EARNINGS MANAGEMENT CONSTRAINTS AND MARKET REACTIONS TO
SUBSEQUENT EARNINGS SURPRISES

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ABSTRACT

In this dissertation, I 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. Ex-ante constrained firms may 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. My tests provide mixed support for the constraint theory. I find evidence that the market reacts more to small positive earnings surprises when they are reported by ex-ante constrained firms than when reported by ex-ante flexible firms. This suggests that the market interprets the earnings surprise reported by constrained firms to be of higher quality. However, I also find that earnings surprises reported by ex-ante constrained firms are no more persistent with regard to one-year-ahead earnings than those reported by ex-ante flexible firms, a result that is not consistent with the differential reaction to earnings surprises.
1. LITERATURE REVIEW

1.1 Prevalence of earnings management

In recent years, 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 the various parties with a vested interest in the quality of accounting information.

Sufficient anecdotal evidence from the practitioner world exists to suggest that earnings management is not an uncommon practice among firms. However, there is some debate as to whether or not all earnings management is bad. Many accountants, analysts, and investors believe that good business practice requires managers to manage earnings (Magrath and Weld, 2002). It is often argued by practitioners that attempts to “smooth” earnings by management, is a positive thing and is typically rewarded by the market (Duncan, 2001). However, there is less argument that “abusive” earnings management is not only detrimental to the firm and its investors, but potentially undermines the very foundation of the accounting profession (i.e. Andersen).

Government regulators have stepped up the pressure on the business world to clean up the “numbers game”. Former SEC Chairman Arthur Levitt called for a stop to the accounting “hocus-pocus” which he felt presented a serious risk to the quality of financial reporting (Levitt, 1998).

Accounting researchers have sought to find evidence of the existence and pervasiveness of earnings management (Healy and Wahlen, 1999; Kothari, 2001; Schipper, 1989). Academics have devised various proxy measures in attempts to isolate
the effects of earnings management on financial statement figures. These measures typically include a measure of accruals or the amount by which reported earnings differs from the operational cash flows (Jones 1991; Dechow et al. 1995; Kang and Sivaramakrishnan 1995).

These measures, however, are only proxies and thus are only rough estimates of the underlying earnings management. In order to increase the power of these tests, academic studies have typically examined settings where managers’ incentives to manage earnings is the greatest. Studies have found evidence of earnings management leading up to important financing events such as seasoned equity offerings (Teoh, Welch, and Wong, 1998b), initial public offerings (Teoh, Welch, and Wong, 1998a), stock-financed acquisitions (Erickson and Wang, 1998). Other studies have found evidence that suggests firms manage earnings towards important earnings thresholds such as analyst forecasts (Burgstahler and Eames, 1998), zero profit vs. a loss (Burgstahler, 1997), and management forecasts (Kasznik, 1999).

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 and Skinner, 2000).

1.2 Earnings management constraints

Earnings management research has also focused on external and internal factors that constrain managements’ ability to manage earnings towards some firm-specific threshold. Klein (2002) examined the impact of independent boards of directors and audit committees on the level of abnormal accruals, where abnormal accruals act as a proxy for
earnings management. She finds negative relations between the independence of the board of directors and abnormal accruals. She found a similar negative relation when examining the independence of audit committees and abnormal accruals. The results were most profound in settings where only a minority of outside board/committee members existed. Overall her results indicate that having independent boards and committees substantially decreases the level of abnormal accruals.

Becker et al. (1998) examine how audit quality acts as a constraint against earnings management. Specifically, they use Big 6 vs. non Big 6 as a dichotomous proxy for audit quality. They find that firms audited by non Big 6 auditors report discretionary accruals that increase income relatively more than those audited by Big 6 auditors. Their results indicate that having a high quality auditor (Big 6) acts as a constraint to earnings flexibility and management.

Morsfield and Tan (2004) examine the role venture capitalists play in the IPO market. They find evidence that abnormal discretionary accruals are significantly lower and that long-run returns are significantly higher for IPO firms which are backed by venture capitalists. This evidence is consistent with venture capitalists constraining earnings management through increased monitoring of the IPO firm.

1.3 The balance sheet as a constraint to earnings management

In addition, recent research has begun to explore 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 debts 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 debts expense in period $t+1$ simply to make up for the previous period’s overoptimistic bad debts expense. Thus, the firm will have more difficult time using the same manipulation to inflate earnings in period $t+1$. “Therefore, managers’ ability to optimistically bias earnings decreases with the extent to which net assets are already overstated” (Barton and Simko 2002, pg. 2)

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.¹ 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.² In the above example, net accounts receivable was overstated since the allowance account was deliberately understated. To measure the extent of overstated net operating assets, Barton and Simko utilize an inverse asset turnover ratio ($\frac{\text{NOA}_{t-1}}{\text{Sales}_{t-1}}$), 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

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¹ Certain types of earnings management are not likely to be reflected in NOA. For example, discretionary reductions in R&D will not directly influence the net operating assets level.

² Similar to Barton and Simko (2002), I use the term “overstated” to describe net operating assets that are recorded at higher (lower) values than would have been under a neutral application of GAAP, without implying a violation of GAAP.
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 et al. (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. These findings suggest that after a number of previous periods of managing earnings upwards, managers have less flexibility to manage earnings in the current period to meet important benchmarks. I look to extend this literature by examining the information content these ex-ante constraint levels hold for subsequent earnings surprises.

