Impact of Earnings Management Flexibility

by

Hiu Lam Choy

Submitted in Partial Fulfillment
of the
Requirements for the Degree
Doctor of Philosophy

Supervised by
Professor Jerold Zimmerman
William E. Simon Graduate School of Business Administration

University of Rochester
Rochester, New York

2003

UMI Number: 3114922

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

CURRICULUM VITAE

The author was born in Beijing in the People's Republic of China on January 20, 1970. She attended the Chinese University of Hong Kong from 1988 to 1992, and graduated with a Bachelor of Business Administration degree. She received a Master of Professional Accounting degree in 1995 from the University of Texas at Austin. She came to the University of Rochester in the summer of 1997 and began graduate studies in Accounting and Finance. She pursued her research in Financial Accounting under the direction of Professor Jerold Zimmerman and received a Master of Science degree in Applied Economics in 2001. She was admitted to candidacy for the Ph.D. degree in the same year.

ACKNOWLEDGEMENTS

I gratefully acknowledge the guidance and support from the members of my dissertation committee, Andrew Leone, Ross Watts, and Jerry Zimmerman (chair). Helpful comments and suggestions were also received from Pamela Bedora, Marcus Butler, Liz Demers,.Barry Gilbert, Philip Joos, Charles Wasley, Joanna Wu, and the faculty and Ph.D. students at the Simon School. I thank Ferdinand Gul and Judy Tsui for inspiring me to pursue the Ph.D. study and for their support. Generous financial support from the Olin Foundation is gratefully acknowledged.

I dedicate this dissertation to my beloved parents. I am indebted to them for their unconditional love, support, and sacrifices.

Abstract

This paper proposes a measure of earnings management flexibility and examines its impact on firms' reporting strategies. Most prior earnings management studies assume that earnings management is free and managers have unlimited ability to manage earnings. In practice, though, with the limitations imposed by GAAP and the monitoring by auditors and the SEC, earnings management with accruals beyond the allowable set can be prohibitively costly. I propose that the manager's discretion in a quarter depends on the limits of the allowable set of accruals, the level of prior discretionary accruals, and the reversal rates of these accruals. Specifically, analysis illustrates that prior discretionary accruals have three effects—reversal, constraint, and benchmark effects—on current period's flexibility. While the magnitude of prior discretionary accruals determines the degree of impact on current quarter flexibility, the reversal rate of accruals determines the number of prior quarters whose accruals have an impact on current quarter's flexibility. Based on this analysis, I construct a flexibility measure that allows me to test the impact of flexibility empirically. The results show that firms with low earnings management flexibility (proxied by both my measure and Barton and Simko's (2002) measure) are more likely to miss analysts' forecasts. Results based on Kasznik's (1999) measure are not significant. Moreover, I show that my flexibility construct provides incremental information to that captured by the flexibility measures proposed in Barton and Simko (2002). I also show that after adjusting the flexibility measures by the industry mean, results using my flexibility measures continue to hold while those using Barton and Simko's flexibility measure are no longer significant.

TABLE OF CONTENTS

LIST OF TABLES

List of Figures

1. Introduction

This paper proposes a new earnings management flexibility measure and examines how flexibility affects a firm's financial reporting decisions. Prior earnings management studies focus on identifying managers' incentives to manipulate earnings [Healy (1985), Sweeney (1994), Defond and Jiambalvo (1994)]. Studies on managers' incentives to manipulate earnings to "fool" the capital market tend to concentrate on stock issuance or other special corporate control events [Teoh, Welch, and Wong (1998a & b), Erickson and Wang (1999)]. Other studies provide evidence of earnings management by showing that the distribution of earnings has a trough in firms reporting small losses, earnings declines, and forecast errors [Burgstahler and Dichev (1997), Degeorge, Patel, and Zeckhauser (1999)].

While these studies contribute to the earnings management literature by showing that earnings management does exist and by documenting incidences when earnings management incentives are particularly strong, there is a missing link: the manager's latitude to manipulate earnings. Accounting conventions of objectivity and verifiability limit the set of allowable accruals [Watts and Zimmerman (1986), Dechow (1994)]. GAAP also constrains the manager's flexibility in managing earnings. Both internal and external control mechanisms, such as auditors, outside directors, audit committees, and regulators, monitor managers' discretion. Although managers can incur accruals beyond the allowable set (e.g. commit fraud), the costs of violation[1] are high and likely outweigh its benefits for most firms. In most situations, managers will probably stay within the allowable set.[2] I denote the limits of this set as the "earnings management flexibility limits."

