Earnings Management Flexibility and Market Reactions to Earnings Announcements

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We examine investors' use of balance sheet information to infer earnings management flexibility and the extent to which investors utilize that information to assess earnings quality. Investors face a level of uncertainty when firms meet or barely beat the consensus analyst forecast. Investors must assess the likelihood that the firm arrived at the reported numbers through earnings management. Firms with limited earnings management flexibility have less ability to manage earnings. We find evidence that the market uses this earnings management flexibility information to discern the firms that reach earnings benchmarks without having to resort to earnings management.

Keywords: earnings management, balance sheet constraints, analyst forecasts

INTRODUCTION

The existence and pervasiveness of earnings management and the circumstances under which firms are most likely to engage in earnings management have been subjects of considerable discussion and debate among accounting researchers (Healy & Wahlen, 1999; Kothari, 2001; Schipper, 1989) as well as among practitioners, government regulators, and investors (Magrath & Weld, 2002; Duncan, 2001; Leavitt, 1998). While the methods used by various studies to detect earnings management are controversial and results not always consistent, previous findings suggest that earnings management occurs and is quite prevalent (Dechow & Skinner, 2000).

Earnings management research has also focused on external and internal factors that constrain managements' ability to manage earnings towards some firm-specific threshold. These factors include independent audit committees and boards of directors (Klein, 2002), Big Six auditors (Becker, DeFond, Jiambalvo, & Subramanyam, 1998), and venture capitalists (Morsfield, Tan, and Felix, 2004). In addition, other research explores the extent to which a firm's balance sheet constrains earnings management. Firms that use their available discretion in measuring accruals to inflate earnings in one period will find it more difficult to inflate earnings in subsequent periods due to the reversing nature of accruals. A simple example will help illustrate this point. A firm that inflates earnings in period t by booking a lower than necessary bad debt expense, is likely to write off more bad debts during period t+1 than was provided for in the accounts receivable allowance account. The firm will have to book an incremental bad debt

expense in period t+1 simply to make up for the previous period's overoptimistic bad debt expense. Thus, the firm will have a more difficult time using the same manipulation to inflate earnings in period t+1.

Due to the articulation between the income statement and the balance sheet, at least a portion of prior periods' earnings management is accumulated in a firm's net assets. To the extent that a firm's net operating assets (NOA) have been affected by income-increasing earnings management, the reported net assets are likely to be overstated compared to a neutral application of generally accepted accounting principles (GAAP). In the above example, net accounts receivable was overstated since the allowance account was deliberately understated. Barton and Simko (2002), find that higher levels of beginning-of-period net operating assets (scaled by prior-period sales) are negatively associated with the probability of at least meeting the consensus analyst forecast for the current period. Hansen (2004) finds that higher levels of beginning-of-period net operating assets (scaled by sales) are negatively associated with the probability of at least meeting the prior period's earnings level. Ettredge, Scholz, Smith, and Sun (2010) find that firms that report non-GAAP financial reports show a pattern of increasing working capital in the years leading up to the non-GAAP reports. These findings suggest that after a number of previous periods of managing earnings upwards, managers have less flexibility (and still stay within GAAP) to manage earnings in the current period to meet important benchmarks. In other words, overstated balance sheets become constraints on firms' ability to manage earnings.

In this study, we examine investors' use of balance sheet information to infer earnings management constraint and the extent to which they utilize that information to assess the quality of subsequent earnings surprises. We argue that ex-ante constrained firms do not have sufficient ability to manage earnings towards desired earnings thresholds and thus their reported earnings surprises are more likely to be the result of real performance. Ex-ante flexible firms, however, have more room to manage earnings and so it becomes less clear to investors whether the reported earnings surprises are the result of real performance or earnings management. If investors use constraint information to infer the quality of reported earnings, a stronger reaction to subsequent earnings surprises should be observed for ex-ante constrained firms than for ex-ante flexible firms. The strength and validity of this effect is likely to depend on both the sign and size of the reported earnings surprise. We anticipate that the effect will be strongest in settings where there is likely to be investor uncertainty surrounding the validity of an earnings surprise. The setting that most resembles this uncertainty scenario is firms reporting small positive earnings surprises. When a firm reports a small positive earnings surprise (defined as 0 to 2 cents), the firm could have arrived at that result through real performance or through earnings management. While we believe the small positive earnings surprise setting provides the strongest test of the constraint effect, examining other surprise settings may also provide interesting results. For this reason we also examine three other earnings surprise settings (large positive, small negative, and large negative).

We find evidence based on earnings announcement day returns, that is consistent with investors using balance sheet information to determine a constraint level and using this constraint information to infer the quality of earnings reported in subsequent earnings announcements. Specifically, we find that ex-ante constrained firms experience higher abnormal earnings announcement day returns than ex-ante flexible firms when reporting small positive earnings surprises. This finding is consistent with the idea that investors perceive small positive earnings surprises to more likely be the result of real performance when reported by ex-ante constrained firms than when reported by ex-ante flexible firms. In contrast, we find no difference between returns of constrained and flexible firms reporting large positive earnings surprises. This finding is consistent with the concept that large earnings surprises are less likely to be the result of earnings management and thus the constraint measure provides less incremental information regarding the quality of the earnings surprise.

With regard to negative earnings surprises, we find marginal evidence that suggests ex-ante constrained firms reporting small negative surprises experience higher abnormal returns. This finding suggests that even for small negative earnings surprises, some uncertainty exists for investors regarding the quality of the reported earnings. Investors act consistently with the idea that earnings reported by ex-ante constrained firms are of higher quality than those reported by ex-ante flexible firms. In contrast, we

find no difference between returns of constrained and flexible firms reporting large negative earnings surprises.