3 Barton and Simko (2002) control for number of shares outstanding, audit quality, incentives (price-to-book, high litigation risk, large analyst following, and previous pattern of meeting or beating expectations), imprecise expectations, the “talking down” of analysts’ forecasts, size, and firm performance (sales growth and ROE).
2. SUMMARY OF RESULTS

In this dissertation, I 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. It is important to layout exactly what I mean by the term quality. I define an earnings figure to be of “high quality” if it is relatively free from earnings management and thus more truly represents the true level of earnings. On the other hand, I define an earnings figure to be of “low quality” if it is relatively more likely to contain earnings management and deviates from the true level of earnings.

I 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. I 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 I believe the small positive earnings surprise setting to provide the strongest test of the constraint effect, examining other surprise settings may also provide interesting results. For this reason I also examine three other earnings surprise settings (large positive, small negative, and large negative).

I 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, I 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, I 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 regards to negative earnings surprises, I 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, I 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. Prior research
finds that managed earnings are less likely to persist than real earnings (Xie, 2001). This
suggests that earnings surprises reported by ex-ante constrained firms should exhibit
higher persistence than those reported by ex-ante flexible firms. Therefore, in additional
tests, I examine the persistence of current period earnings surprises on one-year-ahead
earnings. Contrary to my expectations, I fail to find a significant difference between the
persistence of earnings surprises conditioned on ex-ante constraint level.

This dissertation 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. However, the fact that the differential stock price reaction is
not consistent with differences in persistence raises questions regarding the ability of
investors to correctly assess the difference in earnings quality, consistent with a growing
body of evidence that investors do not correctly consider the characteristics of reported
earnings (e.g., Sloan 1996, Xie 2001).
3. HYPOTHESIS DEVELOPMENT

3.1 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 generally accepted accounting principles (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.

Throughout this dissertation I will refer to the term of earnings quality. I define an earnings figure to be of “high quality” if it is relatively free from earnings management and thus more truly represents the true level of earnings. On the other hand, I define an earnings figure to be of “low quality” if it is relatively more likely to contain earnings management and deviates from the true level of earnings. In this dissertation, I examine the extent to which ex-ante constraint information is able to provide information to investors regarding the quality of the earnings, or the likelihood that the earnings contain earnings management.
Investors’ interpretation of constraint information may not be constant across all earning surprises. I 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 my 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 (Freeman and Tse, 1992) 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. This reduces the uncertainty surrounding the quality of the earnings surprise and thus reduces the need for the quality distinguishing ability of ex-ante constraint levels. Therefore, I expect the effect of the ex-ante constraint to weaken as the earnings surprise moves further away from the zero threshold.\textsuperscript{4} This leads to my second hypothesis:

\textit{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:

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

\textsuperscript{4} Conventional regression analysis tests for significant deviations from distributional means and failure to find a significant deviation does not indicate a statistical equivalence to the mean. Therefore, the results for Hypothesis 2 are not totally conclusive.
**H3b:** Abnormal returns to small negative earnings surprises are less negative for ex-ante flexible firms than for ex-ante constrained firms. (Honesty alternative)

For large negative earnings surprises, investors are less likely to be concerned with income-increasing earnings management. Given the S-shaped surprise/return relation (Freeman and Tse, 1992), the market’s concern is that firms will report a lower than necessary negative earnings surprise in a “big bath” scenario. In this setting, ex-ante constrained firms may attempt to create future flexibility by managing earnings downwards. The market reaction to the negative earnings surprise conditioned on constraint level is an empirical question. On one hand, the market may view the “big bath” earnings management as a reflection of poor integrity on the part of the firm’s management and thus react more negatively to such a scenario. On the other hand, “big baths” in one period tend to indicate higher earnings in subsequent periods, so the market may view this earnings management as a positive signal. “Big bath” earnings represent earnings reported at lower than their true level. Therefore, the market may also react less negatively to the negative earnings surprise given the fact that the reported earnings surprise understates true earnings. This leads to my 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 (Positive signal alternative)

**H4b:** Abnormal returns to large negative earnings surprises are more negative for ex-ante constrained firms than for ex-ante flexible firms (Lack of Integrity alternative)
3.2 Future persistence of earnings surprises conditioned on constraint level

The hypotheses in the prior section are founded on the idea that constraint level provides investors with information about the quality of reported earnings surprises. If such is the case, then there should be a corresponding relationship between current earnings surprises and future earnings. High quality earnings are likely to continue and will thus be a component of future earnings. Low quality earnings, on the other hand, are not only less likely to persist, but also may even reverse creating a negative association with earnings. This reasoning leads to the next set of hypotheses which mirror the hypotheses from section 2.1.

H1 conjectures that investors will react more positively to small positive earnings surprises when they are reported by constrained firms. This reaction by investors is consistent with the constraint level providing information regarding the quality of the earnings surprise. If investors view small positive earnings surprises reported by constrained firms to be of high quality, I expect those earnings surprises to have a higher association (persistence) with future earnings than surprises reported by flexible firms.

H5: The association between small positive earnings surprises and future earnings is greater for ex-ante constrained firms than for ex-ante flexible firms.

H2 conjectures that since there is less of an incentive to manage earnings to report large positive earnings surprises, investors are less likely to need constraint information to discern the quality of the reported surprises. This implies that large positive earnings surprises are viewed as being of similar quality. Thus, I expect there to be no difference in the association (persistence) of earnings surprises and future earnings between constrained and flexible firms.
**H6:** The association between large positive earnings surprises and future earnings is similar for ex-ante constrained firms and ex-ante flexible firms.

H3 conjectures two competing hypotheses regarding the market reaction to small negative earnings surprises conditioned on constraint level. Under H3a, investors view small negative surprises reported by constrained firms as being of high quality because constrained firms are less able to manage earnings. However, H3b suggests that investors may also view small negative surprises reported by flexible firms as being of high quality because these had the ability to manage earnings, but since they just missed the forecast, one can conclude that they chose to be honest and not manage up to the forecast.