Since managers with incentives to manage earnings do not necessarily have the means to attain their earnings targets or face high earnings management costs, the earnings management cases described in prior studies represent only a portion of the intended-manipulators. Further, the manager does not have discretion to permanently inflate earnings. The discretion lies in the timing of reporting certain revenues and expenses. For example, when the value of a plant drops due to a change in technology, the subjective nature of GAAP for such events gives manager some latitude over whether to write down the plant in the current period or continue to incur large depreciation charges in future periods. If he decides to write down the plant, the manager further has discretion over the magnitude of the write down. By taking a larger write-down than necessary or a "big bath" in an early period, companies load up their reserves for a "rainy day" in the future. The earnings management flexibility likely depends on the firms' characteristics and their prior manipulation practices.

---

[1] The costs of violation include the expected cost of being caught by auditors and regulators. If caught, both the manager and the firm face legal costs, reputation costs, significant drop in stock price around the announcement of SEC investigation and restatement, etc. [Dechow et al. (1996), Palmrose et al. (2001), McNamee et al. (2000), and Levitt (2000)].

[2] This paper discusses only cases of earnings management within the constraints of GAAP. In other words, if a manager cannot attain his target earnings with accruals from the allowable set, I assume that he does not have the flexibility to manage earnings. Occasionally some managers choose to engage in fraudulent reporting—inflating earnings by tools outside the limits set by GAAP. These fraudulent reporting cases are not considered in this paper. Since the manager incurs accruals outside the limit of the allowable set, these fraudulent cases are not constrained by the flexibility available. If included in the sample, these fraudulent cases likely reduce the power of the tests.

This paper examines the cross-sectional and time-series variation in firms' earnings management flexibility and investigates the impact of flexibility on financial reporting strategy. Two papers—Barton and Simko (2002) and Kasznik (1999)—examine the impact of earnings management flexibility. Using the firm's net operating assets (i.e., shareholders' equity less cash and marketable securities, plus debt) relative to sales as a proxy for earnings management flexibility, Barton and Simko (2002) suggest that firms with low flexibility have difficulty in managing earnings up by even one cent per share to meet the analysts' forecasts. Kasznik (1999) finds that firms with low flexibility (proxied by the change in total accruals in the prior year) have difficulty in meeting their own management forecasts. While the underlying idea of both papers—a firm's prior earnings management affects current earnings management flexibility—is appealing, neither study formalizes or discusses explicitly how prior earnings management practices affect the firm's ability to manage earnings in the current period. Moreover, the empirical proxies for prior earnings management in both studies can be capturing the difference in operating characteristics across industries and/or real efficiency rather than the earnings management practices in prior periods.

I first discuss how the earnings management practices in prior quarters and the reversal rate of accruals affect a firm's cost of earnings management, and hence its flexibility in the current quarter. Both Kasznik (1999) and Barton and Simko (2002) either ignore the reversal rate or assume that it is constant across firms and over time. I argue that the reversal rate of accruals likely varies with a firm's operating cycle and other operating characteristics. Hence, a firm's earnings management flexibility in a period is a function of both its level of past discretionary accruals and the reversal rate of these accruals.

Based on the results of the above analysis, a measure of the flexibility consumed (cumulative unreversed discretionary accruals) and a measure of the remaining flexibility (flexibility limit less the flexibility used) are constructed. The flexibility measure developed in this paper (operating cycle flexibility measure) captures the firms' available flexibility whereas Barton and Simko (2002) and Kasznik (1999) measures reflect only the flexibility used in prior periods. The set of allowable accruals, and hence flexibility limits, vary both cross-sectionally and over time with a firm's operating characteristics, growth, governance structure, quality of auditors, and the regulatory environment. The firm's remaining flexibility depends on both its past earnings management practice and its flexibility limits. It is the flexibility available, rather than just the portion consumed that will affect the manager's earnings management decision. A flexibility measure based only on the flexibility used in prior periods such as Kaszniks implicitly assumes that the set of allowable accruals is constant across firms, which unlikely holds in general.

