Accrual quality, investor reaction to earnings, and the confirmatory role of sales news

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Abstract

Purpose: Agency theory predicts that information asymmetry provides agents with an incentive to manipulate performance signals to maximize their utility, which gives principals reasons to distrust such signals. The accounting and finance literature finds empirical support for this prediction by studying how earnings reliability attributes affect investors' reactions to earnings announcements. However, research pays less empirical attention to whether investors skeptical of earnings reliability look for confirmatory signals in other parts of the income statement. This study aims at filling such this research gap.

Design/methodology/approach: This study examines investors' combined use of earnings and sales news. It adopts an event-study methodology to analyze whether sales news moderates the stock market response to annual earnings announcements.

Findings: The results show that investors do not fully trust earnings news if earnings beat analyst expectations and the firm has a reputation for low accrual quality. In this case, positive sales data alleviate investors' skepticism of earnings news and, thus, make them react more favorably. In contrast, sales data do not affect the market response if the earnings news is negative, or the firm accrual quality is high. These results are robust to different model specifications and explanations.

Originality/value: The findings shed new light on how investors use sales data to complement earnings news and our understanding of the consequences of accruals quality on investor information processing.

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1. Introduction

Earnings announcements are informative performance signals for investors because they can reveal essential information about future dividends (Basu et al., 2013). However, accrual accounting allows for firm subjectivity and discretion in determining earnings (Imhoff & Lobo, 1992). Some firms may use this discretion poorly, distorting earnings signals with noise or bias. These firms develop a reputation for low-quality accruals, which hinder investors from fully understanding current earnings implications for future performance (Dechow & Dichev, 2002). In this case, investors may look at earnings news skeptically and may not fully react to it (Francis et al., 2007; Ecker et al., 2006). This is especially true if such news beats analyst expectations because compensation and career incentives motivate managers to intervene in the accounting process to report good news; that is, the good news is aligned with managerial reporting objectives and is thus more likely to be the result of manipulation (Jennings, 1987; Kothari et al., 2009).

This study proposes a model based on agency theory, which suggests that when there is information asymmetry, utility-maximizing agents have incentives to report performance opportunistically. Principals' reactions to performance signals are affected by their awareness of such incentives (Fischer & Verrecchia, 2000). Therefore, the Principal rationally discriminates between a signal consistent with the agent's interests and one that is not because the former is likelier to result from the agent's bias (Stein, 1989). Information asymmetry between the Principal and the agent arises because the Principal cannot directly observe bias in the agent's signal. However, the Principal can estimate it based on the reliability of prior signals. Therefore, the Principal rationally discriminates based on the reliability of prior signals. The model assumes that the Principal receives one aggregate performance signal and another one about a performance component, and such a component is costlier for the agent to manipulate and, therefore, less likely to be biased (Fischer & Verrecchia, 2000). Therefore, the Principal rationally discriminates between the situation in which the two signals are consistent and the situation in which they are not and trades accordingly.

Following the theoretical arguments above, this study analyzes whether skeptical investors look at other parts of an income statement in search of confirmatory cues that alleviate earnings quality concerns. Specifically, it examines investors' use of sales revenue data. Previous research suggests that revenue is more persistent and challenging for managers to manipulate than other earnings components (Ertimur et al., 2003). In this case, higher-than-expected sales can alleviate investors' concerns regarding reported earnings because they can act as a confirmatory signal of robust and sustainable performance. Conversely, positive earnings surprises not supported by solid sales data make investors suspicious. They could fear that unexpected good news from non-revenue accounts is more likely to conceal accruals manipulation or estimation errors.

Based on the above considerations, it is hypothesized that if a firm develops a reputation for low accrual quality *and* announces positive earnings news, such news will reflect investor skepticism and weak price response. However, if positive sales data is released with earnings announcements, investors will be relieved, and their response to earnings news will be stronger. It is further hypothesized that positive sales data do *not* corroborate the reaction to negative earnings news *or* the information by high-quality firms. In either case, investors believe information without seeking confirmation.

Despite the above considerations, several arguments contradict these hypotheses. First, various studies lead to doubting the reliability of sales data compared with other financial statement numbers (Edmonds et al., 2013; Massel et al., 2021; Shih, 2019). It is also unclear to what extent investors can rely on them to assess future performance (Kama, 2009), especially for low-quality financial statements (Callen et al., 2008). Ultimately, whether sales news plays a role in shaping market responses to earnings news when such information lacks credibility in investors' eyes is an open empirical question.

This study examines market-adjusted stock returns in the three days around annual earnings announcements made between 1999 and 2019 by firms listed on the NYSE, NASDAQ, and AMEX to test the hypotheses. Accrual quality is measured using abnormal accrual regression models (Dechow & Dichev, 2002; Jones, 1991). Earnings (sales) news is measured as the difference between the announced earnings (sales) figure and the pre-announcement analyst consensus. The results are consistent with expectations. Specifically, the earnings response coefficient for low-quality positive earnings news is approximately twice as large if revenue news is positive. In contrast, negative earnings news or high-quality accruals elicit the same response, regardless of whether sales beat expectations.

Supplemental analyses show that medium and large positive sales surprises, rather than small ones, significantly boost investors' responses to low-quality good earnings news. This is consistent with earlier findings that show that sales data can raise investor skepticism if it is barely above expectations (Shih, 2019). Additional analyses show that these results are not because of differences in firms' fundamental volatility. Rather, they are derived from investors weighing the implications of prior accrual quality and requiring an additional confirmation from sales data if such quality is low. Finally, the paper analyzes trade volumes on announcement days and finds trading patterns that are consistent with the main results.

This study contributes to the existing literature in several ways. First, it contributes to our knowledge of how investors use revenue news. Previous literature focuses on the role of revenue news in providing incremental information content over earnings news or other types of news, all else being equal (Ertimur et al., 2003; Jegadeesh & Livnat, 2006a, 2006b). In contrast, this study shows that it can also play a complementary role by lending credibility to (and affecting the pricing of) earnings news; that is, it has a moderating effect, altering the earnings response coefficient. Thus, this study sheds light on the interplay between earnings and other accounting data to form investors' expectations. Moreover, this study expands our understanding of the consequences of accruals quality on investors' information processing. Previous research highlights that investors are skeptical of low-quality earnings (Ecker et al., 2006; Francis et al., 2007); however, little attention has been paid to whether information from other income statement sections can alleviate their concerns.

