Preannouncements: Forecast or Realized Earnings?

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The literature has long recognized preannouncements as management forecasts issued after the fiscal period ends but before the actual earnings announcements. However, with the advent of Enterprise Resource Planning (ERP) systems, companies now can gather information promptly and process it efficiently, which allows companies to prepare earnings summaries in real-time, thus making it unnecessary to issue forecasts in the days following the quarter-end date. This study argues that any earnings announcements issued after the quarter-end date (preannouncements) by companies that have implemented ERP systems are based on realized earnings. Such announcements are expected to be more accurate than management forecasts, which are based on estimates of future earnings, and may be issued before the quarter-end date. This study finds that the accuracy of management voluntary disclosures and the timeliness of preannouncements improved in the periods following ERP implementation.

Keywords: preannouncements, management forecast, enterprise resource planning

Introduction

Innovations in information technology helped companies improve worker productivity and lead to the economic boom of the 1990s. It also changed the practice of Accounting in meaningful ways and influenced the way managers disclosed information to the market. Many companies implemented sophisticated Enterprise Resource Planning (ERP) systems to make the processing and storage of accounting data more efficient than the legacy systems that preceded them. ERP systems helped improve operational efficiency by automating many accounting and data processing tasks and by eliminating information silos. ERP systems gave managers the ability to consolidate and analyze accounting information rapidly, often within a matter of days following the close of calendar quarters.

The mere implementation of a software platform such as ERP, however, cannot improve company performance. In the initial days of ERP, implementation companies faced resistance from employees who did not want to learn new software. They did not understand how the software worked and treated it like a black box. In addition, the early versions of ERP failed to produce reports that were visually attractive to management and could not be directly used in presentations. Many users simply preferred to extract accounting numbers from ERP only to import them into Microsoft Excel to conduct further analysis. Although Excel may have helped them prepare better-looking presentations, it deprived them of the real power of ERP systems, which was the ability to consolidate and summarize large volumes of data accurately in almost real-time. A significant improvement in firm performance, expressed in terms of a ratio of cost of goods sold to revenue, was only found 3 years

after ERP implementation and not in the first or second years (Poston & Grabski, 2001). It is reasonable to expect a variation in the level and speed of adoption of ERP among firms.

Because ERP systems can consolidate and process data in real-time, it is possible to prepare financial statements based on realized financial performance within three working days or less. Therefore, once a fiscal quarter closes, there is no reason for management to issue guidance based on a forecast. Any guidance issued in the days following a quarter-end date is based on actual financial performance (e.g., earnings realization), and it is not a forecast. For simplicity, such guidance is referred to as "preannouncement" in this study.

The literature has long recognized preannouncements as "management *forecasts* issued after the fiscal period end but before the actual earnings announcements." (e.g., Ajinkya et al., 2005 (footnote 11)). Miller (2005, p.1), refers to preannouncements as "*estimates* of earnings disclosed after the accounting period-end and before the official earnings announcement." Soffer et al. (2000, p.1) do not specifically refer to the period in which preannouncements are made, preferring instead to define preannouncements as a "voluntary disclosure of a *tentative earnings amount* made shortly before the formal earnings announcement." However, the common assumption that preannouncements are forecasts or estimates is mistaken, especially after the adoption of Enterprise Resource Planning (ERP) software by operating firms (ERP firms). Preannouncements are based on actual earnings results and, therefore, are not forecasts at all. Even so, management forecast errors are not expected to be zero for ERP firms because the incentives to meet or beat earnings guidance remain (see Brazel & Dang, 2008; Soffer et al., 2000).

In this study, preannouncements are defined as any disclosure of quarterly earnings corresponding to the recently completed quarter that is released to the market after the quarter-end date but before the actual earnings announcement (EA) date. This definition is more precise than Soffer et al. (2000) who define preannouncement as "a voluntary disclosure of tentative earnings amount made *shortly* before the formal earnings announcement". The preannouncement (PA) timeline is depicted in Figure 1 below.