Also, my cross-sectional operating cycle flexibility measure is based on discretionary accruals, unlike Barton and Simko's (2002) and Kasznik's (1999) flexibility measures that are based on total accruals. It is important to distinguish between discretionary and nondiscretionary accruals because only the discretionary portion should have an impact on current flexibility. Moreover, since Barton and

Simko's flexibility measure is actually the inverse of the asset turnover ratio, it can reflect a firm's real efficiency in utilizing its assets. Hence, it is not clear whether the positive correlation between net operating asset turnover ratios (Barton and Simko's flexibility measure) and the probability of missing analysts' forecasts is driven by the lack of flexibility (as Barton and Simko suggest).

Without a control for the industry average, Barton and Simko's measure may be merely reflecting differences in operating characteristics (e.g., credit policy) across industries. For instance, the manufacturing industry likely has a higher level of net operating assets than the consulting industry. This difference in asset levels is due to the nature of the business and does not necessarily reflect a higher level of earnings management in the manufacturing industry. Hence, without a control for the industry difference in asset turnover ratios, prior results can be misleading. By using the cross-sectional Jones model to estimate discretionary accruals, I account for the difference in the accrual levels across industries.

After constructing the operating cycle flexibility measure, I examine whether it actually proxies for flexibility by examining its impact on financial reporting practices. Specifically, I look at the relation between my flexibility measure and a firm's probability of missing analysts' forecasts. This is a joint test of the ability of the operating cycle measure to capture flexibility and the hypothesis that firms with high flexibility are less likely to miss analysts' forecasts. Both the operating-cycle flexibility measure and Barton and Simko's measure show a significant negative correlation with the probability of missing analysts' forecasts. However, Kasznik's measure is not statistically related to the probability of missing analysts' forecasts. Results of the sensitivity test further show that when industry-adjusted flexibility measures are used, Barton and Simko's flexibility measure no longer has a significant impact on the probability of missing analysts' forecasts. This supports the prior conjecture that Barton and Simko's measure most likely captures the operating characteristics of different industries and not the difference in earnings management flexibility across firms

This paper contributes to the extant literature on earnings management in three ways. First, I construct a measure of flexibility by incorporating not only the variation in the flexibility used but also the difference in the flexibility limits. I use the cumulative unreversed discretionary accruals at the beginning of a quarter to capture the flexibility consumed, and the maximum cumulative discretionary accruals in the prior three years (adjusted for outliers) to reflect the upper limit of flexibility. I show that the measure provides incremental information to Barton and Simko's and Kasznik's flexibility measures. In other words, I find that the discretionary portion of accruals, reversal rate of accruals, and the limits of flexibility provide additional information on a firm's flexibility that is not captured by either asset productivity or total accruals change. Moreover, my flexibility measure captures the difference in earnings management flexibility across firms, not just the difference across industries. Second, the paper focuses on the role of flexibility in the earnings management process. Existing empirical work examines the managers' incentives to manage earnings, such as inflating profits, lowering the costs of capital, and increasing their own compensation. This paper argues that while these financial benefits motivate managers to undertake earnings management, flexibility determines the extent of earnings management they can undertake. By incorporating both the flexibility measure and the managers' incentives in the studies, we can better understand the difference in the extent of earnings management both across firms and over time. Third, this study supplements research on earnings management by pointing out that both the reversal of discretionary accruals and the constraints imposed by the unreversed discretionary accruals affect current reported earnings. I show that the unreversed discretionary accruals lower the level of discretionary accruals the manager can incur in the current period. Hence, even though the unreversed discretionary accruals do not affect reported earnings directly, they impose a constraint on the earnings management decision. This role explains, at least partly, the cross-sectional variation in the probability of meeting analysts' forecasts. Moreover, since the unreversed discretionary accruals have an impact on earnings management decisions, the reversal rate of accruals becomes a significant determinant of a firm's flexibility (because it determines the number of subsequent periods affected by the unreversed discretionary accruals).