The remainder of this paper is organized as follows. Section 2 reviews the related literature and develops the hypotheses. Section 3 illustrates the research design. Section 4 discusses the results, and Section 5 concludes the paper.

2. Literature review and hypothesis development

2.1. Accrual quality, investors' skepticism, and their reaction to earnings news

Investors' responses to an earnings signal depend on i.) news on future cash flows provided by the signal (i.e., the surprise) and ii.) investors' assessment of the signal's reliability. A lack of reliability could arise because of possible errors in the signal formation process (i.e., noise) or because of the concern that managers intentionally manipulate the signal (i.e., bias). In either case, keeping the signal's surprise constant, investors react less when they doubt its

reliability (Holthausen & Verrecchia, 1988; Jennings, 1987; Kim & Verrecchia, 1991; Ng et al., 2013). This is consistent with agency theory, which predicts that principals' reactions to performance signals are affected by agents' incentives to opportunistically report such performance (Fischer & Verrecchia, 2000).

Investors can analyze past financial statements to gauge whether current earnings contain bias or error. Specifically, investors can assess a firm's accruals quality over time, that is, how well accruals are associated with the firm's cash flow realization. Indeed, research shows that investors learn about a firm's accrual quality over time and that such a learning process affects their reaction to earnings. For example, Imhoff and Lobo (1992) and Lipe (1990) found that the response to earnings news was weaker when current earnings were poor predictors of future realizations because of noise in the earnings-generating process. Francis et al. (2007) showed that prior accrual quality increases the earnings response coefficient, and D'Augusta and Prencipe (2022) showed that this effect varies with macroeconomic conditions. Ecker et al. (2006) found consistent evidence that adopts a measure of investor assessment of the risk derived from low accrual quality.

These results are consistent with the findings of the non-archival research. Graham et al. (2005) interviewed corporate executives to identify the factors influencing their reporting and disclosure choices. Their result shows that they are "concerned about the company's reputation for delivering reliable earnings and disclosing transparent information [believing that] a poor reputation for delivering transparent and reliable information can [hurt] stock performance" (Graham et al., 2005:7). Similarly, Hodge et al. (2006) found experimental evidence that a solid reporting reputation alleviates investor skepticism about a signal consistent with managers' interests.

Overall, the literature shows that investors are skeptical about earnings news released by firms with a reputation for low-quality accruals and that such skepticism leads to a muted reaction to earnings news.

2.2. Sales news as a confirmatory signal

Investors may look elsewhere for additional confirmatory signals before reacting to dubious-quality earnings signals.[1] They can find one such signal

[1] Research shows that the investor interpretation of (and reaction to) earnings news can be improved by corroborating information such as the presence of verifiable supplementary

in revenue news. Specifically, if investors receive information on earnings and revenue, they can use the latter as a corroboratory signal, lending credibility to the former. A firm announcing better-than-expected earnings but worse-than-expected revenue can face investor skepticism. Investors fear that earnings news stems from non-revenue income statement items, which are likelier to be based on subjective estimates and easier to manipulate.

Ertimur et al. (2003) argued that investors may have good reasons to view revenue as a more credible performance signal than other income statement items. Revenues are less likely to contain noise than expenses, which are an aggregation of many heterogeneous accounts. Moreover, conservative accounting standards make revenues less likely to be based on managerial estimates and assumptions; thus, they are more persistent, difficult to manipulate (Ghosh et al., 2005; Jegadeesh & Livnat, 2006a, 2006b), and, therefore, less likely to be biased (Fischer & Verrecchia, 2000).

Early research did not find evidence that revenue news provides incremental information on earnings news (Hopwood & McKeown, 1985; Hoskin et al., 1986; Wilson, 1986). However, subsequent studies found that sales can provide incremental information on the persistence and reliability of announced earnings. For instance, using analyst forecast data as a proxy for revenue expectations, Swaminathan and Weintrop (1991) show that disentangling revenue from expenses provides investors with additional information beyond earnings. Extending Swaminathan and Weintrop (1991), Ertimur et al. (2003) found that the market responses are stronger to surprises stemming from revenues than from expenses, which is consistent with investors perceiving revenues to be more reliable. Subsequently, Rees and Sivaramakrishnan (2007) showed that beating sales expectations boosted investors' confidence in (and their response to) positive quarterly earnings surprises between 1998 and 2001.

2.3. Hypothesis development

2.3.1. Predictions

The following predictions are made based on the arguments in sections 2.1 and 2.2. Suppose that the signal is supported by consistent sales data (i.e., a positive earnings surprise backed by higher-than-expected revenue). In that

statements accompanying the disclosure (Hutton et al., 2003), managerial or firm-specific characteristics (Ng et al., 2013; Rogers & Stocken, 2005), or attributes of the firm's financial reporting system (Abdel-Meguid et al., 2019; D'Augusta, 2022; D'Augusta et al., 2016)

case, investors are reassured about the solidity of the firm's performance and react more positively. The price response coefficient per unit of earnings news is larger.

In contrast, suppose sales data contradict earnings surprises (i.e., earnings beat expectations, but sales fall short); investors will take a skeptical view of earnings performance that primarily originates from income statement items other than sales because such items are more likely to contain estimation errors and are easier to manipulate. Therefore, the price-response coefficient per unit of earnings news will be smaller.

However, the arguments above hold true in case investors have reasons to doubt the quality of earnings signals. In the absence of such doubts, investors will not need to seek additional confirmatory signals to respond fully to earnings. This could be the case for firms that have established a reputation for high-quality accruals – that is, firms that have avoided making estimation errors or engaging in earnings manipulation – so that accruals have been reliably mapped into future cash flows. Therefore, when these firms announce their annual earnings, the response coefficient will be unaffected by the sales data.