Figure 1 – Preannouncement Timeline
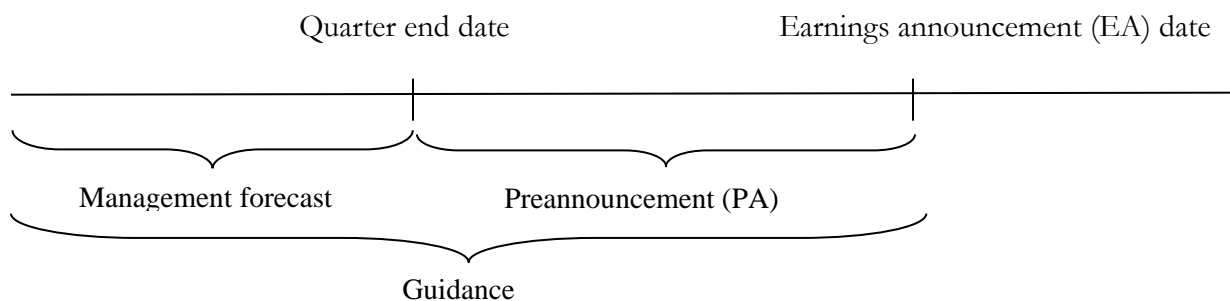
In contrast to preannouncements, forecasts are based on management projections because earnings realizations cannot be determined until the close of the quarter. For the convenience of exposition, we use the term guidance to refer to both preannouncements and forecasts. Before ERP implementation, the forecast period may have extended beyond the quarter-end date. After ERP implementation it is extremely unlikely that management would issue a forecast after the quarter-end

date, knowing fully well that they will have realized earnings information within a few days. Therefore, the quarter-end date is a good cut-off date to distinguish between a forecast and a preannouncement.

Despite all the advances of ERP, there have not been many moves by firms to replace their preannouncement with formal earnings announcements, although Brazel & Dang (2008) show that good news firms with ERP tend to report their earnings earlier than before. There could be several reasons for this behavior. First, management may not believe that there is an obvious advantage to announcing early. Second, firms may lose their ability to manage the expectations of analysts and investors during earnings season. Soffer et al. (2000) show that firms with good news tend to release about half of the news during preannouncements while reserving the other half for the formal earnings announcement. To the extent that firms prefer to retain this flexibility, they will not advance their earnings announcement dates. Third, having a time cushion before the earnings announcement may be beneficial should there be any auditing issues or other unforeseen events that crop up late in the earnings reporting cycle. Earnings announcement dates are usually announced in advance in keeping with tradition, but preannouncements allow full flexibility to firms with regard to their timing. Finally, companies may prefer to stick to tradition and announce formal earnings around the same time as they have been doing in the past.

This study examines the relationship between ERP systems and the voluntary disclosure behavior of firm managers. Empirical analysis of management disclosure and ERP implementation data shows that ERP helps firms reduce guidance errors, and issue preannouncements to the market in a timelier manner.

Literature Review

The Securities and Exchange Commission (SEC) requires all publicly held US corporations to disclose all information that may be relevant for an investor to decide whether they may want to buy, sell or hold a company's security. Some disclosures are mandatory (e.g., 10K, 10Q) while others are voluntary. However, voluntary disclosures are not optional – if any information is pertinent to an investment decision regarding a firm, it must be released. Of course, managers have broad latitude in deciding what, when, and how to release non-public information, subject to the limitations imposed by Regulation FD. Such flexibility in voluntary disclosures allows managers to either act in a manner that enhances the information available to investors and reduces information asymmetry between investors and managers (well-intentioned behavior, consistent with the SEC's stated purpose for financial disclosure), or act opportunistically to benefit the firm, management, or a subset of investors.

The SEC has passed many regulations over the years to encourage voluntary disclosures and to provide some legal protections to managers who make such disclosures. Significant regulatory changes include allowing companies to include forward-looking information in regulatory filings (enacted in 1973), providing safe-harbor to companies providing forward-looking disclosures to shield them from frivolous lawsuits related to disclosures made in good faith (enacted in 1979), and extending the safe-harbor rules to protect firms from lawsuits related to forecasts that do not ultimately materialize (enacted in 1996).

Voluntary disclosures usually take the form of either earnings forecasts (management guidance) or pro-forma (non-GAAP) earnings measures. Earnings forecasts are estimates of what a company believes it will report in the future as a measure of its financial performance. Pro-forma earnings are alternative earnings measures that do not conform to Generally Accepted Accounting Principles (GAAP). They are prepared and disseminated by managers in the belief that they may be useful to investors.