The rest of the paper is organized as follows. In Section 2, I analyze the impact of prior earnings management, the reversal rate of accruals, and the limits of the allowable set of accruals on current earnings management flexibility. Section 3 discusses the empirical proxies for earnings management flexibility. Section 4 describes other factors affecting a firm's flexibility and their proxies. I include these factors as control variables in the analysis of the impact of flexibility. Section 5 describes the sample selection process and provides the descriptive statistics of the sample. In Section 6, I examine the relation between flexibility and the probability of missing analysts' forecasts. Section 7 describes the sensitivity tests and conclusions are drawn in Section 8.

2. Impact of Prior Earnings Management and Reversal Rate on Current Earnings Management Flexibility

As discussed in the introduction, GAAP, auditors, analysts, outside directors, and regulators serve to limit earnings management flexibility. Any prior earnings management practice affects the flexibility available in the current quarter. In this section, I analyze: (i) the effect of discretionary accruals of one quarter on the costs and flexibility of earnings management in subsequent quarters (Section 2.1); (ii) the impact of the reversal rate on the number of quarters whose flexibility is affected by current quarter's earnings management practices (Section 2.2); (iii) the influence of the flexibility limits on the flexibility available (Section 2.3).

2.1 Impact of Prior Earnings Management Practice

The analysis is based on the intertemporal relation between accruals and the assumption that earnings management is not free. Based on these assumptions, I show that prior earnings management affects current costs of earnings management and flexibility in three different ways:

(i) Reversal effect

The reversing nature of accruals is widely documented in the literature [Dechow (1994), Barton and Simko (2002), Kasznik (1999), McCulloch (1998)]. Since total discretionary accruals have to sum to zero over the life of a firm, any inflated earnings in one quarter must reverse in subsequent quarters. These reversals lower the reported earnings of these subsequent quarters. For example, assuming the accruals reverse in N periods, a firm that has inflated earnings at t-N has to incur more positive (less negative) discretionary accruals in order to achieve the same earnings target at t than if it had not inflated earnings at t-N. For example, if a firm underestimates the bad debt allowance at t-1, then when a client defaults on the account receivable in the subsequent quarters, the firm has to write-off the account. Hence, the overestimation of net accounts receivable at t-1 "reverses" and lowers income in subsequent quarters. One example is Perceptive Biosystems Inc., which recorded a one-time charge of $10 million for the writedown of doubtful accounts and obsolete inventory in its fourth quarter ended September 1994 because of the overvaluation of accounts receivable and inventory in prior quarters (*Wall Street Journal*, December 28, 1994). More recently, a class action lawsuit alleged that Amdocs Limited understated reserves for doubtful accounts in fiscal 2001. With the accounts uncollectible in 2002, the firm has to write-off these accounts, which caused the earnings of 2002 to drop significantly and triggered lawsuits (*Business Wire*, August 2, 2002).

(ii) Constraints Effect

Both the reversal of accruals and the unreversed accruals have an impact on a firm's flexibility. A firm's net operating assets and accruals are closely tied to its operating activities. Firms with abnormally high levels of accruals relative to their operating activity level are seen either as very inefficient in utilizing assets or as overstating their value, which will arouse the suspicion of auditors and regulators. Therefore, incurring accruals beyond the allowable set is costly.

To illustrate the constraint effect of prior earnings management, I assume that the cumulative accruals (i.e., unreversed prior accruals and accruals incurred in the current quarter) in quarter t are bounded between $\underline{K}$ and $\overline{K}$, where $\underline{K}$ and $\overline{K}$ are the points beyond which the costs of earnings management are prohibitively high. For example, the accounts receivable balance can be considered as cumulative accruals. It represents the cumulative change in accounts receivable since the founding of the firm: the initial incurrence of accounts receivable, the collection, and the write-offs. If a firm's accounts receivable balance relative to sales is high relative to its peers', the resulting attention of auditors and regulators will prohibitively raise the costs of earnings management. In other words, the net accounts receivable balance is constrained:

$$\underline{K} \le B\_Accru_t + Accru_t \le \overline{K}. \qquad (1)$$

B_Accru_t is the beginning balance of accruals and $Accru_t$ is the level of accruals incurred in quarter t. The bounds, $\underline{K}$ and $\overline{K}$, vary cross-sectionally with firm characteristics. The impact of these bounds is described in Section 2.3. Given the bounds, any unreversed positive accruals in B_Accru_t lower the level of $Accru_t$ that can be incurred in the current quarter.[3] Hence, even without the reversal effect, prior discretionary accruals can still constrain current earnings management flexibility.