The earnings announcement date results suggest that for both small positive and small negative earnings surprises, those reported by ex-ante constrained firms are more likely to be the result of real performance and not earnings management. This study contributes to the earnings management constraint literature by examining use of information about constraints by investors in interpreting earnings quality. The finding that stock prices behave as if investors consider constraint information and attribute higher quality to earnings of constrained firms is a new result not previously documented.

The remainder of the paper is organized in sections as follows: discussion of the balance sheet constraint concept, development of hypotheses regarding the impact of the ex-ante constraint information on investors' earnings quality perceptions, discussion of issues related to alternative measures of a firm's constraint level, description of the data and the statistical model used in the market response tests, and report of the market response results. These sections are followed by the conclusion.

THE BALANCE SHEET AS A CONSTRAINT

While most research in earnings management focuses on the impact of earnings management on a firm's income statement, Barton and Simko (2002) instead provide a balance sheet perspective. Their hypothesis is based on the articulation inherent in our accounting system. This articulation causes accruals to be reflected in earnings on the income statement while at the same time being reflected in net assets on the balance sheet. Opportunistic accrual management (within the bounds of GAAP) that increases earnings causes a firm's net assets to be reflected at higher values than would be reported under a neutral use of GAAP. Opportunistically biased accruals by managers in one period reduce managers' ability to make similarly opportunistically biased accruals in subsequent periods while remaining within the bounds set by GAAP. "Therefore, managers' ability to optimistically bias earnings decreases with the extent to which net assets are already overstated" (Barton & Simko, 2002, p. 2)

To measure the extent of overstated net operating assets, Barton and Simko utilize an inverse asset turnover ratio ($NOA_{t-1}/Sales_{t-1}$), where NOA is defined as shareholders' equity less cash and marketable securities, plus total debt, measured at the beginning of period t. They assume that higher values of this ratio sufficiently proxy for the amount of overstated (managed) net operating assets present in a firm. They find, after controlling for other potential causes of earnings surprises, that a one standard deviation increase in the NOA to Sales ratio results in a 7.7% decrease in the probability that firms will meet or beat analysts' forecasts. This finding is consistent with the concept that firms with overstated net operating assets have a more difficult time using accruals management to meet or beat important earnings thresholds.

Degeorge, Patel, and Zeckhauser (1999) and Brown and Caylor (2004) provide evidence that meeting or beating the consensus analyst forecast is not the only earnings threshold that is of importance to firms. They find that the market also rewards firms who report profits instead of losses and those firms who report earnings increases instead of decreases. Hansen (2004) extends the balance sheet constraint concept by looking at earnings changes as the threshold of interest. Using a probit analysis, he finds ex-ante that constrained firms are less likely to report an earnings increase than ex-ante flexible firms after controlling for firms who legitimately reported an earnings increase. This finding provides additional evidence that the constraint concept applies to other important thresholds and not only to analyst forecasts. Prior research appears to indicate that ex-ante constraint levels are useful in assessing the likelihood of meeting or beating earnings thresholds.

Finally, Ettredge at al. (2010) examine instances of non-GAAP reporting (both fraud and non-fraud restatements) and the levels of abnormal working capital in the years leading up to the issuance of non-GAAP reports. They find a pattern of systematically increasing abnormal working capital levels (balance sheet bloat) for firms that subsequently issue fraudulent financial statements. While at a lower magnitude, they also find high levels of abnormal working capital levels by companies in the years leading up to non-fraud restatements. These results indicate that companies' past use of working capital accruals to manage

earnings, limits their ability to continue to do so without crossing over into non-GAAP reporting. We look to extend this literature by examining the information content these ex-ante constraint levels hold for subsequent earnings surprises.

MARKET REACTIONS TO SUBSEQUENT EARNINGS ANNOUNCEMENTS

The results provided by the balance sheet constraint literature give important insights into how the accounting reporting system in conjunction with GAAP can constrain earnings management. The balance sheet constraint concept is not only useful in determining the likelihood a firm will at least meet the consensus forecast, but also is potentially useful in interpreting the quality of subsequent earnings surprises. According to the constraint theory, ex-ante constrained firms do not have sufficient ability to manage earnings towards desired earnings thresholds and thus their reported earnings surprises are more likely to be the result of real performance. Ex-ante flexible firms, however, have more room to manage earnings and so it becomes less clear to investors whether the reported earnings surprises are the result of real performance or earnings management. Investors' interpretation of constraint information may not be constant across all earning surprises. We therefore examine the constraint effect in four earnings surprise settings (small positive, large positive, small negative, and large positive).