Management Guidance

Prior literature documents several reasons – both well-intentioned and opportunistic – why managers voluntarily provide earnings guidance. One reason is the expectations hypothesis (Ajinkya & Gift, 1984 and King et al., 1990), which posits that managers issue guidance to align the market's earnings expectations with management beliefs. Guidance reduces information asymmetry between managers and investors, reduces bid-ask spreads for a company's common stock, decreases the dispersion of analyst forecasts, and favorably influences stock prices. Another reason why companies disclose earnings guidance is to reduce litigation risk associated with shareholder lawsuits (Skinner, 1994). If managers withhold material information, which subsequently leads to shareholder losses, they may be subject to shareholder lawsuits that may damage their reputation and impose significant costs on the company. Therefore, managers have the incentive to release material information, especially unfavorable information, to investors. Finally, managers disclose earnings guidance to develop a favorable reputation for transparent and accurate reporting (Graham et al., 2005).

Prior literature also documents examples of opportunistic disclosure behavior. For example, Choi & Ziebart (2004) provide evidence that shows that managers' long-term forecasts are systematically higher than actual earnings realizations. This may simply reflect managers' natural tendency to be optimistic. On the other hand, it may also indicate that managers prefer to be overly optimistic to maximize their stock price by increasing the market's expectation of future earnings.

Several studies (Hutton, 2005; Ke & Yu, 2006; Richardson et al., 2004) have shown that managers' short-term forecasts tend to be systematically lower than subsequent earnings announcements. Managers have been known to engage in "expectations management" to talk down analysts' expectations shortly before earnings announcements in an attempt to meet or beat consensus analyst estimates (Burgstahler & Eames, 2006; Matsumoto, 2002). The incentives for doing this are strong: the stock market provides a valuation premium to companies that meet or beat analyst consensus estimates (Skinner & Sloan, 2002) but punishes companies who miss analyst consensus estimates with a large drop in share price.

Other evidence of opportunistic disclosure behavior includes managers issuing bad news earnings guidance around stock option award periods to temporarily depress stock prices (Aboody & Kasznik, 2000), and issuing overly optimistic guidance around secondary equity offerings (SEOs) to ensure higher prices for new shares (Rogers & Stocken, 2005).

Voluntary Disclosures of Non-GAAP Earnings Measures

During the boom years of the 1990s, many companies released pro-forma earnings along with their quarterly earnings announcements. Managers claimed that pro-forma earnings better reflected the actual economic performance of their companies. Others claimed that since pro-forma earnings did not conform to GAAP, managers could use them to mislead investors. Academic research on Pro-forma disclosures finds evidence that supports both claims. Bhattacharya et al. (2003) show that pro-forma earnings are more strongly associated with stock prices than GAAP earnings, suggesting that investors find pro-forma earnings more informative than GAAP earnings. Other studies (Lougee & Marquardt, 2004) show that the quality of GAAP earnings for companies that report pro-forma earnings is of a lower quality than those companies that don't. This suggests that companies that issue pro-forma earnings do so to improve on the deficiencies of their GAAP earnings.

Hypotheses Development

US firms started implementing ERP systems in the early-1990s. The transition from legacy systems-generated to ERP-generated financial results happened over time (it took multiple years to complete implementation at many firms). ERP systems gather information on time, help process accounting information efficiently (Davenport 1998; Hitt et al. 2002), and provide a unified enterprise

view of a firm's financial condition (Dillon 1999). They also help eliminate information silos and allow managers unprecedented access to accounting information (O'Leary 2000). Brazel & Dang (2008) show that ERP system implementations shorten reporting lags, between quarter-end and earnings release dates, for "good news" firms. Hayes et al. (2001) compare ERP adopters with ERP non-adopters and illustrate that ERP adopters exhibit improved operational performance.

The above evidence points to an improved internal information environment for firms with ERP systems which likely helped managers provide better guidance to the market. Guidance errors (ABSERROR) are expected to have decreased significantly in the years following ERP implementation:

ABSERROR = |Realized Earnings - Management Guidance| / Lagged Assets per Share   (1),

where management guidance corresponds to the latest forecast or preannouncement issued before the earnings announcement.

Hypothesis 1: Management guidance errors in ERP firms decreased in the years following ERP implementation

The motivation for managers to manage earnings expectation upward or downward has been extensively studied in the literature (see literature review above). The incentives for managing earnings are strong: the stock market provides a valuation premium to companies that meet or beat analyst consensus estimates (Skinner & Sloan, 2002) but punishes companies who miss analyst consensus estimates with a large drop in share price. Consequently, risk-averse managers will prefer not to issue forecasts in the days leading up to the quarter-end date when they will be close to having the actual performance data from the ERP system. They will postpone the issuance of management forecasts until they have actual earnings data. If they need to issue a forecast, it will happen earlier in the quarter.