Additionally, managers have clear incentives to report positive earnings news because their compensation and tenure depend on the news. Investors are likely to take a skeptical view of good news but believe in bad news, being aware of such incentives (Baginski et al., 2014). This is consistent with agency theory, which predicts that a principal will rationally distinguish a performance signal consistent with the agent's interests from an inconsistent one because the former is more likely to be biased (Stein, 1989). Therefore, the response coefficient to negative earnings surprises is not expected to depend on the accompanying sales data; that is, investors will respond to bad news whether sales beat or miss expectations.

2.3.2. Counterarguments

However, several counterarguments suggest that there may be no association between sales data and earnings response coefficients, thus creating tension for the predictions developed above. For instance, there is no evidence that investor responses to revenue depend on the likelihood of earnings manipulation. Kama (2009) analyzed the responses to different quarters' earnings and found that when earnings are more likely to be contaminated by errors or bias, as in the fourth quarter, investors' reactions to earnings are weaker. However, their response to revenues is not affected. These results

lead to questioning whether revenue surprises alleviate investors' skepticism about unreliable news.

Additionally, research shows that investors can view revenue as unreliable. For instance, Massel et al. (2021) found that managers report revenues opportunistically just before IPOs. Additionally, Shih (2019) showed that investors can be skeptical about (and refrain from reacting to) sales surprises, especially small ones, and have good reasons to do so. Similarly, Edmonds et al. (2013) showed that compensation schemes incentivize managers to manipulate revenue. Once again, these arguments contradict the expectation that revenue news will enhance the credibility of low-quality good earnings news. Additionally, Callen et al. (2008) showed that opportunistic managers can focus their efforts on manipulating revenues rather than earnings when they expect investors to pay more attention to the former than the latter. This could be the case for low-accrual-quality firms, whose earnings news elicits a milder market response. This could trigger a circle in which managers manipulate revenues because they anticipate investors' skepticism regarding earnings, and investors become more skeptical regarding revenues because they expect managers' opportunistic behavior.

Finally, there is evidence that investors and analysts underreact to revenue news, suggesting that its persistent properties are not fully understood (Gu et al., 2006; Jegadeesh & Livnat, 2006b). One may doubt whether the implications of revenue surprises for future performance enhance responses to unreliable earnings news if even sophisticated users fail to grasp such implications.

2.3.3. Hypotheses

Despite these counterarguments that support the null hypothesis, the following directional hypotheses are formalized based on the theoretical discussion developed in Section 2.3.1:

*H1: Beating sales expectations will **increase** the response coefficient to **positive** earnings news announced by **low**-accrual quality firms*

*H2: Beating sales expectations will **not affect** the response coefficient to **positive** earnings news announced by **high**-accrual quality firms*

*H3: Beating sales expectations will **not affect** the response coefficient to **negative** earnings news announced by **low**-accrual quality firms*

*H4: Beating sales expectations will **not affect** the response coefficient to **negative** earnings news announced by **high**-accrual quality firms*

3. Research methodology

3.1. Measurement of the variables

In this study, accrual quality is measured using the residuals from abnormal accrual models, consistent with prior research (Francis et al., 2007; Mafrolla & Nobili, 2017). The main proxy employed in the analysis is the standard deviation of the residuals from the abnormal accruals model by Jones (1991), modified from Dechow et al. (1995) and Kothari et al. (2005). Specifically, the residuals are obtained by running the following regression for each industry and year:

$TA_{it} = \delta_0 + \delta_1 1/Assets_{it-1} + \delta_2(\Delta SALES_{it} - \Delta Receivables_{it}) + \delta_3 PPE_{it} + \delta_4 ROA_{it} + \varepsilon_{it}$.

In the equation above, *TA* is total accruals scaled by total assets, *ΔSALES*, *ΔReceivables*, and *PPE* are the year-over-year sales and accounts receivable changes, and the level of property, plant, and equipment, all scaled by total assets, and *ROA* is the return on assets. The standard deviation of the residual ε_{it} is then computed over a rolling window from t-1 up to t-5. $VOL(\varepsilon_{it})$, therefore, is an inverse measure of a firm's accruals quality (AQ). Each firm-year observation belongs to the High-AQ (Low-AQ) subsample if $VOL(\varepsilon_{it})$ is below (above) the annual median.

The three-day cumulative market-adjusted return around the announcement (*RET*) is regressed on a firm's earnings news. Daily market-adjusted return is the difference between a firm's stock and value-weighted market returns. Earnings news (*ENEWS*) is calculated as the difference between the reported earnings per share and the pre-announcement analyst consensus scaled by the firm's stock price at the end of the fiscal year (Skinner & Sloan, 2002). To measure whether a firm's sales beat expectations, the regression model employs a dummy variable (*DREV*) equal to one if the firm's revenue exceeds the pre-announcement analyst consensus and zero otherwise. To assess whether beating revenue expectations lends credibility to earnings news and thus boosts the market response, the model includes an interaction term between *ENEWS* and *DREV* as follows:

$$RET = \beta_0 + \beta_1 ENEWS + \beta_2 ENEWS*DREV + \beta_3 DREV + \varsigma, \quad [3]$$

In the equation above, β_1 is the market response coefficient when the firm does not beat sales expectations. β_2 represents how such a coefficient increases when the firm beats them: if doing so plays a confirmatory role and reassures investors about the reliability of earnings news, β_2 will be positive.

The hypotheses are tested by running the regression of Equation 3 separately on low- and high-AQ observations, as previously defined, and on pos-

itive and negative *ENEWS*. The hypotheses predict that β_2 will be positive when *ENEWS* is positive, *and* accruals quality is low, and not significant when *ENEWS* is negative *or* accruals quality is high.