Firms reporting small positive earnings surprises reach those earnings levels either by real performance or through earnings management. The ex-ante constraint level is likely to be of the most use in this scenario as investors attempt to distinguish between the real performers and the earnings managers. Ex-ante constrained firms have less ability to manage earnings and therefore are more likely to have arrived at a positive earnings surprise through real performance. Ex-ante flexible firms, on the other hand, may either be real performers or have used their available flexibility to manage earnings in order to report the positive earnings surprise. If investors condition on the ex-ante constraint level when interpreting earnings news, the higher likelihood that the flexible firms achieved positive earnings surprises through earning management is likely to result in less positive return reactions to the earnings of those firms, especially if the magnitude of the earnings surprise is small enough to have been produced by earnings management. This reasoning leads to our first hypothesis:

H1: *Abnormal returns to small positive earnings surprises are higher for ex-ante constrained firms than for ex-ante flexible firms.*

Results from Barton and Simko (2002) suggest that the constraint effect lessens as the earnings surprise increases. This is consistent with management having lower incentives or ability to beat the analyst forecast by large amounts. Due to the lower incentives and the increased difficulty to beat forecasts by large amounts, large positive earnings surprises, regardless of ex-ante constraint level, are less likely to be the result of earnings management and therefore more likely to be the result of real performance. Therefore, we expect the effect of the ex-ante constraint to weaken as the earnings surprise moves further away from the zero threshold. This leads to our second hypothesis:

H2: *Abnormal returns to large positive earnings surprises are similar for ex-ante constrained firms and ex-ante flexible firms.*

For small negative earnings surprises, two competing hypotheses are possible. On one hand, similar to Hypothesis 1, investors may perceive earnings surprises reported by ex-ante constrained firms to be of higher quality and thus react less negatively to the negative earnings surprise. On the other hand, investors may perceive small negative earnings surprises reported by ex-ante flexible firms to be of high quality because the firm had the flexibility to manage earnings to the expected earnings threshold but chose not to do so, suggesting that the firm is reporting honestly. These two competing arguments result in opposite predictions regarding the sign of the difference between abnormal returns of constrained and flexible firms. The third hypothesis is stated as two competing alternatives:

H3a: *Abnormal returns to small negative earnings surprises are less negative for ex-ante constrained than for ex-ante flexible firms. (Constraint alternative)*

H3b: *Abnormal returns to small negative earnings surprises are less negative for ex-ante flexible firms than for ex-ante constrained firms. (Honesty alternative).*

As with the small negative earnings surprises, two competing alternatives exist for large negative earnings surprises. Once again, if investors perceive earnings surprises reported by ex-ante constrained firms to be of higher quality, then a less negative reaction will be observed. However, ex-ante constrained firms who miss the forecast by a large amount may be perceived as attempting to reduce their constraint by taking a "big bath" in order to have more flexibility to allow earnings management in future periods. In this case, a more negative reaction will be observed for ex-ante constrained firms. This leads to our fourth hypothesis, again stated as competing alternatives:

H4a: *Abnormal returns to large negative earnings surprises are less negative for ex-ante constrained firms than for ex-ante flexible firms (Constraint alternative).*

H4b: *Abnormal returns to large negative earnings surprises are more negative for ex-ante constrained firms than for ex-ante flexible firms (Constraint reduction alternative).*

MEASUREMENT OF CONSTRAINTS ON EARNINGS MANAGEMENT

In order to test the hypotheses developed in the preceding section, it is necessary to select a measure of the constraints imposed on earnings management by the balance sheet. This section focuses on the issues related to choosing either net operating assets (NOA) or working capital as the constraint measure.

The theory behind the constraint concept is that as firms manage earnings upwards over a number of periods, their operating assets become overstated. However, the use of NOA/Sales as a measure of constraint fails to consider the *expected* level of net operating assets. This causes a disconnect between NOA as a constraint measure and the theoretical construct investigated. DeFond points out that "there are likely to be systematic differences in the ratios across industries, as well as firm-specific effects on the ratios, that are unrelated to whether net assets are overstated" (DeFond, 2002, p. 31). These potential differences likely cause unnecessary noise in the constraint measure which once controlled for, will allow for more powerful tests of the implications of the effect of the constraint.

In an effort to mitigate the above-mentioned measurement error, we follow Ettredge et al. (2010) and make two adjustments to the NOA measure. First, we focus on the working capital (WC) component of NOA. We define WC as current assets less cash, marketable securities, and current liabilities, plus short-term debt and the current portion of long-term debt, all at the beginning of quarter t and scaled by sales for quarter t-1. The other two components of NOA are Net Fixed Assets (NFA), defined as property, plant, and equipment, net of accumulated depreciation, and Other Long-term Assets (OLT), defined as NOA less WC and NFA. Second, we estimate the amount of *unexpected* working capital by using a firm's industry as a benchmark.

Prior research suggests that the WC component of NOA is more relevant than total NOA for understanding and measuring constraints on earnings management. Burgstahler and Dichev (1997) provide evidence that changes in working capital are used to achieve increased earnings, while Kreutzfeldt and Wallace (1986) and DeFond and Jiambalvo (1994) find that working capital is more likely to be utilized by management to manage earnings than the other components of net operating assets. By focusing on the WC component of NOA, the portions of NOA that are less likely to result in a binding earnings management constraint are excluded, and the measure comes closer to capturing the underlying theoretical construct.

In order to identify a firm's *unexpected* working capital, it is necessary to have a measure of a firm's *normal* working capital. In line with Ettredge el al. (2010), we make the assumption that over the long

run, the best estimate of a firm's normal or unmanaged working capital is the mean of the firm's industry. We therefore calculate for each firm a deviation from the corresponding quarter's industry mean (using 2-digit SIC codes). Some industries exhibit higher levels of operating assets and thus deviations from the mean will inherently be higher for these industries. For example, SIC code 3100 (Leather and Leather Products) has the highest average working capital-to-sales ratio (1.397) while SIC code 7000 (Hotels, Other Lodging Places) has the lowest average working capital-to-sales ratio (-.297). Failure to control for these industry differences could cause weak results or even spurious results.