Hypothesis 2: For the ERP firms, the number of days to quarter-end of management forecasts issued in the days before the quarter-end, will increase in the years following ERP implementation

ERP systems can gather, process, and consolidate data in real-time. Towards the end of an accounting period, although some manual intervention may be required, in the form of adjusting entries or managerial reviews, it is possible to produce financial statements in three working days or less. In any case, companies can issue preannouncements much earlier after ERP implementation compared to prior periods.

Hypothesis 3: For the ERP firms, the number of days after quarter-end of preannouncements issued in the days following quarter-end, will decrease in the years following ERP implementation

Method
Sample Selection
ERP system implementation data are obtained from a proprietary database supplied by a leading international provider of ERP systems. The database contains the names of firms that implemented ERP systems and the dates on which the system went live, among other details that are not used in this paper. There are 315 unique firms with ticker symbols, CUSIP, and PERMNO in the database that implemented ERP systems between 1994 and 1999 (go-live dates).

Other data, which are described in more detail in Appendix 1, are available from Compustat, First Call, Audit Analytics, and IBES. The data from Compustat comprise 331,569 firm-quarter

observations for the period 1991 through 2002. This period was chosen to include at least 12 quarters of data before the first ERP implementation date and 12 quarters of data beyond the last ERP implementation date. This data was merged with management forecast data from First Call, BIG4 data from Audit Analytics, and ERP implementation data. Observations with missing values were dropped. That left us with 7009 firm-quarter observations. Finally, analyst forecast data obtained from IBES were merged and the observations were limited to plus or minus 3 years from the ERP implementation dates. That left 1842 firm-quarter observations to estimate our regressions. The top and bottom 1% of each continuous variable was winsorized to mitigate the influence of outliers.

Research Design

The literature has employed two different approaches to study the accuracy of management guidance. One approach focuses on the incentives facing managers and their firms (e.g., Rogers & Stocken, 2005). The other approach focuses on the quality of internal control over financial reporting (Feng et al., 2009). The quality of internal control is directly related to the quality of the data in the financial system. The quality of data is important because, no matter the incentives, management guidance based on inferior data will be less accurate. Because ERP systems are expected to enhance data quality, the second approach is chosen to conduct our empirical tests.

Managers' disclosures influence the market, but their decision to issue guidance, being voluntary, may, in turn, be influenced by the market. To control for this endogeneity in managers' disclosure decisions, the two-stage least squares model of Feng et al. (2009) is modified to test our hypotheses. Since material weakness disclosures were not required before the implementation of the Sarbanes-Oxley Act, the material weakness variable in their regression is replaced with a corporate governance proxy (INSTOWN). An ERP dummy variable is also included in the second stage, which takes the value of 1 in the years following ERP implementation and zeroes otherwise, to test the impact of ERP implementation on management guidance error. In the first stage, the following probit regression of the choice to provide guidance is estimated. GUIDANCE is an indicator variable that is equal to 1 if the manager issues guidance in the quarter, and zeroes otherwise.

$$\text{GUIDANCE} = b_0 + b_1\text{ERP} + b_2\text{LN\_TA} + b_3\text{BIG4} + b_4\text{ABSCHGROA} + b_5\text{STD\_AF} + b_6\text{VOLATILITY} + b_7\text{ORGANIZATIONAL CHANGE} + b_8\text{COMPLEXITY} + b_9\text{FINANCIAL CHALLENGES} + b_{10}\text{INSTOWN} + b_{11}\text{LN\_ANALYSTS} + \Sigma b_i \text{ Industry and Year indicators} \tag{2}$$

The inverse Mill's ratio (IMR) from the first stage model of the choice to issue guidance above (equation 2) is used to estimate the second stage ordinary least square model below:

$$\text{ABSERROR} = b_0 + b_1\text{ERP} + b_2\text{INSTOWN} + b_3\text{LN\_TA} + b_4\text{BIG4} + b_5\text{ABSCHGROA} + b_6\text{DISPFOR} + b_7\text{VOLATILITY} + b_8\text{ORGANIZATIONAL CHANGE} + b_9\text{COMPLEXITY} + b_{10}\text{FINANCIAL CHALLENGES} + b_{11}\text{HORIZON} + b_{12}\text{ABSREVISION} + b_{13}\text{IMR} + \Sigma b_i \text{ Industry and Year Indicators} + e \tag{3}$$