The regression model includes various control variables such as the logarithm of the firm's market value of equity (*SIZE*), financial leverage (*LEV*), the firm's stock price (*PRICE*), and the market-to-book ratio (*MB*) because these factors are associated with market reactions to earnings news (Francis et al. 2007; Skinner & Sloan, 2002). The model also includes the pre-announcement number of outstanding analyst earnings forecasts (*FOLLOW*) and the standard deviation of such forecasts (*DISPERSION*) because differences in the pre-announcement analyst information environment can affect investors' reactions to earnings news (Imhoff & Lobo, 1992; Mikhail et al., 2003; Zhang, 2006). The model also controls for factors that capture firm-specific risk and volatility, affecting market patterns around earnings news announcements and investor skepticism about such news (Cao & Narayanamoorthy, 2012; Zhang, 2006). These factors are the following: the standard deviation of the firm's operating cash flow over the years t-1 up to t-5 (*SDCFO)*; the firm's beta coefficient (*BETA*), obtained from regressing daily stock returns on market returns over the calendar year before the year of the earnings announcement; the firm's persistence of earnings changes (*PERS*), measured as the autocorrelation coefficient obtained from regressing the asset-deflated change in earnings on its prior year's value over a rolling window from t-1 up to t-8; The standard deviation of daily stock returns over the fifty-day pre-announcement window ending five days before the earnings announcement (*SDRET*). The model includes the level of the company's stock turnover before the announcement (*PriorTO*) because the trading volume can reflect differences in liquidity, visibility, or disagreement, which in turn can affect returns around earnings announcements (Garfinkel & Sokobin, 2006; Gervais et al., 2001; Mashruwala & Mashruwala, 2014). Finally, the model controls for the market-adjusted cumulative stock return before the announcement (*PriorRET*) because return momentum can also influence announcement returns (Jain et al., 2020; Jegadeesh & Titman, 1993). All models include year and industry-fixed effects.

3.2. Sample and descriptive statistics

The sample includes annual earnings announcements by firms listed on the NYSE, AMEX, and NASDAQ for fiscal years 1999-2019, with sufficient data to construct the variables required by the models. The data are downloaded

from the Wharton Research Data Services (WRDS) website. Stock market and financial statement data are obtained from the Center for Research in Security Prices (CRSP) and Compustat Fundamentals Annual. Analysts' forecast data come from the Institutional Brokers' Estimate System (I/B/E/S) Summary Statistics database. Earnings and sales news are calculated using the I/B/E/S Surprise History database. The sample excludes financial firms identified by Fama and French (1997). The revenue and earnings news must be announced on the same day. To mitigate the influence of penny stocks, which could lead to return measurement problems because of trading frictions (Taffler et al., 2004), observations with stock prices less than $2 are removed, consistent with prior literature (Bens et al., 2018; Hurwitz, 2017; Neilson, 2022; Tucker, 2007). The sample also excludes observations if the market value of equity is less than $20 million or if daily stock return data in the window (-55, +1) around earnings announcements are missing. Tables 1 and 2 present the descriptive statistics and correlations between the variables. The sample means and standard deviations of *RET*, *ENEWS*, and *VOL(ε)* are consistent with those of prior research (e.g., Chang et al., 2013; Francis et al., 2007). As expected, announcement returns (*RET*) are associated positively with *ENEWS* and *DREV* and negatively with lack of accrual quality (*VOL(ε)*) or with proxies for a turbulent business environment (*SDCFO, SDRET*).

Table 1 – Descriptive statistics

	N	Mean	Std. Dev.	25th perc.	Median	75th perc.
Variables of interest:						
RET	29.676	0,220	8,170	-3,979	0,201	4,551
ENEWS	29.676	-0,042	1,264	-0,065	0,047	0,215
DREV	29.676	0,585	0,493	0,000	1,000	1,000
VOL(ε)	29.676	0,052	0,040	0,025	0,040	0,066
Control variables:						
SIZE	29.676	21,164	1,675	19,938	21,046	22,250
PRICE	29.676	3,113	0,949	2,492	3,146	3,741
DISP	29.676	0,003	0,007	0,000	0,001	0,003
FOLL	29.676	9,802	7,211	4,000	8,000	14,000
MB	29.676	3,628	4,166	1,557	2,396	3,943
LEV	29.676	1,701	2,487	0,489	1,013	1,899
PriorRET	29.676	0,014	0,156	-0,069	0,010	0,092
BETA	29.676	1,148	0,518	0,795	1,103	1,455
PERS	29.676	-0,178	0,419	-0,438	-0,209	0,062
SDCFO	29.676	0,056	0,056	0,023	0,039	0,066
SDRET	29.676	0,025	0,014	0,015	0,021	0,030
PriorTO	29.676	0,010	0,007	0,005	0,008	0,013

All variables are defined in the appendix.

Table 2 – Pearson (lower diagonal) and Spearman (upper diagonal) correlations

	RET	ENEWS	DREV	VOL(ε)	SIZE	PRICE	DISP	FOLL	MB	LEV	PriorRET	BETA	PERS	SDCFO	SDRET	PriorTO
RET	1	0.269*	0.137*	-0.005	0.026*	-0.006	-0.050*	0.014*	0.010	0.010	-0.006	-0.001	0.000	-0.018*	-0.019*	0.009
ENEWS	0.164*	1	0.165*	0.012*	0.006	-0.019*	-0.010	0.008	-0.027*	-0.018*	0.062*	0.044*	-0.014*	0.026*	0.009	0.060*
DREV	0.158*	0.127*	1	0.012*	0.050*	0.035*	-0.075*	0.038*	0.071*	-0.036*	0.057*	0.037*	-0.002	0.020*	-0.041*	0.032*
VOL(ε)	-0.016*	-0.045*	0.004	1	-0.365*	-0.281*	0.142*	-0.216*	0.020*	-0.213*	0.043*	0.141*	0.016*	0.595*	0.341*	0.109*
SIZE	0.018*	0.102*	0.058*	-0.323*	1	0.640*	-0.359*	0.739*	0.338*	0.271*	-0.015*	-0.054*	-0.018*	-0.402*	-0.485*	0.141*
PRICE	-0.009	0.080*	0.044*	-0.240*	0.618*	1	-0.402*	0.404*	0.338*	0.129*	-0.039*	-0.044*	0.001	-0.295*	-0.441*	0.094*
DISP	-0.031*	-0.194*	-0.078*	0.115*	-0.266*	-0.288*	1	-0.218*	-0.373*	0.093*	-0.004	0.147*	-0.043*	0.229*	0.377*	0.093*
FOLL	0.009	0.064*	0.051*	-0.179*	0.728*	0.374*	-0.151*	1	0.232*	0.161*	-0.016*	0.008	0.022*	-0.229*	-0.240*	0.298*
MB	0.006	0.019*	0.042*	0.067*	0.214*	0.211*	-0.074*	0.149*	1	0.087*	0.033*	-0.001	0.008	0.090*	-0.158*	0.108*
LEV	0.006	-0.029*	-0.031*	-0.073*	0.114*	0.030*	0.102*	0.047*	0.523*	1	0.001	-0.115*	-0.111*	-0.283*	-0.173*	-0.011
PriorRET	-0.005	0.033*	0.059*	0.039*	-0.026*	-0.047*	0.000	-0.024*	0.037*	0.007	1	-0.003	-0.006	0.037*	0.084*	0.036*
BETA	0.001	0.024*	0.046*	0.123*	-0.055*	-0.039*	0.104*	-0.001	0.023*	-0.015*	-0.015*	1	0.012*	0.200*	0.230*	0.344*
PERS	0.001	0.002	0.003	0.003	-0.018*	0.002	-0.020*	0.027*	-0.018*	-0.078*	-0.008	-0.003	1	0.027*	0.021*	0.027*
SDCFO	-0.032*	-0.023*	-0.006	0.526*	-0.329*	-0.237*	0.206*	-0.184*	0.195*	-0.073*	0.028*	0.147*	0.008	1	0.391*	0.169*
SDRET	-0.024*	-0.100*	-0.066*	0.292*	-0.407*	-0.376*	0.324*	-0.182*	-0.030*	-0.020*	0.105*	0.211*	0.008	0.306*	1	0.251*
PriorTO	-0.004	0.012*	0.032*	0.105*	0.056*	0.056*	0.103*	0.212*	0.087*	0.059*	0.037*	0.328*	0.018*	0.160*	0.288*	1