To control for industry differences, we divide each observation's mean-deviation by the standard deviation of its respective industry's working capital ratio. Thus, our constraint measure is expressed as a standardized mean-deviation (denoted WC_IND). Firms with positive (negative) values are above (below) their industry mean and are more (less) constrained than other firms within their industry.

We evaluate the validity of our alternative measure using a generalized ordered logistic model, as in Barton and Simko (2002). This model allows for the ordinal nature of the earnings surprise variable as well as allowing the model coefficients to vary across earnings surprise thresholds, denoted by k. The model is as follows:

$$Pr(SURPRISE_{it} \geq k) / Pr(SURPRISE_{it} < k) = exp\ (\beta_{0,k} + \beta_{1,k}NOA_{it} + \beta_{2,k}CONTROLS_{it}) \quad (1)$$

where SURPRISE is defined as the I/B/E/S actual reported EPS for quarter t minus the consensus analyst forecast of EPS for quarter t, both rounded to the nearest penny. We use the most recent summary consensus forecast prior to the earnings announcement date. All firms with an earnings surprise less than or equal to -5 cents are combined into the -5 SURPRISE category while all firms with an earnings surprise greater than or equal to 5 cents are combined into the 5 SURPRISE category. This model calculates the odds of reporting an earnings surprise of at least k cents (from -5 cents to +5 cents), by jointly estimating 10 unique equations through maximum likelihood techniques. The result is 10 separate estimation equations each with its own set of parameter estimates for the independent variables. The main threshold of interest in this paper is where k=0, so only the results from this threshold are presented.

CONTROLS is a vector of variables included in the model to control for (1) other constraints on earnings management (SHARES: the number of shares outstanding; BIG5: indicator variable equal to 1 if firm is audited by a Big 5 auditor, 0 otherwise), (2) managerial incentives to meet or slightly beat forecasts (LTGN_RISK: indicator variable equal to 1 if in industry susceptible to securities litigation, 0 otherwise; ESTIMATES: the number of estimates comprising the consensus analyst forecast; PREV_MB: indicator variable equal to 1 if the firm met or beat the consensus forecast in the prior quarter, 0 otherwise; SD: the standard deviation of forecasts included in the consensus forecast; DOWN_REV: indicator variable equal to 1 if at least one analyst revised his or her forecast down prior to the earnings announcement for the quarter, 0 otherwise), (3) firm performance (SALES_GRW: defined as sales for quarter t divided by sales for quarter t-4, less 1; ROE: defined as earnings before extraordinary items divided by shareholders' equity; □ROE: defined as the change in ROE over the previous year), and (4) size (MKT_CAP: defined as the natural logarithm of the market value of equity at the end of quarter t).

We conduct our tests using quarterly data for the years 1993-1999 excluding utilities and financial service firms (two-digit SIC codes 49 and 60-67) from the COMPUSTAT and I/B/E/S databases. All observations are required to have complete data for our test variables. All variables are winsorized at the upper and lower one percent of their respective distributions in order to reduce the influence of outliers on results. Our final sample includes 34,502 observations for 3,641 firms.

Table 1 contains descriptive statistics for the test variables. The mean (median) level of NOA is 2.91 (2.05) indicating that net operating assets are typically 2-3 times larger than sales. When broken down into its subcomponents, it becomes apparent that net fixed assets (NFA) is the largest of the three components, comprising almost 63% of NOA, other long-term assets (OLT) is the second-largest component comprising 22% of NOA, and working capital is the smallest of the three components comprising 15% of NOA. By construction, the three industry-standardized measures have a mean of zero

and a standard deviation close to one. The remaining control variables are consistent with the descriptive statistics presented by Barton and Simko (2002).

TABLE 1
DESCRIPTIVE STATISTICS FOR INDEPENDENT VARIABLES

Independent Variable	Mean	Standard Deviation	First Quartile	Median	Third Quartile
NOA	2.91	3.23	1.26	2.05	3.20
WC	0.44	0.70	0.11	0.46	0.81
NFA	1.83	2.86	0.42	0.89	1.85
OLT	0.64	1.58	0.01	0.22	0.77
WC_IND	0.00	0.98	-0.55	-0.02	0.51
NFA_IND	0.00	0.98	-0.53	-0.24	0.27
OLT_IND	0.00	0.98	-0.54	-0.27	0.27
SHARES	62.66	121.73	11.74	23.53	53.99
BIG5	0.97	0.17	1.00	1.00	1.00
PB	3.64	3.87	1.70	2.63	4.24
LTGN_RISK	0.33	0.47	0.00	0.00	1.00
ESTIMATES	6.45	4.77	3.00	5.00	8.00
PREV_MB	0.71	0.46	0.00	1.00	1.00
SD	0.04	.69	0.01	0.01	0.03
DOWN_REV	0.36	0.48	0.00	0.00	1.00
SALES_GRW	0.32	0.69	0.02	0.15	0.38
ROE	0.04	0.43	0.02	0.11	0.18
ΔROE	-0.02	0.69	-0.08	-0.01	0.05
MKT_CAP	6.36	1.63	5.13	6.22	7.39

The sample consists of 34,502 firm-quarters included in both the Compustat and I/B/E/S databases with complete data over 1993-1999, excluding utilities and financial services firms (two-digit SIC codes 49 and 60-67). The variables are defined as follows:

NOA = Net operating assets (shareholders' equity less cash and marketable securities, plus total debt) at the beginning of quarter t, scaled by sales for quarter t-1);

WC = Working capital (current assets less cash, marketable securities, and current liabilities, plus short term debt and the current portion of long-term debt, all at the beginning of quarter t and scaled by sales for quarter t-1);