The independent variables used in equations 2 and 3 are taken from prior research. A description of the variables is included in Appendix 1. LN_TA is the natural logarithm of a firm's total assets, used here as a proxy for firm size. Prior research (e.g., Kasznik & Lev, 1995) provides evidence of a positive association between firm size and management guidance. BIG4 is an indicator variable that is equal to 1 if the auditor is a Big 4 auditor, and zero otherwise. Prior research shows that firms using Big 4 auditors tend to have better disclosures (e.g. Ajinkya et al., 2005). ABSCHGROA, the absolute value of the change in return on assets, is used as a proxy for shocks to earnings, which makes

it more difficult to predict future earnings (Feng et al., 2009). DISPFOR is the standard deviation of analysts' forecast before the issuance of management guidance. This variable captures the inter-analyst uncertainty in the earnings prospects of a firm, indicating the level of difficulty of providing accurate earnings guidance (e.g., Ajinkya & Gift, 1984). The variables VOLATILITY, ORGANIZATIONAL CHANGE, COMPLEXITY, and FINANCIAL CHALLENGES are factors, derived from a principal component analysis of 14 variables that proxy for a firm's underlying volatility and innate uncertainty. More detail on these variables is included in Appendix 2. Two additional variables, HORIZON and ABSREVISION are used to control for the difficulty in estimating accurate management guidance. HORIZON is defined as the number of days before the fiscal period-end that the management guidance is issued, where a larger number indicates more timely guidance. Guidance issued after the fiscal period-end is not excluded, and thus HORIZON can be negative. ABSREVISION is the magnitude of the revision suggested by the management guidance, defined as the absolute value of management guidance less the pre-existing median of consensus analyst forecast deflated by lagged assets per share. Both HORIZON and ABSREVISION should be positively associated with guidance error (Ajinkya et al., 2005).

To successfully control endogeneity, at least one independent variable should be correlated with the dependent variable in the first stage model but not the dependent variable in the second stage model. In equation (2), the logarithm of the number of analysts following a firm (LN_ANALYSTS) is correlated with the dependent variable (see Feng et al., 2009; Lang & Lundholm, 1996; Ajinkya et al., 2005). Analyst following and management guidance errors are not significantly associated (Ajinkya et al., 2005). For H1 to be true, the ERP coefficient, b_1 in equation (3) should be negative and significant.

Hypothesis 2
For testing hypothesis 2, the variable HORIZON is split into two variables, FCAST_HORIZON and PRE_HORIZON, where FCAST_HORIZON = number of days from management forecast date to quarter-end date, and PRE_HORIZON = number of days from quarter-end date to preannouncement date.

The 2nd stage regression, equation (3) is modified to include FCAST_HORIZON as follows:

$$FCAST\_HORIZON = b_0 + b_1ERP + b_2\ INSTOWN + b_3LN\_TA + b_4BIG4 + b_5ABSCHGROA + b_6DISPFOR + b_7VOLATILITY + b_8ORGANIZATIONAL\ CHANGE + b_9COMPLEXITY + b_{10}FINANCIAL\ CHALLENGES + b_{11}ABSREVISION + b_{12}IMR + \Sigma b_i\ Industry\ and\ Year\ Indicators + e \qquad (4)$$

The ERP coefficient, b_1 in the above regression is expected to be positive and significant.

Hypothesis 3
For testing hypothesis 3, the following regression is estimated:

$$PRE\_HORIZON = b_0 + b_1ERP + b_2INSTOWN + b_3LN\_TA + b_4BIG4 + b_5ABSCHGROA + b_6DISPFOR + b_7VOLATILITY + b_8ORGANIZATIONAL\ CHANGE + b_9COMPLEXITY + b_{10}FINANCIAL\ CHALLENGES + b_{11}ABSREVISION + b_{12}IMR + \Sigma b_i\ Industry\ and\ Year\ Indicators + e \qquad (5)$$

A negative and significant coefficient on the ERP dummy variable (b_1) will support hypothesis 3.

Table 1 shows descriptive statistics for all variables used in the two-stage regressions for the periods before and after the completion of ERP implementation. Variable definitions are provided in Appendix 1. Guidance error (ABSERROR) has been defined as the absolute value of the difference between realized earnings per share and management guidance per share, deflated by lagged total assets per share. Univariate comparison of ABSERROR (Table 1 Panel A versus Panel B) demonstrates that guidance errors decrease in the period immediately following ERP implementations, suggesting that ERP helps managers provide more accurate guidance after ERP adoption. However, a univariate analysis does not reliably explain the change in guidance accuracy because it may be driven by other variables, creating a correlated, omitted variable problem. Therefore, multivariate regressions are needed to study the relationship between our dependent and independent variables.