*All variables are defined in the appendix. * indicates significance at less than 5 percent*

4. Findings

4.1. Main analysis

Table 3 reports the results from the regression of Equation 3. First, the table reports the results from the regression over the entire sample (Column 1). The coefficient of *ENEWS* is significantly positive, showing that the market responds to earnings news even if sales miss expectations. The coefficient's magnitude suggests that if earnings news increases by an amount equal to one percent of the stock price, the abnormal stock returns around the announcement day are approximately 81 basis points higher. The coefficient of *DREV* is also positive, suggesting that if the earnings news is zero, beating sales expectations will increase stock return by 2.4 percent on average. The focus of the test is on the interaction coefficient *ENEWS*DREV*: it is significantly positive, showing that beating sales expectations boosts the credibility of (and the reaction to) earnings news by about 47 percent[2].

[2] Calculated as the ratio between the ENEWS*DREV and the ENEWS coefficients.

Table 3 – Main results

	Column 1		*Column 2*		*Column 3*		*Column 4*		*Column 5*		*Column 6*		*Column 7*		*Column 8*		*Column 9*	
	Full sample										ENEWS > 0				ENEWS ≤ 0			
Dep.var.: RET	*All observations*		*High Quality*		*Low Quality*		*ENEWS > 0*		*ENEWS ≤ 0*		*High Quality*		*Low Quality*		*High Quality*		*Low Quality*	
	Coeff.	*t-stat.*	*Coeff.*	*t-stat.*	*Coeff.*	*t-stat.*	*Coeff.*	*t-stat.*	*Coeff.*	*t-stat.*	*Coeff.*	*t-stat.*	*Coeff.*	*t-stat.*	*Coeff.*	*t-stat.*	*Coeff.*	*t-stat.*
ENEWS	0.815***	(11.56)	1.091***	(8.77)	0.661***	(7.61)	1.005***	(5.04)	0.473***	(5.03)	1.495***	(4.98)	0.747***	(2.85)	0.717***	(4.39)	0.345***	(2.90)
DREV	2.396***	(23.31)	2.122***	(16.40)	2.669***	(16.66)	1.832***	(13.31)	1.619***	(9.40)	1.795***	(10.38)	1.891***	(8.38)	1.485***	(6.92)	1.720***	(6.47)
ENEWS*DREV	**0.386*** **	**(3.57)**	**0.068**	**(0.36)**	**0.566*** **	**(4.19)**	**0.635*** **	**(2.81)**	**-0.080**	**(-0.59)**	**0.114**	**(0.32)**	**0.895*** **	**(3.07)**	**-0.289**	**(-1.23)**	**0.053**	**(0.30)**
SIZE	0.238***	(2.58)	0.066	(0.59)	0.429***	(2.83)	-0.189*	(-1.72)	0.775***	(5.05)	-0.319**	(-2.31)	-0.031	(-0.17)	0.577***	(3.13)	0.978***	(3.97)
PRICE	-0.386***	(-5.55)	-0.195**	(-1.98)	-0.560***	(-5.81)	-0.295***	(-3.33)	-0.631***	(-5.69)	-0.169	(-1.44)	-0.393***	(-3.05)	-0.354**	(-2.22)	-0.889***	(-5.72)
DISP	0.096	(1.42)	0.078	(0.69)	0.113	(1.33)	-0.659***	(-5.44)	0.412***	(4.00)	-0.657***	(-3.09)	-0.654***	(-4.46)	0.334**	(2.04)	0.470***	(3.59)
FOLL	-0.140*	(-1.85)	-0.108	(-1.14)	-0.151	(-1.23)	-0.154*	(-1.73)	-0.112	(-0.84)	-0.061	(-0.53)	-0.231	(-1.62)	-0.170	(-1.06)	-0.072	(-0.33)
MB	0.088	(1.18)	0.179*	(1.72)	-0.010	(-0.10)	0.183**	(2.06)	-0.010	(-0.09)	0.233*	(1.89)	0.117	(0.96)	0.217	(1.24)	-0.160	(-1.04)
LEV	0.052	(0.73)	0.003	(0.03)	0.116	(1.23)	-0.017	(-0.19)	0.192*	(1.72)	-0.041	(-0.33)	0.028	(0.23)	0.018	(0.10)	0.314**	(2.11)
PriorRET	-0.167***	(-2.83)	-0.165*	(-1.91)	-0.194**	(-2.45)	-0.302***	(-3.89)	-0.126	(-1.40)	-0.247**	(-2.22)	-0.359***	(-3.43)	-0.219	(-1.61)	-0.070	(-0.59)
BETA	-0.006	(-0.10)	-0.030	(-0.33)	-0.013	(-0.15)	0.054	(0.68)	-0.109	(-1.09)	0.021	(0.18)	0.047	(0.41)	-0.109	(-0.78)	-0.119	(-0.86)
PERS	-0.024	(-0.48)	-0.003	(-0.05)	-0.047	(-0.61)	0.060	(0.97)	-0.117	(-1.47)	0.058	(0.74)	0.060	(0.63)	-0.074	(-0.72)	-0.147	(-1.24)
SDCFO	-0.240***	(-3.56)	0.045	(0.33)	-0.320***	(-3.87)	-0.370***	(-4.20)	-0.040	(-0.40)	-0.117	(-0.61)	-0.475***	(-4.40)	0.154	(0.82)	-0.059	(-0.46)
SDRET	-0.051	(-0.57)	-0.061	(-0.47)	-0.050	(-0.40)	-0.084	(-0.73)	0.049	(0.35)	-0.235	(-1.37)	-0.011	(-0.07)	0.236	(1.18)	-0.016	(-0.08)
PriorTO	0.027	(0.38)	-0.160	(-1.56)	0.142	(1.54)	0.184**	(2.09)	-0.407***	(-3.57)	0.066	(0.50)	0.249**	(2.18)	-0.584***	(-3.48)	-0.278*	(-1.84)
Constant	-0.290	(-0.31)	-0.606	(-0.41)	0.126	(0.09)	1.434	(1.50)	-2.130	(-1.26)	0.762	(0.55)	2.100	(1.43)	-2.439	(-1.21)	-1.669	(-0.72)
Observations	29676		14844		14832		19004		10672		9712		9292		5132		5540	
Adj. R^2	0.053		0.056		0.052		0.039		0.035		0.038		0.037		0.052		0.028	
Year / Ind. FE	YES		YES		YES		YES		YES		YES		YES		YES		YES	