It's important to remember that these firms are reporting negative earnings surprises (deviations from the analyst forecast) and not negative earnings. Therefore, whereas losses in terms of profits are not likely to persist, negative earnings surprises may provide some persistence information for future earnings. These competing hypotheses create additional competing hypotheses on the association of small negative surprises and future earnings.

**H7a:** The association between small negative earnings surprises and future earnings is greater for ex-ante constrained firms than for ex-ante flexible firms. (Constraint alternative)

**H7b:** The association between small negative earnings surprises and future earnings is greater for ex-ante flexible firms than for ex-ante constrained firms. (Honesty alternative)

If ex-ante constrained firms are more likely to engage in “big bath” earnings management in order to create future flexibility, then current earnings for constrained
firms should be negatively associated with one-year-ahead earnings. In other words, larger negative earnings surprises (“big baths”) should lead to higher earnings one-year ahead. This leads to the following hypothesis:

\[ H8: \text{Large negative earnings surprises reported by ex-ante constrained firms are negatively associated with future earnings.} \]
4. MEASUREMENT OF CONSTRAINTS ON EARNINGS MANAGEMENT

4.1 Weaknesses in measurements from prior studies

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, pg. 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.

4.2 Improved measure of constraint

In an effort to mitigate the above-mentioned measurement error, I make two adjustments to the net operating assets measure. First, I focus on the working capital subcomponent of net operating assets and second, I estimate the amount of unexpected working capital by using a firm’s industry as a benchmark.
Prior research suggests that the working capital 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. I define working capital 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. By focusing on the working capital 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. I 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. I 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

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5 The three components of NOA are Working Capital (WC) as defined above, Net Fixed Assets (NFA) defined as property, plant, and equipment, net of accumulated depreciation, at the beginning of quarter t and scaled by sales for quarter t-1 and Other Long-term Assets (OLT) defined as NOA less WC and NFA.  
6 To the extent that my sample includes industries with high concentrations of firms engaged in earnings management, my measure will understate the level of overstated assets. This potential measurement error will work against finding significant results.
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, I divide each observation’s mean-deviation by the standard deviation of its respective industry’s working capital ratio. Thus, my 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.

I evaluate the validity of my 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:

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

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. I 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.\(^7\) This model calculates the odds of

\(^7\) The purpose of this consolidation is for tractability issues with the generalized ordered logistic model.
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 dissertation 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 1 if in industry susceptible to securities litigation\footnote{Francis et al. (1994) and Ali and Kallapur (2001) identify computers (3570-3577, 7370-7374), electronics (3600-3674), pharmaceuticals (SIC codes 2833-2836, 8731-8734), and retail (5200-5961) as being the industries most 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) (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; $\Delta$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 $t$).
I conduct my 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 my 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. My 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 close to a standard deviation of one. The remaining control variables are consistent with the descriptive statistics presented by Barton and Simko (2002).

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 (-.034) for NFA and OLT, respectively.
In order to test the appropriateness of my proxy for constraint level, I 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.

The first set of columns on Table 3 shows the original NOA model and consistent with Barton and Simko (2002), I find a significantly negative coefficient on NOA.\(^9\) The results indicate that for each standard deviation increase in NOA, the odds of at least meeting the analyst forecast decreases by 7.06\%.\(^{10}\) 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

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\(^9\) The control variables are generally consistent in both sign and magnitudes when compared to Barton and Simko (2002).

\(^{10}\) The percentage change in odds is calculated in the following manner. For continuous variables: \(100\times[\exp(s_jb_{j,k}) - 1]\), where \(s_j\) is the sample standard deviation of variable \(j\) and \(b_{j,k}\) is the estimated regression coefficient for variable \(j\). For indicator variables: \(100\times[\exp(b_{j,k}) - 1]\).
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 of 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 dissertation.
5. SUBSEQUENT EARNINGS ANNOUNCEMENTS

5.1 Research Method

For the market tests, I utilize the initial sample described in Section 4.2, 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.

I calculate cumulative abnormal returns (CAR) around the earnings announcement date for each firm-quarter observation. I 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. Specifically I use the following model to calculate the abnormal returns:

\[ AR_{it} = R_{it} - \alpha_{it} - \beta_{it} * R_{mt} \]

where

- \( AR_{it} \) = the daily abnormal return for firm \( i \) on date \( t \).
- \( R_{it} \) = the unadjusted return for firm \( i \) on date \( t \).
- \( \alpha_{it} \) = the alpha for firm \( i \) calculated using the 250 trading days prior to the return accumulation period.
- \( \beta_{it} \) = the beta for firm \( i \) calculated using the 250 trading days prior to the return accumulation period.
- \( R_{mt} \) = the equally-weighted market return on date \( t \).

Using the total three-day abnormal returns as the dependent variable, I then estimate the following regression:
(2) \[ CAR_{it} = \beta_0 + \beta_1 \text{SURPRISE}_{it} + \beta_2 \text{CONSTRAINT}_{it} + \]
\[ \beta_3 \text{SURPRISE} \times \text{CONSTRAINT}_{it} + \beta_4 \text{SIZE} \times \text{SURPRISE}_{it} + \beta_5 \text{LEV} \times \text{SURPRISE}_{it} + \]
\[ \beta_6 \text{PERSIST} \times \text{SURPRISE}_{it} + \beta_7 \text{PB} \times \text{SURPRISE}_{it} + \epsilon_{it} \]

where

SURPRISE_{it} = the earnings surprise calculated as reported EPS less the I/B/E/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 and Lipe, 1987; Collins and Kothari, 1989). Lopez and Rees (2002), examine the earnings response relationship with returns using a model that controls for the interaction effects of these other cross-sectional determinants. To ensure that my results are not confounded by correlated omitted variables, I follow the model and variable measurements utilized by Lopez and Rees (2002). Specifically, I interact
SIZE, LEV, PERSIST, and PB with UE to control for these other earnings response coefficient determinants.

