0.047***	(0.001)	0.022**	(0.046)
ACT_{IBES} *vs.* EXP_{FIRST}	0.023**	(0.046)	0.048***	(0.002)

Panel F: Time-series Mean Return on Equity (MROE) and Tests of Significant Differences between Series

	Full Sample			*Firm Held Constant*		
Time series	**N**	**Firms**	**Mean ROE**	**N**	**Firms**	**Mean ROE**
EXP_{FIRST}	41,240	2,062	0.033	39,000	1,950	0.034
ACT_{IBES}	39,240	1,962	0.031	39,000	1,950	0.031
ACT_{GAAP}	56,120	2,806	0.02	39,000	1,950	0.022
Tests of differences (p-values):						
EXP_{FIRST} *vs.* ACT_{IBES}					0.003***	(0.000)
ACT_{IBES} *vs.* ACT_{GAAP}					0.009***	(0.000)
EXP_{FIRST} *vs.* ACT_{GAAP}					0.012***	(0.000)

Table 7 presents reproductions of our primary tests using EXP_{FIRST} (i.e., using the first management forecast or analyst forecast made for the forecasted period rather than the last forecast made for the period). Panels A and B present results similar to those in Table 4 (i.e., a test of management's financial communication policy and persistence). Panel C compares the persistence of the first and last expectations series. Panels D and E present results similar to those in Table 5 (i.e., cross-sectional correlations between accounting beta and market beta and between accounting earnings volatility and market return volatility derived from alternative time series). Panel F presents results similar to those in Table 6 (i.e., time series mean return on equity (*MROE*) and tests of significant differences between series). All variables are defined in Appendix A.

TABLE 8

Management's Financial Communication Policy and Cost of Capital

Panel A: Communication Policy using the EXP series Relative to GAAP Actuals

DV = ICC

	(1)	(2)	(3)
Intercept	0.150***	0.150***	0.150***
	(0.00)	(0.00)	(0.00)
HQ_PER	**-0.000**		**-0.000**
	(0.44)		**(0.44)**
HQ_MFFrequency		**0.001**	**0.001**
		(0.27)	**(0.27)**
Observations	1,316	1,316	1,316
Controls	Yes	Yes	Yes
Adjusted R-squared	0.255	0.255	0.254

Panel B: Communication Policy using the EXP series Relative to IBES Actuals

DV = ICC

	(1)	(2)	(3)
Intercept	0.150***	0.151***	0.151***
	(0.00)	(0.00)	(0.00)
HQ_PER	**0.000**		**0.000**
	(0.44)		**(0.43)**
HQ_MFFrequency		**0.001**	**0.001**
		(0.32)	**(0.32)**
Observations	1,280	1,280	1,280
Controls	Yes	Yes	Yes
Adjusted R-squared	0.252	0.252	0.252

Panel C: Communication Policy using the EXP_{FIRST} series Relative to GAAP Actuals

DV = ICC

	(1)	(2)	(3)
Intercept	0.151***	0.150***	0.151***
	(0.00)	(0.00)	(0.00)
HQ_PER	**-0.004***		**-0.004***
	(0.08)		**(0.08)**
HQ_MFFrequency		**0.001**	**0.001**
		(0.27)	**(0.28)**
Observations	1,316	1,316	1,316
Controls	Yes	Yes	Yes
Adjusted R-squared	0.256	0.255	0.255

Panel D: Communication Policy using the EXP_{FIRST} Relative to IBES Actuals

DV = ICC

	(1)	(2)	(3)
Intercept	0.153***	0.151***	0.153***
	(0.00)	(0.00)	(0.00)
HQ_PER	**-0.005*** **		**-0.005*** **
	(0.00)		**(0.00)**
HQ_MFFrequency		**0.001**	**0.000**
		(0.32)	**(0.49)**
Observations	1,280	1,280	1,280
Controls	Yes	Yes	Yes
Adjusted R-squared	0.257	0.252	0.256

Table 8 presents coefficients (p-values) for estimations of equation 3. The dependent variable is the firm's implied cost of capital (*ICC*). The two independent variables of interest (*HQ_PER and HQ_MFFrequency*) are two indicators of the quality of management's financial communication policy, where a value of one indicates that the series is high quality. (1) *HQ_PER* is an indicator variable equal to one if the firm's expectations time series has higher persistence than the time series of GAAP/IBES actual earnings, and zero otherwise. (2) *HQ_MFFrequency* is an indicator variable equal to one if the expectations time series contains an above median number of management forecasts (i.e., the firm provides an above median amount of management forecasts). Panels A and B (C and D) use the EXP (EXP_{FIRST}) series to define the quality measures. Panel A and C (B and D) compare the expectation series to GAAP actuals (IBES actuals). *** (**, *) denotes two-tailed significance at the $p < 0.01$ ($p < 0.05$, $p < 0.10$) level for regression coefficients. All variables are defined in Appendix A.