All variables are defined in the appendix. All continuous variables are winsorized at the 1st and 99th percentile. RET and ENEWS have been multiplied by 100 to facilitate the interpretation of the coefficients. CONTROLS is the vector of control variables listed in Table 1. T-statistics are reported in parentheses and are based on standard errors clustered by firm. All variables are defined in the appendix. *, **, and *** indicate significance at less than 10%, 5%, and 1% respectively.

Columns 2 and 3 report the regression results separately for the low- and high-AQ observations. The results show that the interaction coefficient *ENEWS*DREV* is significant only when accruals quality is low. This is consistent with the hypothesis that investors view low-quality earnings news as unreliable and look at revenue surprises for confirmation before fully reacting to it. In contrast, they consider high-quality earnings news reliable without requiring sales data to corroborate it. Similarly, Columns 4 and 5 show that *ENEWS*DREV* is significant for good news but not for bad news, suggesting that the former raises investor skepticism while the latter does not.

Columns 6 through 9 report the results from a four-way partition using both the news sign and accrual quality level to test the four hypotheses. The results show that it is only when accrual quality is low *and* the earnings news is positive that investors require a confirmation from sales data to react fully. This finding is consistent with investors' skepticism of low-quality earnings

surprises aligned with managerial incentives. In contrast, when earnings news is negative (i.e., when it can be assumed to run counter to the motivations of managers who risk being fired or otherwise penalized for reporting it), investors do not look at sales data to corroborate it. Overall, the results confirm all predictions presented in Section 2.

Two sensitivity checks are performed (data are not tabulated for brevity). In the first check, accruals quality (AQ) is recalculated using the volatility of the residuals from the Dechow and Dichev (2002) model, as modified by Ball and Shivakumar (2006) and McNichols (2002). These results support the hypotheses, similar to those presented in Table 3. The second check repeats the analysis after i.) scaling *ENEWS* by the stock price four days before the announcement or ii.) using the unscaled *ENEWS*. The results remain qualitatively similar to those in Table 3, suggesting that the choice of the scalar did not influence the tests.

4.2. Additional analyses

4.2.1. Volume reaction

Research shows that the information content of earnings announcements leads to stock price and volume reactions because the news encourages investors to alter their portfolios (Beaver, 1968). In contrast, price movements characterized by low volume suggest that few investors engage in trading activities, while most are reluctant to do so. Therefore, this section examines whether the confirmatory signal provided by positive sales data encourages investors to participate in trading activities, thereby increasing share turnover. This is done by substituting *RET* with the daily share turnover accumulated over the three days around the announcement (*TO*) in regression 3. Daily turnover is computed as the ratio of daily trade volume to outstanding shares.

The interaction coefficient ENEWS*DREV is expected to be significantly positive when low-quality firms announce good news, indicating that sales news is informative regarding the reliability of earnings news, leading to a stronger trade volume reaction. In contrast, the interaction coefficient is expected to be insignificant when news is bad or accruals quality is high because the main results show that in these situations, investors' reactions to earnings news are unaffected by sales data. The results reported in Table 4 are consistent with these expectations, showing that positive sales data increase the trade volume response to earnings news, but this effect exists only when such sales data boost investors' confidence in the reliability of the news.

Table 4 – Volume reaction

	Column 1		*Column 2*		*Column 3*		*Column 4*	
	ENEWS > 0				*ENEWS ≤ 0*			
Dep.var.: TO	*High Quality*		*Low Quality*		*High Quality*		*Low Quality*	
	coeff.	*(t-stat)*	*coeff.*	*(t-stat)*	*coeff.*	*(t-stat)*	*coeff.*	*(t-stat)*
ENEWS	0.046*	(1.82)	0.040*	(1.92)	-0.016	(-1.03)	-0.002	(-0.22)
DREV	-0.005	(-0.36)	0.001	(0.03)	-0.068***	(-3.75)	-0.066***	(-2.80)
ENEWS*DREV	0.028	(0.97)	0.057**	(2.47)	-0.001	(-0.05)	-0.004	(-0.30)
Observations	9712		9292		5132		5540	
Adj. R^2	0.615		0.580		0.548		0.502	
CONTROLS	YES		YES		YES		YES	
Year / Ind. FE	YES		YES		YES		YES	

All variables are defined in the appendix. All continuous variables are winsorized at the 1st and 99th percentile. ENEWS has been multiplied by 100 to facilitate the interpretation of the coefficients. CONTROLS is the vector of control variables listed in Table 1. T-statistics are reported in parentheses and are based on standard errors clustered by firm. All variables are defined in the appendix. *, **, and *** indicate significance at less than 10%, 5%, and 1% respectively.