Due to a high level of induced multicollinearity between the earnings surprise variable and the interaction variables, within each surprise setting I 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.\textsuperscript{11} Using the decile rank variable substantially reduces multicollinearity issues. However, due to this transformation of the surprise variable, the coefficient ($\beta_1$) can no longer be considered a true earnings response coefficient and the interpretation of the coefficients becomes less obvious. For this reason, I make predictions only on the sign of the coefficients and not their relative magnitudes.

I expect the surprise main effect ($\beta_1$) to be positive for all firms. Since the working capital measure is based on information from the prior quarter, I expect that the working capital main effect (Constraint), if any, will have already been impounded into prices and therefore I expect the coefficient $\beta_2$ to be insignificant. The variable of interest in the regression is Surprise*Constraint and thus the coefficient $\beta_3$. The sign of $\beta_3$ is expected to vary dependent upon both the sign and size of the earnings surprise. Therefore, I divide my sample into four subgroups based on the sign and size of their earnings surprise (Small Positive, Large Positive, Small Negative, and Large Negative).

\textsuperscript{11} The earnings surprise variable contains both positive and negative values and the interaction variables SIZE, LEV, and PB all are strictly positive values. Thus, when the earnings surprise variable is interacted with these control variables, the interaction variable always has the same sign as the earnings surprise variable, inducing a high level of correlation (96\%). Estimating the tests without correcting this multicollinearity problem causes severe and unexpected results to both coefficients and their significance levels.
Consistent with Schwartz (2003), I 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. I include firms which exactly met the forecast (earnings surprise of zero) in the ‘Small Positive’ group.

Based on these four subgroups, I 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, I expect the coefficient $\beta_3$ 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, I expect the coefficient $\beta_3$ 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 $\beta_3$ supports Hypothesis 3a (Constraint alternative) while a negative coefficient on $\beta_3$ supports Hypothesis 3b (Honesty alternative). An insignificant coefficient on $\beta_3$ 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 $\beta_3$ supports Hypothesis 4a (Constraint alternative) and a negative coefficient on $\beta_3$ supports Hypothesis 4b (Constraint reduction alternative).

5.2 Empirical results

Table 4 reports the results of the earnings announcement regression for the four above-mentioned surprise setting. For each setting, I 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, I 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.

Positive Earnings Surprises

Panel A of Table 4 reports the results for the positive earnings surprise groups. Consistent with expectations, the coefficient $\beta_1$ 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 \( \beta_3 \), the coefficient on the interaction variable between the earnings surprise (SURPRISE) and the unexpected working capital (CONSTRAINT). Consistent with Hypothesis 1, \( \beta_3 \) 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, \( \beta_3 \) 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.

Negative Earnings Surprises

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 $\beta_3$. Hypotheses 3a and 3b focus on two competing hypotheses of the market’s reaction to small negative earnings surprises. The coefficient $\beta_3$ 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 $\beta_3$ 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.
6. FUTURE PERSISTENCE

6.1 Research method

The results in the previous section suggest that investors use prior period financial statement information to infer a company’s level of earnings management constraint, and then use this information to infer the quality of subsequent earnings surprises. These findings suggest that investors perceive small positive earnings surprises reported by ex-ante constrained firms to be of higher quality and therefore have a higher level of association with future earnings. In other words, earnings surprises reported by ex-ante constrained firms are being interpreted by the market as having a higher level of persistence than those reported by ex-ante flexible firms. The natural question is whether the market is correct in this interpretation.

To examine this question, I estimate the following regression for the Small Positive Earnings Surprise group.

\[
EARN_{t+4} = \beta_0 + \beta_1 \text{FORECAST}_{it} + \beta_2 \text{SURPRISE}_{it} + \beta_3 \text{CONSTRAINT}_{it} + \beta_4 \text{FORECAST} \times \text{CONSTRAINT}_{it} + \beta_5 \text{SURPRISE} \times \text{CONSTRAINT}_{it} + \varepsilon_{it}
\]

Where \(EARN_{t+4}\) is earnings four quarters ahead, \(\text{FORECAST}\) is the current quarter analyst forecast, \(\text{SURPRISE}\) is the difference between actual current quarter earnings and the analyst forecast, and \(\text{CONSTRAINT}\) is a dummy variable equal to 1 if the firm’s measure of ex-ante constraint is in the top 1/3 of the sample, 0 if the firm’s constraint measure is in the bottom 1/3 of the sample. The observations with constraint measures in the middle 1/3 of the sample are removed. All variables except the constraint and the interaction variables are scaled by beginning of quarter assets per share.
Similar to the methodology used in the previous section, I examine the above model separately for each of the four surprise settings. I expect the coefficients on the FORECAST variable to positive and significant across all surprise settings since the forecast reflects the market’s expectations of firms’ true earnings. Prior literature is silent as to the expected persistence of earnings surprises on one-year ahead earnings therefore I don’t have any ex-ante expectations of the sign or magnitude of the coefficients on the SURPRISE variable. I have no expectations regarding the sign on the CONSTRAINT main effect variable or on the interaction of CONSTRAINT with FORECAST.

The coefficient of interest in the persistence regression is $\beta_5$. If the surprise component of current earnings has a higher level of persistence for one-year-ahead earnings for constrained firms than for flexible firms, $\beta_5$ will be positive. I expect $\beta_5$ to be positive for the Small Positive group and zero for the Large Positive group. Since the hypotheses for the negative surprise groups are competing hypotheses, I make no prediction as to which hypotheses will be validated by the results.