NFA = Net fixed assets (property, plant, and equipment, net of accumulated depreciation, at the beginning of quarter t and scaled by sales for quarter t-1);

OLT = Other long-term assets (NOA less WC and NFA);

WC_IND = Working capital less the industry mean working capital divided by the industry's standard deviation of working capital all at the beginning of quarter t;

NFA_IND = Net fixed assets less the industry mean net fixed assets divided by the industry's standard deviation of net fixed assets all at the beginning of quarter t;

OLT_IND = Other long-term assets less the industry mean other long-term assets divided by the industry's standard deviation of other long-term assets all at the beginning of quarter t;

SHARES = Weighted average number of common shares outstanding during quarter t;

BIG5 = Indicator variable coded 1 if the firm has a Big 5 auditor in quarter t, 0 otherwise;

PB = Market value of common shares divided by shareholders' equity, both at the end of quarter t;

LTGN_RISK = Indicator variable coded 1 if the firm is in one of the following industries: pharmaceutical/biotechnology (SIC codes 2833-2836, 8731-8734), computers (3570-3577, 7340-7374), electronics (3600-3674), or retail (5200-5961), 0 otherwise;

ESTIMATES	=	Number of estimates in the I/B/E/S consensus EPS forecast for quarter t;
PREV_MB	=	Indicator variable coded 1 if, based on I/B/E/S, the firm reported a nonnegative earnings surprise in quarter t-1, 0 otherwise;
SD	=	Standard deviation of forecasts included in the consensus forecast for quarter t;
DOWN_REV	=	Indicator variable coded 1 if at least one of the firm's analysts revised his or her forecast down prior to the end of quarter t, but after the earnings announcement date for quarter t-1, 0 otherwise;
SALES_GRW	=	Sales for quarter t divided by sales for quarter t-4, less 1;
ROE	=	Net income current year divided by shareholders' equity at the end of the current year;
ΔROE	=	ROE for year t less ROE for year t-1;
MKT_CAP	=	Natural logarithm of market value of common shares at the end of quarter t;

Table 2 reports both Pearson and Spearman-rank correlations between the dependent variable (SURPRISE) and the main independent variables. NOA shows a Pearson (Spearman) correlation of -.047 (-.088) with SURPRISE, indicating that SURPRISE decreases as the level of NOA increases. Consistent with the argument that working capital is the driving force behind the association with SURPRISE, the Pearson (Spearman) correlation for WC is -.086 (-.092) compared to -.021 (-.034) and -.022 (-.049) for NFA and OLT, respectively.

TABLE 2
PEARSON (SPEARMAN) CORRELATIONS BELOW (ABOVE) THE DIAGONAL

	SURPRISE	***NOA***	***WC***	***NFA***	***OLT***	***WC_IND***	***NFA_IND***	***OLT_IND***
SURPRISE	1.000	-0.088	-0.092	-0.034	-0.049	-0.114	-0.040	-0.048
		<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*
NOA	-0.047	1.000	0.166	0.701	0.322	0.301	0.444	0.374
	<.0001		*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*
WC	-0.086	-0.134	1.000	-0.221	0.065	0.714	-0.058	0.068
	<.0001	*<.0001*		*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*
NFA	-0.021	0.823	-0.351	1.000	-0.130	-0.031	0.598	0.007
	<.0001	*<.0001*	*<.0001*		*<.0001*	*<.0001*	*<.0001*	*0.165*
OLT	-0.022	0.557	-0.135	0.111	1.000	0.092	-0.038	0.757
	<.0001	*<.0001*	*<.0001*	*<.0001*		*<.0001*	*<.0001*	*<.0001*
WC_IND	-0.105	0.032	0.791	-0.162	-0.033	1.000	-0.076	0.093
	<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*		*<.0001*	*<.0001*
NFA_IND	-0.038	0.468	-0.150	0.536	0.130	-0.146	1.000	-0.055
	<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*		*<.0001*
OLT_IND	-0.032	0.402	-0.013	0.058	0.722	0.032	0.076	1.000
	<.0001	*<.0001*	*0.015*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	

In order to test the appropriateness of our proxy for constraint level, we estimate three versions of the generalized ordered logistic model. The first estimates the model using only NOA as the independent variable of interest. The second uses the three components of NOA as the independent variables of interest, and the third uses the industry-standardized versions of the three components of NOA. Table 3 includes the results of the generalized ordered logistic model for each of these models.

TABLE 3
REGRESSION RESULTS FOR VARIOUS CONSTRAINT MODELS USING GENERALIZED ORDERED LOGISTIC REGRESSION

Models:

$Pr(SURPRISE_{it} \geq k) / Pr(SURPRISE_{it} < k) = exp\ (\beta_{0,k} + \beta_{1,k}Var_{it} + \beta_{2,k}SHARES_{it} + \beta_{3,k}BIG5_{it} + \beta_{4,k}PB_{it} + \beta_{5,k}LTGN\_RISK_{it} + \beta_{6,k}ESTIMATES_{it} + b_{7,k}PREV\_MB_{it} + \beta_{8,k}SD_{it} + \beta_{9,k}DOWN\_REV_{it} + \beta_{10,k}SALES\_GRW_{it} + \beta_{11,k}ROE_{it} + \beta_{12,k}\Delta ROE_{it} + \beta_{13,k}MKT\_CAP_{it} + \varepsilon_{it})$

Regression Results for k = 0, i.e., Odds of Meeting or Beating vs. Missing Analysts' Forecasts