Table 1 – Descriptive Statistics

Panel A: Before ERP Implementation					
Variable	N	Mean	Std. Dev.	Min.	Max.
ABSERROR	902	0.0128	0.0298	0	0.2125
LN_ANALYSTS	902	1.8259	0.7346	0	3.3673
STD_AF	902	0.0669	0.1120	0	2.0560
DISPFOR	902	0.0660	0.1032	0	1.4616
LN_TA	902	7.3650	1.5799	3.9816	11.3012
ABSREVISION	902	0.0031	0.0272	-0.0762	0.2133
INSTOWN	902	0.0845	0.0785	0	0.4026
ABSCHGROA	902	0.0002	0.0009	0	0.0204
FINANCIAL CHALLENGES	902	0.6281	0.7701	-3.4364	2.7437
COMPLEXITY	902	0.5343	1.0106	-1.3618	4.9056
ORGANIZATIONAL CHANGE	902	0.0332	0.7711	-1.8766	6.3817
VOLATILITY	902	-0.3189	1.1488	-3.7094	2.8026
HORIZON	902	16.3968	43.7188	-43	191
FCAST_HORIZON	734	32.2538	34.3408	1	191
PRE_HORIZON	168	18.5424	42.0367	1	43
Panel B: After ERP Implementation					
Variable	N	Mean	Std. Dev.	Min.	Max.
ABSERROR	940	0.0051	0.0115	0	0.1437
LN_ANALYSTS	940	2.0994	0.8338	0	3.8067
STD_AF	940	0.0827	0.1437	0	3.1847
DISPFOR	940	0.0804	0.1345	0	3.1847
LN_TA	940	7.8074	1.5297	3.6431	11.8803
ABSREVISION	940	-0.0013	0.0139	-0.1214	0.1105
INSTOWN	940	0.0221	0.0506	0	0.4584
ABSCHGROA	940	0.0002	0.0006	0	0.0167

FINANCIAL CHALLENGES	940	0.6248	0.7665	-3.5444	3.0007
COMPLEXITY	940	1.2398	1.4453	-1.6843	8.0460
ORGANIZATIONAL CHANGE	940	0.0882	0.6908	-1.7346	7.1868
VOLATILITY	940	0.2350	1.3416	-3.6446	4.3402
HORIZON	940	41.2783	59.6901	-17	162
FCAST_HORIZON	765	58.0475	34.9062	7	162
PRE_HORIZON	175	39.5563	83.6112	1	17

Variable definitions are provided in Appendix 1

Hypothesis 1 suggests that management guidance became more accurate following ERP implementation. The results of a two-stage least squares test of H1 are presented in Table 2 (1st stage) and Table 3 (2nd stage). The instrument variable for analysts following (LN_ANALYSTS) is significant, as expected, confirming that it is correlated with the choice to provide guidance (GUIDANCE), the dependent variable. Consistent with the literature, the probit regression shows that management guidance is more prevalent in larger firms (e.g., Ajinkya et al., 2005). GUIDANCE is also significantly correlated with several other of our independent variables shown in bold in Table 2.

Table 2 – PROBIT Regression (1st Stage) of the Choice to Issue Guidance

Variable	Coefficient	Wald chi-square	p-value
INTERCEPT	-2.4828	162.65	<.0001
ERP	1.0044	446.44	<.0001
LN_TA	0.1004	15.34	<.0001
BIG4	0.1507	1.76	0.1849
ABSCHGROA	46.341	3.08	0.0794
STD_AF	-0.8778	22.64	<.0001
FINANCIAL CHALLENGES	-0.1115	11.7	0.0006
COMPLEXITY	0.0054	0.08	0.7803
ORGANIZATIONAL CHANGE	-0.0361	1.88	0.17
VOLATILITY	0.1066	34.57	<.0001
INSTOWN	-1.1286	12.26	0.0005
LN_ANALYSTS	0.1802	37.94	<.0001
Industry indicators		included	
Year indicators		included	
No. of observations		1842	
Log-likelihood		-3433.61	

The coefficient on the dummy variable ERP in Table 3 is negative and significant at the 10% level, suggesting that, on average, ERP implementations help firms improve the accuracy of management guidance, which is consistent with Hypothesis 1. The fact that the coefficient on the inverse Mill's ratio (IMR) is significant indicates that self-selection in the choice to issue guidance does affect management guidance error.