6.2 Empirical results

Table 5 reports the results of the persistence regression. Panel A reports the results for the positive surprise groups and Panel B reports the results for the negative surprise groups. For each surprise setting, I 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, I 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.

Positive Earnings Surprises

Panel A of Table 5 reports the results of the earnings persistence regression estimated for firms reporting positive earnings surprises. For the small positive surprise group, the coefficient on FORECAST is significant and positive. This result is consistent with analysts’ forecasts of the current period being a solid indicator of future performance of those firms reporting small positive earnings surprises. The coefficient on SURPRISE is also positive (2.399) and significant (p<.01). This result suggests that, on average, a one cent positive earnings surprise in quarter t will lead to 2.4 cents of earnings in quarter t+4. The coefficient on CONSTRAINT is positive yet insignificant indicating that ex-ante constraint level, by itself, has no incremental effect on year-ahead earnings. The coefficient on the interaction between FORECAST and CONSTRAINT is negative (-.261) and significant (p<.01). The forecast portion of current earnings for ex-ante constrained firms appears to be less persistent than for ex-ante flexible firms. This result suggests that some portion of the forecasted earnings for constrained firms contains a positive transitory component that does not show up in the future earnings number.

The coefficient of interest is the interaction between SURPRISE and CONSTRAINT. Contrary to my expectations, this coefficient is negative (-.745) and
marginally significant (p<.10) using the pooled results. Using the Fama-MacBeth approach also yields a negative coefficient (-.969) but the coefficient is insignificant. This result suggests that the persistence of small positive earnings surprises is not conditional upon the ex-ante constraint level. Thus I find no support for H5.

For the large positive surprise group, the coefficient on FORECAST is positive (.648) and significant (p<.01), but is less than 1 indicating that a portion of the current period’s forecast is not reflected in one-year ahead earnings. The coefficient on SURPRISE is negative (-.244) and significant (p<.01). This result suggests that, on average, a ten cent positive earnings surprise in quarter t will lead to a 2.4 cent decrease of earnings in t+4. The coefficient on CONSTRAINT is negative (-.007) but only marginally significant (p<.10) indicating that ex-ante constraint level, by itself, has little incremental effect on year-ahead earnings. The coefficient on the interaction between FORECAST and CONSTRAINT is positive (.949) and significant (p<.01). The forecast portion of current earnings for ex-ante constrained firms appears to be more persistent than for ex-ante flexible firms. This result suggests that forecasted earnings for flexible firms contain a transitory component that does not show up in the future earnings number.

Once again the variable of interest is the interaction between SURPRISE and CONSTRAINT. This coefficient is negative (-.343) and marginally significant (p<.10). This finding is somewhat inconsistent with H6 which predicted the coefficient to be insignificantly different from zero. However, the coefficient from the large surprise
group appears to be significantly less than the coefficient from the small surprise group which is consistent with H6.

This result is consistent with the idea that the uncertainty surrounding the positive earnings surprise decreases as the magnitude of the surprise increases. Thus, since there is less uncertainty, there is less need for investors to use the quality distinguishing ability of the constraint information.

Negative Earnings Surprises

Panel B of Table 5 reports the results of the earnings persistence regression estimated for firms reporting negative earnings surprises. For the small negative surprise group, the coefficient on the FORECAST variable is positive (.392) and significant (p<.01). The coefficient on the SURPRISE variable is positive (3.676) and significant (p<.01). This result suggests that firms that just miss the analyst forecast experience a significant drop in one-year-ahead earnings. A negative one cent surprise in the current period, on average, leads to a 3.7 cent reduction in one-year-ahead earnings per share. This result suggests a negative relationship between just missing analyst forecasts and future profitability.

The coefficient on the CONSTRAINT variable is negative (-.001) and insignificant using the pooled regression, however the coefficient is positive (.005) and significant (p<.01) using the Fama-MacBeth regression. The coefficient on the interaction between FORECAST and CONSTRAINT has mixed results. Using pooled regression, the coefficient is positive (.172) and significant (p<.01), however using the Fama-MacBeth regression, the coefficient is negative (-.263) and also significant (p<.01). The coefficient
on the interaction between SURPRISE and COEFFICIENT is not significantly different from zero under both regressions. This result suggests that there is no significant difference in the persistence of the surprise component of earnings between constrained and flexible firms. Thus, I find inconclusive evidence for either of the H7 alternatives.

For large negative surprise group, the coefficient on FORECAST is positive (.633) and significant (p<.01) which is consistent with the result from the other three surprise groups. The coefficient on the SURPRISE variable is negative (-.098) and significant (p<.01). This result suggests that large negative surprises on average lead to higher earnings one-year ahead. This is consistent with large negative surprises being highly transitory in nature and thus do not persist long into the future. The coefficient on CONSTRAINT is positive (.012) and significant (p<.01).

The coefficient on the interaction between FORECAST and CONSTRAINT is positive (.137) and significant (p<.01). This suggests that the forecast portion of current earnings for constrained firms is slightly more persistence than that of flexible firms. The coefficient on the interaction between SURPRISE and CONSTRAINT is positive (.463) and significant (p<.01). This finding suggests that constrained firms have significantly lower one-year-ahead earnings than do flexible firms. This result is opposite the predicted sign from H8. This finding suggests that ex-ante constraint level is not an effective tool in identifying “big bath” firms.

Overall, the persistence results are inconsistent with the previously reported market reaction results. In the case small positive earnings surprises, investors appear to place a premium on constrained firms who meet or beat the forecast suggesting that
investors perceive the reported earnings by these firms to be of higher quality than those reported by flexible firms. However, the current earnings of constrained firms show no or even negative incremental persistence relative to earnings of flexible firms.