	Model 1		*Model 2*		*Model 3*	
Independent Variable	*Coeff.*	*Change in Odds (%)*	*Coeff.*	*Change in Odds (%)*	*Coeff.*	*Change in Odds (%)*
Intercept	-0.722	*NA*	-0.782	*NA*	-0.824	*NA*
NOA	-0.023	-7.06***				
WC			-0.120	-8.04***		
NFA			-0.021	-5.70***		
OLT			-0.028	-4.33		
WC_IND					-0.147	-13.66***
NFA_IND					-0.097	-9.27***
OLT_IND					-0.034	-3.38***
SHARES	-0.001	-15.28***	-0.001	-15.97***	-0.001	-15.99***
BIG5	0.159	17.18	0.146	15.75	0.138	14.78**
PB	0.033	13.81***	0.032	13.29***	0.023	9.32***
LTGN_RISK	0.092	9.60	0.080	8.30	0.102	10.79***
ESTIMATES	0.024	12.10***	0.024	12.44***	0.025	12.76***

PREV_M						
B	0.796	121.62***	0.796	121.76***	0.816	126.19***
SD	-5.601	-97.96***	-3.640	-92.03***	-3.269	-89.68***
DOWN_R						
EV	-0.748	-52.67***	-0.745	-52.53***	-0.737	-52.15***
SALES_G						
RW	0.367	29.09***	0.366	28.97***	0.349	27.53***
ROE	0.514	24.67***	0.521	25.05***	0.569	27.65***
ΔROE	-0.066	-4.52**	-0.070	-4.79**	-0.080	-5.39***
MKT_CA						
P	0.163	30.68***	0.164	30.76***	0.164	30.81***

*, **, and *** denote significance at the .10, .05, and .01 level respectively.

The first set of columns on Table 3 shows the original NOA model and consistent with Barton and Simko (2002), we find a significantly negative coefficient on NOA. The results indicate that for each standard deviation increase in NOA, the odds of at least meeting the analyst forecast decreases by 7.06%. The second set of columns shows the results when NOA is separated into its three subcomponents. Both the WC and NFA components are significant at the .01 level, while the OLT component is not statistically significant. The results indicate that for each standard deviation increase in WC (NFA), the odds of at least meeting the analyst forecast decreases by 8.04% (5.70%). While the NFA component is also statistically significant, the WC component appears to be the driving force behind the previously reported NOA results.

The third set of columns reports the test results using the industry-standardized versions of the three components of NOA. In this version of the test, all three subcomponents of NOA have statistically significant negative coefficients. For each standard deviation above the industry mean, the odds of at least meeting the consensus forecast decreases by 13.66% (WC_IND), 9.27% (NFA_IND) and 3.38% (OLT_IND). Once again, while the other two components are also statistically significant, the working capital component (WC_IND) has a more significant impact on the odds of achieving the forecast amount. The results also provide evidence that the industry-standardized versions of the components contain less noise and allow for a cleaner and stronger association with the earnings surprise level. For example, the impact of the working capital component on the odds of at least meeting the consensus forecast is much greater following the industry-standardization (8.04% vs. 13.66%).

Overall, the results in this section suggest that the alternative measure based on working capital reduces the amount of noise in the NOA/Sales ratio. Accordingly, this measure will be used as the constraint measure in the hypothesis tests in the remainder of the paper.

SAMPLE SELECTION AND DATA DESCRIPTION

For the market tests, we utilize the initial sample described previously, with the only additional requirement being available market returns data from the CRSP database. This causes the sample to lose 579 observations down to 33,923 firm-quarter observations.

We calculate cumulative abnormal returns (CAR) around the earnings announcement date for each firm-quarter observation. We use a simple risk-adjusted market model to estimate the abnormal returns over the three-day period extending from one day prior to the earnings announcement to one day following the announcement. The parameter estimates of firms' alphas and betas for the market model were estimated using the 250 trading days prior to the return accumulation period. Using the total three-day abnormal returns as the dependent variable, we then estimate the following regression:

$$CAR_{it} = \beta_0 + \beta_1 SURPRISE_{it} + \beta_2 CONSTRAINT_{it} + \beta_3 SURPRISE*CONSTRAINT_{it} + \beta_4 SIZE*SURPRISE_{it} + \beta_5 LEV*SURPRISE_{it} + \beta_6 PERSIST*SURPRISE_{it} + \beta_7 PB*SURPRISE_{it} + \varepsilon_{it} \quad (2)$$

where

- $SURPRISE_{it}$ = the earnings surprise calculated as reported EPS less the I/BE/S consensus EPS forecast for firm i in quarter t, scaled by the firm's share price two days prior to the announcement date;
- $CONSTRAINT_{it}$ = working capital-to-sales ratio for firm i less the industry mean working-capital-to-sales ratio divided by the industry's standard deviation, all at the beginning of quarter t;
- $SIZE*SURPRISE_{it}$ = a variable interacting the earnings surprise with size, calculated as the natural log of total assets;

- LEV*SURPRISE$_{it}$ = a variable interacting the earnings surprise with a measure of leverage, calculated as a long-term debt divided by the sum of long-term debt and stockholders' equity;
- PERSIST*SURPRISE$_{it}$ = a variable interacting the earnings surprise with a measure of persistence, defined as an indicator variable equal to 1 if a firm's earnings-to-price ratio has a decile ranking from 3 to 8 in time period t, 0 otherwise;
- PB*SURPRISE$_{it}$ = a variable interacting the earnings surprise with a measure of growth, calculated as the market-to-book ratio.