Table 3 – OLS Regression (2nd Stage) of Management Forecast Error (abserror)

Variable	Coefficient	t-stat	p-value
INTERCEPT	-0.0089	-1	0.3166
ERP	-0.0024	-1.74	0.0816
INSTOWN	-0.0145	-1.92	0.0544
LN_TA	0.0001	0.14	0.8906
BIG4	0.0023	1.22	0.2217
ABSCHGROA	9.6957	16.78	<.0001
DISPFOR	0.0286	8	<.0001
FINANCIAL CHALLENGES	-0.0042	-7.57	<.0001
COMPLEXITY	0.0016	4.57	<.0001
ORGANIZATIONAL CHANGE	0.0010	2.2	0.0283
VOLATILITY	-0.0004	-1.32	0.188
HORIZON	0.00002	4.8	<.0001
ABSREVISION	0.4038	19.92	<.0001
IMR	0.0057	3.95	<.0001
Industry indicators		included	
Year indicators		included	
No. of observations		1842	
Adjusted R^2		0.335	

Table 4 shows the results of the 2nd stage of the two-stage regression (equation 4) for FCAST_HORIZON, the number of days to end of the quarter from the date of the forecast. Although univariate results in Table 1 show that the forecast horizon increased from 32.25 days before to 58.05 days after ERP implementation, supporting Hypothesis 2, the results of multivariate regression of FCAST_HORIZON in Table 4 do not confirm the hypothesis. The ERP coefficient, though positive, is not significant.

Table 4 – OLS Regression (2nd Stage) of Management Forecast Horizon (fcast_horizon)

Variable	Coefficient	t-stat	p-value
INTERCEPT	77.1915	2.2	0.0277
ERP	5.5139	0.56	0.5746
INSTOWN	-82.7839	-2.97	0.003
LN_TA	-0.1062	-0.05	0.9586
BIG4	-5.4671	-0.94	0.3449
ABSCHGROA	3036.0372	1.03	0.3047
DISPFOR	2.8656	0.19	0.852
FINANCIAL CHALLENGES	-5.7780	-2.73	0.0064
COMPLEXITY	1.3250	1.25	0.2108
ORGANIZATIONAL CHANGE	1.9915	1.34	0.182
VOLATILITY	-1.3895	-0.96	0.3385

ABSREVISION	444.2482	7.07	<.0001
IMR	-16.1390	-1.36	0.1733
Industry indicators		included	
Year indicators		included	
No. of observations		1499	
Adjusted R^2		0.089	

Table 5 shows the regression results of the 2nd stage of the two-stage regression (equation 5) for PRE_HORIZON, the number of days after quarter-end to the date of preannouncement. The coefficient on the ERP dummy is negative and significant at the 5% level, which supports Hypothesis 3. The evidence shows that preannouncements are issued sooner in the period following ERP implementation compared to prior periods.

Table 5 – OLS Regression (2nd Stage) of Preannouncement Horizon (pre_horizon)

Variable	Coefficient	t-stat	p-value
INTERCEPT	194.1816	1.55	0.1214
ERP	-69.4219	-2.04	0.0426
INSTOWN	-47.1383	-0.62	0.5341
LN_TA	-5.6915	-0.77	0.4432
BIG4	14.5375	0.43	0.6642
ABSCHGROA	-4353.4860	-1.01	0.3142
DISPFOR	8.6675	0.27	0.7905
FINANCIAL CHALLENGES	-8.2207	-0.95	0.3427
COMPLEXITY	4.5111	1.13	0.2602
ORGANIZATIONAL CHANGE	21.8187	3.73	0.0002
VOLATILITY	16.7339	3.17	0.0017
ABSREVISION	111.3202	0.42	0.6734
IMR	-70.6082	-1.72	0.0865
Industry indicators		included	
Year indicators		included	
No. of observations		343	
Adjusted R^2		0.2975	

Conclusion

This study examined the relationship between ERP system implementations and voluntary disclosure behavior of managers while recognizing the distinction between management guidance, forecasts, and preannouncements. Using a two-stage empirical design to control for endogeneity between the choice to issue guidance and management guidance error, the absolute guidance errors were found to be lower in the periods following ERP implementations compared to prior periods. ERP systems were also found to have enabled managers to make preannouncements promptly

following the close of a fiscal quarter. These results are consistent with the improved speed and accuracy that ERP systems brought to the consolidation and preparation of financial statements.