Four possible explanations may account for these conflicting results. First, investors may be using the constraint information to infer earnings quality; however, they may overestimate the difference in persistence of earnings of constrained and flexible firms. Second, earnings surprises reported by constrained firms may be of higher quality and thus have higher persistence; however, my one-year-ahead time frame may not be the correct window within which to capture the incremental persistence. For example, a firm that has become constrained is likely to seek to reduce the constraint for future periods. Thus, changes in constraint level over the subsequent year may alter the correlation between current earnings surprises and future earnings conditioned on the current level of constraint. Third, prior literature suggests that the persistence of earnings surprises varies by fiscal year quarter (Livnat, 2003). Therefore, my results which are based on a pooling of quarters may be confounded by the varying quarterly effects. Fourth, investors may be reacting to other information that is highly correlated with my constraint measure but not correlated with future persistence of earnings surprises.
7. SUMMARY AND CONCLUSION

In this dissertation, I 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. I 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. I 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 I believe the small positive earnings surprise setting to provide the strongest test of the constraint effect, examining other surprise settings may also provide interesting results. For this reason I also examine three other earnings surprise settings (large positive, small negative, and large negative).
I 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, I 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, I 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 regards to negative earnings surprises, I 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, I 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. Prior research finds that managed earnings are less likely to persist than real earnings (Xie, 2001). This suggests that earnings surprises reported by ex-ante constrained firms should exhibit higher persistence than those reported by ex-ante flexible firms. Therefore, in additional tests, I examine the persistence of current period earnings surprises on one-year-ahead earnings. Contrary to my expectations, I fail to find a significant difference between the persistence of earnings surprises conditioned on ex-ante constraint level.

This dissertation 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. However, the fact that the differential stock price reaction is not consistent with differences in persistence raises questions regarding the ability of investors to correctly assess the difference in earnings quality, consistent with a growing body of evidence that investors do not correctly consider the characteristics of reported earnings (e.g., Sloan 1996, Xie 2001). The inconsistent results suggest that additional research may be necessary to fully understand whether constraint information is interpreted correctly by investors, or whether other factors result in the apparent inconsistency.
### TABLE 1 – DESCRIPTIVE STATISTICS

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<th>Independent Variable</th>
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<th>Median</th>
<th>3rd Quartile</th>
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<td>5.00</td>
<td>8.00</td>
</tr>
<tr>
<td>PREV_MB</td>
<td>0.71</td>
<td>0.46</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>SD</td>
<td>0.04</td>
<td>0.69</td>
<td>0.01</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>DOWN_REV</td>
<td>0.36</td>
<td>0.48</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>SALES_GRW</td>
<td>0.32</td>
<td>0.69</td>
<td>0.02</td>
<td>0.15</td>
<td>0.38</td>
</tr>
<tr>
<td>ROE</td>
<td>0.04</td>
<td>0.43</td>
<td>0.02</td>
<td>0.11</td>
<td>0.18</td>
</tr>
<tr>
<td>∆ROE</td>
<td>-0.02</td>
<td>0.69</td>
<td>-0.08</td>
<td>-0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>MKT_CAP</td>
<td>6.36</td>
<td>1.63</td>
<td>5.13</td>
<td>6.22</td>
<td>7.39</td>
</tr>
</tbody>
</table>

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;
- **∆ROE** = 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>
<thead>
<tr>
<th></th>
<th>SURPRISE</th>
<th>NOA</th>
<th>WC</th>
<th>NFA</th>
<th>OLT</th>
<th>WC_IND</th>
<th>NFA_IND</th>
<th>OLT_IND</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SURPRISE</strong></td>
<td>1.000</td>
<td>-0.088</td>
<td>-0.092</td>
<td>-0.034</td>
<td>-0.049</td>
<td>-0.114</td>
<td>-0.040</td>
<td>-0.048</td>
</tr>
<tr>
<td><strong>NOA</strong></td>
<td>-0.047</td>
<td>1.000</td>
<td>0.166</td>
<td>0.701</td>
<td>0.322</td>
<td>0.301</td>
<td>0.444</td>
<td>0.374</td>
</tr>
<tr>
<td><strong>WC</strong></td>
<td>-0.086</td>
<td>-0.134</td>
<td>1.000</td>
<td>-0.221</td>
<td>0.065</td>
<td>0.714</td>
<td>-0.058</td>
<td>0.068</td>
</tr>
<tr>
<td><strong>NFA</strong></td>
<td>-0.021</td>
<td>0.823</td>
<td>-0.351</td>
<td>1.000</td>
<td>-0.130</td>
<td>-0.031</td>
<td>0.598</td>
<td>0.007</td>
</tr>
<tr>
<td><strong>OLT</strong></td>
<td>-0.022</td>
<td>0.557</td>
<td>-0.135</td>
<td>0.111</td>
<td>1.000</td>
<td>0.092</td>
<td>-0.038</td>
<td>0.757</td>
</tr>
<tr>
<td><strong>WC_IND</strong></td>
<td>-0.105</td>
<td>0.032</td>
<td>0.791</td>
<td>-0.162</td>
<td>-0.033</td>
<td>1.000</td>
<td>-0.076</td>
<td>0.093</td>
</tr>
<tr>
<td><strong>NFA_IND</strong></td>
<td>-0.038</td>
<td>0.468</td>
<td>-0.150</td>
<td>0.536</td>
<td>0.130</td>
<td>-0.146</td>
<td>1.000</td>
<td>-0.055</td>
</tr>
<tr>
<td><strong>OLT_IND</strong></td>
<td>-0.032</td>
<td>0.402</td>
<td>-0.013</td>
<td>0.058</td>
<td>0.722</td>
<td>0.032</td>
<td>0.076</td>
<td>1.000</td>
</tr>
</tbody>
</table>
TABLE 3
Regression Results for Various Constraint Models Using Generalized Ordered Logistic Regression