4.2.2. Small, medium, and large sales surprises

Previous research suggests that when investors consider the incremental information content of a sales surprise, the magnitude of the surprise matters. Shih (2019) suggests that investors may be skeptical of small sales surprises because they may suspect manipulation. In that case, the confirmatory role played by sales that beat expectations should primarily stem from medium or large sales surprises rather than small ones. The quartile ranks of positive sales surprises are calculated to determine whether this is the case. Then, a binary variable (*DREV_SMALL*) is created that takes the value one if the positive sales surprise is small (i.e., it belongs to the first quartile) and zero otherwise (i.e., if the surprise is negative or if it belongs to a quartile higher than the first one). Similarly, two other binary variables identifying medium (second and third quartiles) and large (fourth quartile) surprises, labeled *DREV_MED* and *DREV_LARGE*, respectively, are constructed. These three variables are used instead of *DREV* in regression Equation 3, and Table 5 reports the results.

Consistent with Shih (2019), the coefficients of *ENEWS*DREV_MED* and *ENEWS*DREV_LARGE* show that medium and large sales surprises

play confirmatory roles and lend credibility to low-quality firms' positive earnings news. In contrast, the coefficient of *ENEWS*DREV_SMALL* is less than half that of *ENEWS*DREV_LARGE* and is barely significant. No sales surprises affect the reaction to high-quality earnings or negative earnings news, which is consistent with expectations.

Table 5 – Small, medium, and large sales surprises

	Column 1		*Column 2*		*Column 3*		*Column 4*	
	ENEWS > 0				*ENEWS ≤ 0*			
Dep.var.: RET	*High Quality*		*Low Quality*		*High Quality*		*Low Quality*	
	coeff.	*(t-stat)*	*coeff.*	*(t-stat)*	*coeff.*	*(t-stat)*	*coeff.*	*(t-stat)*
ENEWS	1.507***	(5.02)	0.680**	(2.58)	0.712***	(4.36)	0.343***	(2.87)
DREV_SMALL	1.496***	(4.74)	0.928***	(2.90)	1.665***	(4.31)	1.821***	(4.68)
DREV_MED	2.217***	(10.51)	2.436***	(9.54)	1.785***	(6.42)	1.704***	(4.94)
DREV_LARGE	1.349***	(6.43)	1.777***	(5.30)	0.872***	(2.97)	1.519***	(3.14)
ENEWS*DREV_SMALL	-0.196	(-0.31)	0.600*	(1.65)	-0.081	(-0.27)	-0.008	(-0.03)
ENEWS*DREV_MED	0.125	(0.29)	0.948***	(2.73)	-0.415	(-1.26)	0.037	(0.15)
ENEWS*DREV_LARGE	0.301	(0.65)	1.317***	(2.86)	-0.267	(-0.64)	0.261	(0.87)
Observations	9712		9292		5132		5540	
Adj. R^2	0.040		0.041		0.053		0.027	
CONTROLS	YES		YES		YES		YES	
Year / Ind. FE	YES		YES		YES		YES	

All variables are defined in the appendix. All continuous variables are winsorized at the 1st and 99th percentile. RET and ENEWS have been multiplied by 100 to facilitate the interpretation of the coefficients. CONTROLS is the vector of control variables listed in Table 1. T-statistics are reported in parentheses and are based on standard errors clustered by firm. All variables are defined in the appendix. *, **, and *** indicate significance at less than 10%, 5%, and 1% respectively.

4.2.3. Economic volatility

Low accrual quality could stem from management-specific factors (e.g., managers' lack of expertise, a deficient internal control system, and intentional manipulation of accounts). This could also result from fundamental economic factors (e.g., the firm operates in a turbulent environment that makes it difficult to avoid accrual estimation errors) or a combination of both

factors. The hypotheses are agnostic regarding the primary driver of a firm's accruals quality. Either way, investors will be suspicious of low-quality positive earnings news because it is more likely to contain estimation errors and, thus, be an unreliable future performance predictor. Nevertheless, one could wonder whether the latter driver, economic volatility, plays a disproportionately larger role in shaping investors' expectations of earnings news quality. The confirmatory effect of positive sales surprises would be concentrated among high-volatility firms if this were the case.[3]

The analysis is repeated after splitting the sample based on the firm's economic volatility rather than accruals quality to shed more light on this issue. This is done by examining the daily stock return volatility in the year before the earnings announcement. If such volatility is above (below) the annual median, the observation is labeled as High-VOL (Low-VOL). Table 7 shows that this approach does not replicate the results. When earnings news is positive, *DREV*ENEWS* is insignificant when volatility is high and increases (though barely significant) when volatility is low. These findings suggest that the main results are not simply driven by cross-sectional variations in firms' economic volatility. Rather, they stem from investors' consideration of whether a company's accruals have been unreliable predictors of future performance in prior years and thus require additional confirmation from sales data.

Table 6 – Economic volatility

	Column 1		*Column 2*		*Column 3*		*Column 4*	
	ENEWS > 0				*ENEWS ≤ 0*			
Dep.var.: RET	*Low Volatility*		*High Volatility*		*Low Volatility*		*High Volatility*	
	coeff.	*(t-stat)*	*coeff.*	*(t-stat)*	*coeff.*	*(t-stat)*	*coeff.*	*(t-stat)*
ENEWS	0.867**	(2.32)	1.150***	(4.89)	0.314*	(1.66)	0.473***	(4.35)
DREV	1.351***	(9.13)	2.442***	(9.81)	1.351***	(6.96)	1.925***	(6.73)
ENEWS*DREV	0.789*	(1.81)	0.412	(1.56)	0.074	(0.25)	-0.054	(-0.35)
Observations	10050		8954		4794		5878	
Adj. R^2	0.037		0.041		0.036		0.033	
CONTROLS	YES		YES		YES		YES	
Year / Ind. FE	YES		YES		YES		YES	

[3] Since all models already control for various fundamental volatility proxies (i.e., *SDRET, SDCFO, DISP*) or other variables likely correlated with such volatility (*MB, LEV*), it is unlikely that the results are driven by cross-sectional variation in such volatility.