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APPENDIX 1 – Variables Definition

ERP: An indicator variable that is equal to one for quarters following ERP implementation, and zero otherwise

GUIDANCE: An indicator variable that is equal to one if managers issue earnings guidance in quarter t, and zero otherwise

LN_TA: The natural logarithm of total assets.

BIG4: An indicator variable that is equal to one if the auditor is a Big4 auditor, and zero otherwise.

BETA: The slope coefficient from estimating Sharpe's (1964) market model using daily return data from quarter t-1.

LN_AGE: The natural logarithm of the number of years that a firm is covered by CRSP.

ABSCHGROA: The absolute value of the change in ROA (earnings before extraordinary items scaled by lagged total assets) from quarter t-1 to quarter t.

DISPFOR: The standard deviation of the individual analyst forecasts for quarter t, before the management guidance in quarter t.

STD_AF: The standard deviation of the individual analyst forecasts at the beginning of quarter t.

VOLATILITY: A factor comprised of cash flow volatility, sales volatility, and the existence of foreign transactions

ORG.CHANGE: A factor comprised of asset growth, sales growth, leverage, and merger and acquisition activity.

COMPLEXITY: A factor comprised of the number of segments, special items, and the existence of a restructuring

FINANCIAL CHALLENGES: A factor comprised of return on assets, losses, research and development, and earnings volatility.

ABSREVISION: The absolute value of the revision implied by the management guidance: [|(management guidance less the pre-existing median consensus analyst forecast)|/lagged assets per share].

ABSERROR: Absolute forecast error defined as |Realized Earnings - Management Guidance|/ Lagged Assets per Share

INSTOWN: Institutional ownership in quarter t-1.

LN_ANALYSTS: The natural logarithm of the number of analysts following the firm at the beginning of quarter t.

SIC: One-digit SIC code.

IMR: Inverse Mill's ratio from the stage 1 regression.

HORIZON: The number of days before the fiscal quarter-end that the management guidance is issued, where a larger number indicates more timely guidance. Guidance issued after the fiscal quarter-end is not excluded, and thus HORIZON can be negative.

FCAST_HORIZON: The number of days from management forecast date to quarter-end date

PRE_HORIZON: The number of days from quarter-end date to preannouncement date

APPENDIX 2 – Factors Formation

       Specific firm characteristics, as well as its external environment, may have a systematic impact on management forecast errors. These variables are expected to be associated with innate variability and uncertainty facing a firm (Feng et al. 2009). To control for these factors, 14 variables that are listed below in Table A2 are selected and principal component analysis is applied to aggregate them into 4 factors as shown below. All factor loadings were greater than 0.7. These factors are used in the regressions for testing hypotheses 1, 2, and 3.

Table A2 – Factor Formation

Financial Challenges
ROA
Losses
Earnings volatility
R&D
Complexity
Segments
Restructuring
Special Items
Organizational Change
Asset growth
Sales growth
Leverage
M&A
Volatility
Cash flow volatility
Sales volatility
Foreign transactions

Variable Definitions for Factor Formation:

ROA: Earnings before extraordinary items/lagged total assets

Losses: An indicator variable equal to 1 if earnings before extraordinary items in quarter t and t-1 sum to less than zero, and zero otherwise

Earnings volatility: The standard deviation of quarterly ROA over the prior 7 quarters (requiring at least 3 non-missing observations)

R&D: Research and Development expense/lagged total assets

Segments: The natural logarithm of the total number of geographic and operating segments

Restructuring: An indicator variable that is equal to 1 if the firm recognized restructuring charges in quarter t, and zero otherwise

Special Items: Absolute value of special items/ lagged total assets

Asset growth: Asset growth from quarter t-1 to t $(assets_t - assets_{t-1})/assets_{t-1}$

Sales growth: Sales growth from quarter t-1 to t $(sales_t - sales_{t-1})/ sales_{t-1}$

Leverage: Total liabilities/ lagged total assets

M&A: An indicator variable that is equal to 1 if the firm undertook a large merger or acquisition in quarter t, and zero otherwise

Cash flow volatility: The standard deviation of quarterly operating cash flows over the prior 7 quarters (requiring at least 3 non-missing observations)

Sales volatility: The standard deviation of quarterly sales over the prior 7 quarters (requiring at least 3 non-missing observations)

Foreign transactions: An indicator variable that is equal to 1 if the firm has foreign transactions in quarter t, and zero otherwise.