\[
\Pr(\text{SURPRISE}_i \geq k)/\Pr(\text{SURPRISE}_i < k) = \exp(\beta_{0,k} + \beta_{1,k} \text{Var}_i + \beta_{3,k} \text{SHARES}_i + \beta_{4,k} \text{BIG5}_i + \beta_{5,k} \text{PB}_i + \beta_{6,k} \text{LTGN\_RISK}_i + \\
\quad + \beta_{7,k} \text{ESTIMATES}_i + \beta_{8,k} \text{PREV\_MB}_i + \beta_{9,k} \text{SD}_i + \beta_{10,k} \text{DOWN\_REV}_i + \\
\quad + \beta_{11,k} \text{SALES\_GRW}_i + \beta_{12,k} \text{ROE}_i + \beta_{13,k} \Delta \text{ROE}_i + \beta_{14,k} \text{MKT\_CAP}_i + \epsilon_i)
\]

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

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Model 1 Coefficient</th>
<th>Change in Odds (%)</th>
<th>Model 2 Coefficient</th>
<th>Change in Odds (%)</th>
<th>Model 3 Coefficient</th>
<th>Change in Odds (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOA</td>
<td>-0.023</td>
<td>-7.06***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WC</td>
<td>-0.120</td>
<td>-8.04***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NFA</td>
<td>-0.021</td>
<td>-5.70***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OLT</td>
<td>-0.028</td>
<td>-4.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WC_IND</td>
<td>-0.147</td>
<td>-13.66***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NFA_IND</td>
<td>-0.097</td>
<td>-9.27***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OLT_IND</td>
<td>-0.034</td>
<td>-3.38***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHARES</td>
<td>-0.001</td>
<td>-15.28***</td>
<td>-0.001</td>
<td>-15.97***</td>
<td>-0.001</td>
<td>-15.99***</td>
</tr>
<tr>
<td>BIG5</td>
<td>-0.159</td>
<td>17.18</td>
<td>-0.146</td>
<td>15.75</td>
<td>0.138</td>
<td>14.78**</td>
</tr>
<tr>
<td>PB</td>
<td>0.033</td>
<td>13.81***</td>
<td>0.032</td>
<td>13.29***</td>
<td>0.023</td>
<td>9.32**</td>
</tr>
<tr>
<td>LTGN_RISK</td>
<td>0.092</td>
<td>9.60</td>
<td>0.080</td>
<td>8.30</td>
<td>0.102</td>
<td>10.79***</td>
</tr>
<tr>
<td>ESTIMATES</td>
<td>0.024</td>
<td>12.10***</td>
<td>0.024</td>
<td>12.44***</td>
<td>0.025</td>
<td>12.76***</td>
</tr>
<tr>
<td>PREV_MB</td>
<td>0.796</td>
<td>121.62***</td>
<td>0.796</td>
<td>121.76***</td>
<td>0.816</td>
<td>126.19***</td>
</tr>
<tr>
<td>SD</td>
<td>-5.601</td>
<td>-97.96***</td>
<td>-3.640</td>
<td>-92.03***</td>
<td>-3.269</td>
<td>-89.68***</td>
</tr>
<tr>
<td>DOWN_REV</td>
<td>-0.748</td>
<td>-52.67***</td>
<td>-0.745</td>
<td>-52.53***</td>
<td>-0.737</td>
<td>-52.15***</td>
</tr>
<tr>
<td>SALES_GRW</td>
<td>0.367</td>
<td>29.09***</td>
<td>0.366</td>
<td>28.97***</td>
<td>0.349</td>
<td>27.53***</td>
</tr>
<tr>
<td>ROE</td>
<td>-0.514</td>
<td>24.67***</td>
<td>0.521</td>
<td>25.05***</td>
<td>0.569</td>
<td>27.65***</td>
</tr>
<tr>
<td>ΔROE</td>
<td>-0.066</td>
<td>-4.52**</td>
<td>-0.070</td>
<td>-4.79**</td>
<td>-0.080</td>
<td>-5.39***</td>
</tr>
<tr>
<td>MKT_CAP</td>
<td>0.163</td>
<td>30.68***</td>
<td>0.164</td>
<td>30.76***</td>
<td>0.164</td>
<td>30.81***</td>
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</tbody>
</table>

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

50


**TABLE 4**

Regression Results of Three-Day Cumulative Abnormal Returns on Unexpected Earnings and Constraint Level

Panel A: Positive Earnings Surprise Firms

Model:

\[
CAR_{it} = \beta_0 + \beta_1 \text{Surprise}_{it} + \beta_2 \text{Constraint}_{it} + \beta_3 \text{Surprise*Constraint}_{it} + \beta_4 \text{SIZE*Surprise}_{it} \\
+ \beta_5 \text{LEV*Surprise}_{it} + \beta_6 \text{PERSIST*Surprise}_{it} + \beta_7 \text{PB*Surprise}_{it} + \epsilon_{it}
\]

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Small Positive Surprise (cents per share)</th>
<th>Large Positive Surprise (cents per share)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>POOLED Coefficient</td>
<td>FAMA-MACBETH Coefficient</td>
</tr>
<tr>
<td>Surprise (Decile)</td>
<td>0.003***</td>
<td>0.003***</td>
</tr>
<tr>
<td>Constraint</td>
<td>-0.003**</td>
<td>-0.002</td>
</tr>
<tr>
<td>Surprise*Constraint</td>
<td>0.001***</td>
<td>0.001**</td>
</tr>
<tr>
<td>Size*Surprise</td>
<td>0.000***</td>
<td>0.003***</td>
</tr>
<tr>
<td>Leverage*Surprise</td>
<td>-0.001***</td>
<td>-0.002***</td>
</tr>
<tr>
<td>Persistence*Surprise</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>PriceBook*Surprise</td>
<td>0.000***</td>
<td>0.000***</td>
</tr>
</tbody>
</table>