All variables are defined in the appendix. All continuous variables are winsorized at the 1st and 99th percentile. ENEWS has been multiplied by 100 to facilitate the interpretation of the coefficients. CONTROLS is the vector of control variables listed in Table 1. T-statistics are reported in parentheses and are based on standard errors clustered by firm. All variables are defined in the appendix. *, **, and *** indicate significance at less than 10%, 5%, and 1% respectively.

5. Concluding remarks

This study examines whether investors look at sales data when they doubt the reliability of earnings news. This study analyzes the effect of higher-than-expected sales on the market response to positive earnings news released by firms with low accrual quality. The findings show that beating sales expectations doubles the magnitude of the earnings response coefficient. This finding shows that positive revenue surprises can play a confirmatory role by lending credibility to earnings news that investors would otherwise be skeptical of. There is no evidence of such an effect for bad-news earnings announcements or announcements made by high-quality firms. This finding suggests that investors view such announcements as credible disclosures that do not require additional confirmation from other income statement sources.

This study contributes to the extant literature by studying how investors use sales revenue information. Prior research shows evidence of the incremental informativeness of sales data over net income (e.g., Ertimur et al., 2003; Jegadeesh & Livnat, 2006a, 2006b). Expanding on this stream of literature, this study examines the complementary role of sales information. By lending credibility to earnings news, sales surprises moderate earnings response coefficients. In particular, the study contributes to the literature on the effect of accruals quality on investor reactions to accounting numbers. Building on previous research showing that investors are skeptical of low-quality earnings (Ecker et al., 2006; Francis et al., 2007), this study sheds new light on this issue by proposing that confirming signals from sales information is a mechanism that can alleviate investors' concerns.

This study has some limitations that future research could address. For instance, the focus of the study is limited to public announcements of income statement numbers. However, future research could extend this analysis to other financial reporting channels. For instance, the simultaneous *voluntary* release of earnings and sales information through management forecasts could reveal a similar interplay if investors react to the former only when reassured by the latter. It would also be interesting to study whether the voluntary release of forward-looking sales data complements or substitutes for other financial reporting attributes to alleviate investor skepticism. As Arena

et al. (2021) noted, the empirical literature found mixed evidence regarding the relationship between mandatory and voluntary disclosures; the confirmatory role of sales data could be an interesting setting to shed new light on this debate.

Moreover, this study's sample is limited to public companies listed on U.S. stock markets that tend to share specific ownership and governance features. However, research shows that alternative ownership structures, such as family-controlled firms, can affect managerial tendencies to use accounting discretion (Greco and Neri, 2021) or engage in impression management (Bozzolan et al., 2022). This could also imply that sales surprises play a different role in shaping investor responses to earnings news.

Similarly, the U.S.-market orientation in this study implies that the focus is limited to an environment with specific institutional and cultural characteristics. Future research could analyze cross-country differences in the extent to which investors view good news skeptically and require consistent sales data to alleviate this. Research shows that international differences and national cultures can lead to cross-country variations in accrual quality measurement (Di Narzo et al., 2018), earnings management perception (Geiger et al., 2006), stakeholder engagement (Dal Maso et al., 2017), disclosure compliance (Mazzi et al., 2018), accounting standard enforcement (Quagli et al., 2021), and earnings benchmark-beating manipulation (Mattei, 2007, 2012). All of these venues for inquiries fall outside the scope of this study and are left for future research.

APPENDIX – Variable definition

RET = cumulative market-adjusted abnormal returns over the window (-1,+1), where 0 is the earnings announcement day. Cumulative abnormal stock returns are adjusted by subtracting the cumulative value-weighted market returns.

ENEWS = earnings news, calculated as the difference between the reported earnings per share for year *t* and the pre-release mean analyst forecast, scaled by the stock price at the end of fiscal year *t*.

DREV = a binary variable equal to one if the firm's revenue beats the pre-announcement analyst consensus and zero otherwise.

VOL(ε) = the accrual quality measure, calculated as the volatility over the years t-5 to t-1 of the residual from the Jones (1991) model, modified as in Dechow et al. (1995) and Kothari et al. (2005).

SIZE = logarithm of firms' market capitalization at the end of fiscal year *t*.

PRICE = the logarithm of the firm's stock price at the end of fiscal year *t*.

DISPERSION = the most recent pre-announcement value of the standard deviation of outstanding analyst forecast estimates relative to year *t* earnings scaled by the stock price at the end of fiscal year *t*.

FOLLOW = most recent pre-announcement value of the number of outstanding analyst forecast estimates relative to year *t* earnings.

MB = market to book ratio at the end of the year *t*.

LEV = financial leverage measured as total liabilities divided by the book value of equity at the end of fiscal year *t*.

PriorRET = market-adjusted cumulative stock return over 50 days ending five days before the earnings announcement.

BETA = the firm's beta coefficient obtained by regressing daily stock returns on market returns over the calendar year before the year in which earnings are announced.

PERS = a firm's persistence in earnings changes, measured as the autocorrelation coefficient obtained by regressing the asset-deflated change in earnings on its prior year's value over a rolling window from t-1 up to t-8.

SDCFO = standard deviation, calculated over the years t-5 to t-1, of the firm's operating cash flow, scaled by total assets.

SDRET = the standard deviation of daily stock returns over 50 days ending five days before the earnings announcement.

PriorTO = average value of the company's stock turnover before the earnings announcement, calculated as the ratio of trade volume to shares outstanding over the 50 days ending five days before the earnings announcement.

TO = the cumulative daily stock turnover around the earnings announcement, calculated as the ratio of trade volume to shares outstanding over the window (-1,+1), where 0 is the earnings announcement day.

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