Prior literature has identified growth, leverage, size, and earnings permanence as variables that are important cross-sectional determinants of the earnings response coefficient (Kormendi & Lipe, 1987; Collins & Kothari, 1989, Lopez & Rees, 2002). For this reason we interact SIZE, LEV, PERSIST, and PB with unexpected earnings (SURPRISE) to control for these other earnings response coefficient determinants. The variable measurements are consistent with Lopez and Rees (2002).

Due to a high level of induced multicollinearity between the earnings surprise variable and the interaction variables, within each surprise setting we ranked the earnings surprise variable into deciles and used decile rank as the main effect value as well as in the calculation of the interaction variables. Using the decile rank variable substantially reduces multicollinearity issues. However, due to this transformation of the surprise variable, the coefficient (β_1) can no longer be considered a true earnings response coefficient and the interpretation of the coefficients becomes less obvious. For this reason, we make predictions only on the sign of the coefficients and not their relative magnitudes.

We expect the surprise main effect (β_1) to be positive for all firms. Since the working capital measure is based on information from the prior quarter, we expect that the working capital main effect (Constraint), if any, will have already been impounded into prices and therefore we expect the coefficient β_2 to be insignificant. The variable of interest in the regression is Surprise*Constraint and thus the coefficient β_3. The sign of β_3 is expected to vary dependent upon both the sign and size of the earnings surprise. Therefore, we divide our sample into four subgroups based on the sign and size of their earnings surprise (Small Positive, Large Positive, Small Negative, and Large Negative). Consistent with Schwartz (2003), we define 'small' as actual EPS being within 2 cents of the forecasted EPS and 'large' as any surprise which exceeds or misses the forecasted EPS by more than 2 cents. We include firms which exactly met the forecast (earnings surprise of zero) in the 'Small Positive' group.

Based on these four subgroups, we estimate four versions of the market returns model. Hypothesis 1 predicts that firms reporting small positive earnings surprises will have an incremental positive market response to the level of earnings surprise when the firms is considered to be ex-ante constrained (high abnormal working capital-to-sales ratio). Therefore, when the above regression is estimated on the Small Positive group, we expect the coefficient β_3 to be positive. Hypothesis 2 predicts that firms reporting large positive earnings surprises will have similar levels of incremental abnormal returns across ex-ante constraint levels. Therefore, when the market returns model is estimated on the Large Positive group, we expect the coefficient β_3 to not be significantly different from zero.

Hypotheses 3a and 3b predict the impact of ex-ante constraint level for firms reporting small negative earnings surprises. When the regression is estimated on the Small Negative group, a positive coefficient on β_3 supports Hypothesis 3a (Constraint alternative) while a negative coefficient on β_3 supports Hypothesis 3b (Honesty alternative). An insignificant coefficient on β_3 could mean either that the ex-ante constraint level is unimportant to investors when pricing firms who just miss the analyst forecast, or that the constraint and honesty effects are functioning concurrently, with offsetting effects. Hypotheses 4a and 4b correspond to the final earnings group, Large Negative. When the market returns model is estimated on this last group, a positive coefficient on β_3 supports Hypothesis 4a (Constraint alternative) and a negative coefficient on β_3 supports Hypothesis 4b (Constraint reduction alternative).

EARNINGS ANNOUNCEMENT RESULTS

Table 4 reports the results of the earnings announcement regression for the four above-mentioned surprise setting. For each setting, we report two sets of results. The first set is based on a simple pooled

regression including all observations from the corresponding surprise setting. To control for possible autocorrelation caused by having firms represented in the sample a number of times across the sample time period, we estimate the regression coefficients using the Fama-MacBeth (1973) procedure. The Fama-MacBeth results are based on the mean of 28 quarterly regressions and the t-statistics are computed using the standard error of the corresponding distribution of quarterly coefficients. While the Fama-MacBeth procedure helps correct the possible effects of autocorrelation in the results, the procedure tends to result in a loss of power due to the smaller sample size. Therefore, both sets of results are reported.

TABLE 4
REGRESSION RESULTS OF THREE-DAY CUMULATIVE ABNORMAL RETURNS ON UNEXPECTED EARNINGS AND CONSTRAINT LEVEL

Panel A: Positive Earnings Surprise Firms

Model:

$$CAR_{it} = \beta_0 + \beta_1 Surprise_{it} + \beta_2 Constraint_{it} + \beta_3 Surprise*Constraint_{it} + \beta_4 SIZE*Surprise_{it} + \beta_5 LEV*Surprise_{it} + \beta_6 PERSIST*Surprise_{it} + \beta_7 PB*Surprise_{it} + \varepsilon_{it}$$

	Small Positive Surprise (cents per share) 0 ≤ Surprise ≤ 2 15,746 Obs.		*Large Positive Surprise (cents per share) Surprise ≥ 3 7,516 Obs.*	
	POOLED	*FAMA-MACBETH*	*POOLED*	*FAMA-MACBETH*
Independent Variables	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
Surprise (Decile)	0.003***	0.003***	0.006***	0.006***
Constraint	-0.003***	-0.002***	0.003***	0.004***
Surprise*Constraint	0.001***	0.001***	0.000***	0.000***
Size*Surprise	0.000***	0.003***	0.000***	-0.001***
Leverage*Surprise	-0.001***	-0.002***	-0.001***	-0.002***
Persistence*Surprise	0.000***	0.000***	0.003***	0.003***
PriceBook*Surprise	0.000***	-0.000***	0.000***	0.000***

*, **, and *** denote significance at the .10, .05, and .01 level respectively.