*, **, and *** denote significance at the .10, .05, and .01 level respectively.
TABLE 4 (Continued)

Regression Results of Three-Day Cumulative Abnormal Returns on Unexpected Earnings and Constraint Level

Panel B: Negative Earnings Surprise Firms

Model:
\[
CAR_t = \beta_0 + \beta_1 \text{Surprise}_t + \beta_2 \text{Constraint}_t + \beta_3 \text{Surprise}_t \times \text{Constraint}_t + \beta_4 \text{SIZE}_t \times \text{Surprise}_t \\
+ \beta_5 \text{LEV}_t \times \text{Surprise}_t + \beta_6 \text{PERSIST}_t \times \text{Surprise}_t + \beta_7 \text{PB}_t \times \text{Surprise}_t + \epsilon_t
\]

<table>
<thead>
<tr>
<th></th>
<th>Small Negative Surprise (cents per share)</th>
<th>Large Negative Surprise (cents per share)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4,243 Obs.</td>
<td>6,589 Obs.</td>
</tr>
<tr>
<td>Independent Variables</td>
<td>POOLED Coefficient</td>
<td>FAMA-MACBETH Coefficient</td>
</tr>
<tr>
<td>Surprise (Decile)</td>
<td>-0.005***</td>
<td>-0.005***</td>
</tr>
<tr>
<td>Constraint</td>
<td>-0.004**</td>
<td>-0.006*</td>
</tr>
<tr>
<td>Constraint*Surprise</td>
<td>0.001**</td>
<td>0.001</td>
</tr>
<tr>
<td>Size*Surprise</td>
<td>0.001***</td>
<td>0.001***</td>
</tr>
<tr>
<td>Leverage*Surprise</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Persistence*Surprise</td>
<td>-0.002***</td>
<td>-0.001***</td>
</tr>
<tr>
<td>PriceBook*Surprise</td>
<td>-0.001***</td>
<td>-0.001***</td>
</tr>
</tbody>
</table>

*, **, and *** denote significance at the .10, .05, and .01 level respectively.
### TABLE 5

Regression Results of One-year-ahead Earnings on Analyst Forecast and Earnings Surprise Conditioned on Constraint Level

**Panel A: Positive Earnings Surprise Firms**

Model:

\[ EARN_{t+4} = \beta_0 + \beta_1 \text{Forecast}_{it} + \beta_2 \text{Surprise}_{it} + \beta_3 \text{Constraint}_{it} + \beta_4 \text{Forecast}^{*}\text{Constraint}_{it} + \beta_5 \text{Surprise}^{*}\text{Constraint}_{it} + \epsilon_{it} \]

Small Positive Surprise (cents per share)  
\[ 0 \leq \text{Surprise} \leq 2 \]

Large Positive Surprise (cents per share)  
\[ \text{Surprise} \geq 3 \]

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>POOLED Coefficient</th>
<th>FAMA-MACBETH Coefficient</th>
<th>POOLED Coefficient</th>
<th>FAMA-MACBETH Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forecast</td>
<td>1.043***</td>
<td>1.013***</td>
<td>0.648***</td>
<td>0.890***</td>
</tr>
<tr>
<td>Surprise</td>
<td>2.339***</td>
<td>3.495***</td>
<td>-0.244***</td>
<td>0.534</td>
</tr>
<tr>
<td>Constraint</td>
<td>0.001</td>
<td>0.001</td>
<td>-0.007*</td>
<td>0.003</td>
</tr>
<tr>
<td>Forecast*Constraint</td>
<td>-0.261***</td>
<td>-0.165***</td>
<td>0.949***</td>
<td>0.008</td>
</tr>
<tr>
<td>Surprise*Constraint</td>
<td>-0.745*</td>
<td>-0.969</td>
<td>-0.343*</td>
<td>-0.631</td>
</tr>
</tbody>
</table>

*, **, and *** denote significance at the .10, .05, and .01 level respectively.
TABLE 5 (Continued)

Regression Results of One-year-ahead Earnings on Analyst Forecast and Earnings Surprise Conditioned on Constraint Level

Panel B: Negative Earnings Surprise Firms

Model:

\[ EARN_{t+4} = \beta_0 + \beta_1\text{Forecast}_{it} + \beta_2\text{Surprise}_{it} + \beta_3\text{Constraint}_{it} + \beta_4\text{Forecast}^*\text{Constraint}_{it} + \beta_5\text{Surprise}^*\text{Constraint}_{it} + \epsilon_{it} \]

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Small Negative Surprise (cents per share)</th>
<th>Large Negative Surprise (cents per share)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>POOLED</td>
<td>FAMA-MACBETH</td>
</tr>
<tr>
<td>Forecast</td>
<td>0.392***</td>
<td>0.993***</td>
</tr>
<tr>
<td>Surprise</td>
<td>3.676***</td>
<td>1.667**</td>
</tr>
<tr>
<td>Constraint</td>
<td>-0.001</td>
<td>0.005***</td>
</tr>
<tr>
<td>Forecast*Constraint</td>
<td>0.172***</td>
<td>-0.263***</td>
</tr>
<tr>
<td>Surprise*Constraint</td>
<td>-0.432</td>
<td>1.099</td>
</tr>
</tbody>
</table>

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