Panel B: Negative Earnings Surprise Firms

Model:

$$CAR_{it} = \beta_0 + \beta_1 Surprise_{it} + \beta_2 Constraint_{it} + \beta_3 Surprise*Constraint_{it} + \beta_4 SIZE*Surprise_{it} + \beta_5 LEV*Surprise_{it} + \beta_6 PERSIST*Surprise_{it} + \beta_7 PB*Surprise_{it} + \varepsilon_{it}$$

	Small Negative Surprise (cents per share) -2 < Surprise < 0 4,243 Obs.		*Large Negative Surprise (cents per share) Surprise < -3 6,589 Obs.*	
	POOLED	*FAMA-MACBETH*	*POOLED*	*FAMA-MACBETH*
Independent Variables	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
Surprise (Decile)	-0.005***	-0.005***	-0.015***	-0.020***
Constraint	-0.004***	-0.006***	-0.005***	-0.037***
Constraint*Surprise	0.001***	0.001***	-0.008***	-0.004***
Size*Surprise	0.001***	0.001***	0.001***	0.001***
Leverage*Surprise	0.000***	0.000***	-0.000***	0.000***
Persistence*Surprise	-0.002***	-0.001***	0.007***	0.009***
PriceBook*Surprise	-0.001***	-0.001***	0.000***	0.000***

*, **, and *** denote significance at the .10, .05, and .01 level respectively.

Panel A of Table 4 reports the results for the positive earnings surprise groups. Consistent with expectations, the coefficient β_1 is positive and significant ($p<.01$) indicating a market reward to meeting or beating the analyst forecast. The market response to beating the forecast appears to not be linear across the two positive earnings surprise settings. The market reaction to large positive earnings surprises is twice the reaction to small positive earnings surprises. Contrary to expectations, the level of a firms' prior unexpected working capital-to-sales ratio (CONSTRAINT) is negatively associated with abnormal returns ($p<.05$). This result appears only in the small positive earnings surprise group and loses significance when estimated under the Fama-MacBeth procedure. The result suggests that for these firms, the information content of prior period working capital may not have been fully incorporated into prices when the balance sheet information was released.

The main coefficient of interest in the models is β_3 the coefficient on the interaction variable between the earnings surprise (SURPRISE) and the unexpected working capital (CONSTRAINT). Consistent with Hypothesis 1, β_3 is positive and significant ($p<.05$) for firms reporting small positive earnings surprises. This result suggests an incremental positive market reaction to firms' earnings surprises when firms have high levels of unexpected working capital or in other words, are constrained. This finding is consistent with the market viewing the small earnings surprise reported by ex-ante constrained firms to be of higher quality than those reported by ex-ante flexible firms.

Consistent with Hypothesis 2, β_3 is not significantly different from zero for firms reporting large positive earnings surprises. Conventional regression analysis primarily tests for significant deviations from distributional means and a failure to find significant deviations does not necessarily indicate a

statistical equivalence to the mean. Therefore, the result for Hypothesis 2 is not totally conclusive; however, the magnitude of the coefficient appears to be at least lower than the reported coefficient from the 'Small Positive' group, which is also consistent with the constraint theory. The finding is therefore generally consistent with the ex-ante constraint level providing little incremental earnings quality information to the market because large earnings surprises are less likely to be the result of earnings management.

Panel B of Table 4 reports the results for the negative earnings surprise groups. Contrary to expectations, the coefficient on the SURPRISE main effect variable is negative and significant for the small negative surprise group and negative but insignificant for the large negative surprise group. These results suggest that the market reacts severely and consistently to very small negative earnings surprises, yet perhaps not as consistently for larger negative earnings surprises.

The main coefficient of interest in Panel B is once again β_3. Hypotheses 3a and 3b focus on two competing hypotheses of the market's reaction to small negative earnings surprises. The coefficient β_3 is positive and significant ($p<.05$) in the pooled regression and positive but insignificant in the Fama-MacBeth regressions. This result is marginally consistent with Hypothesis 3a and suggests that the market infers that small negative earnings surprises reported by ex-ante constrained firms are of higher quality than those reported by the ex-ante constrained firms. The market does not appear to reward those firms who appear to have the ability to manage earnings up to the threshold, yet choose not to do so.

Hypotheses 4a and 4b also focus on two competing hypotheses; the constrained hypothesis and the constraint reduction hypothesis. For the large negative surprise group, the coefficient β_3 is negative but is not, however statistically significant. This result suggests either that constraint information is unimportant to investors when firms report large negative earnings surprises, or that both of the underlying Hypotheses (4a and 4b) are concurrently at work and are offsetting each other.

Overall these results indicate that returns behave as if investors use the ex-ante constraint level of firms to interpret the quality of subsequent earnings surprises. The investor interpretation of the ex-ante constraint level also appears to vary on both the size and sign of the earnings surprise.

CONCLUSION

Previous research suggests that abnormally high levels of net operating assets act as constraints on managers' abilities to manage earnings in subsequent periods. In this paper, we extend this prior research by examining whether or not investors use this ex-ante constraint level to assess the quality of subsequent earnings surprises. We find evidence that indicates that market returns behave as if investors use balance sheet information to infer a firm's ex-ante constraint level and use this information to assess the quality of subsequent earnings surprises.

This study contributes to the earnings management constraint literature by examining use of information about constraints by investors in interpreting earnings quality. The finding that stock prices behave as if investors consider constraint information and attribute higher quality to earnings of constrained firms is a new result not previously documented.

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