[3] It is possible that managers, observing a high level of B_Accru_t, change the governance structure or switch auditors to expand the flexibility limit. However, this expansion of flexibility limits is also constrained. Moreover, these changes to expand the flexibility limit are not free, and hence increase the costs of earnings management.

Unlike the reversal effect of positive accruals, which always lowers the current reported earnings and raises the costs of earnings management, the unreversed positive discretionary accruals constrain a firm's earnings management flexibility only if its current pre-managed earnings are below some target (such as analysts consensus forecasts).

(iii) Ratchet effect

In addition to the reversal and constraint effects, earnings management in the current quarter raises investors' expectation of future earnings and the performance benchmark of future quarters. The use of prior performance as a benchmark in the manager's performance evaluation has been documented in prior studies [Leone and Rock (2002) and Murphy (1999)]. Furthermore, a firm's prior performance likely affects the analysts' expectation of its current earnings. Inflating prior earnings can cause an "apparent" earnings drop because it raises the benchmark for current earnings. For example, suppose that the pre-managed earnings in two quarters are the same, if the manager inflates earnings by $X in the first quarter, he has to inflate earnings in the second quarter by at least $X to avoid reporting an earnings drop in the second quarter. This again raises the costs of earnings management. *Ceteris paribus*, this leads to a higher probability of missing the benchmark in the second quarter. Consider the following earnings change equation:

$$\begin{aligned} E_t - E_{t-4} = {} & (CF_t - CF_{t-4}) + (NDA_t - NDA_{t-4}) + (DA_t - DA_{t-4}) \\ & - (NDA_{t-N} - NDA_{t-N-4}) - (DA_{t-N} - DA_{t-N-4}). \end{aligned} \tag{2}$$

In this equation, earnings are decomposed into three components: cash flows (*CF*), nondiscretionary accruals (*NDA*), and discretionary accruals (*DA*). The accruals are further broken down into those incurred in the current period and those resulting from the reversal of prior accruals. Accruals are assumed to reverse in N quarters. The reversal of positive prior accruals has two effects on the reported earnings change at t (E_t-E_{t-4}). As shown in equation (2), the discretionary accruals incurred in the same quarter last year (DA_{t-4}) and the reversal of t-N's discretionary accruals (DA_{t-N}) lower E_t-E_{t-4}. On the other hand, the reversal of DA_{t-N-4} leads to an increase in E_t-E_{t-4} because it reduces the reported earnings in quarter t-4, and hence, the benchmark against which current earnings is compared. In conclusion, *ceteris paribus*, a firm can report a larger earnings increase if it has not inflated earnings by incurring positive discretionary accruals at t-4 (i.e., $DA_{t-4} \leq 0$).

The above analysis implies that the accruals, both discretionary and nondiscretionary, incurred in prior quarters affect reported earnings and earnings management flexibility in the current quarter. However, since nondiscretionary accruals are usually a function of the firm's operating activities, and since both earnings management flexibility and the market's expectation incorporate the reversal effect of these nondiscretionary accruals, earnings management flexibility in the current quarter is constrained by *DA* in prior quarters. Consequently, I concentrate on the impact of the prior quarters' discretionary accruals on earnings management flexibility in the following analysis. Positive discretionary accruals of the prior quarters affect on flexibility in three ways:

(i) the reversal of prior positive discretionary accruals lowers the current reported earnings and increases the level of discretionary accruals required to attain the earnings target. This increases the costs of earnings management;

(ii) the unreversed prior positive discretionary accruals reduce the maximum level of discretionary accruals the firm can incur in the current quarter, and hence its flexibility; and

(iii) prior positive discretionary accruals inflate prior reported earnings, which raises the benchmark against which current reported earnings is compared. This raises the costs of earnings management because investors are concerned not only about the level of earnings but also the earnings change and earnings surprises. Further, this decreases the probability to meet the benchmark with the allowable set of accruals. On the other hand, the reversal of prior discretionary accruals in the benchmark quarter (i.e., the reversal of DA_{t-N-4} in quarter t-4) lowers the reported earnings in that quarter and hence the benchmark for current reported earnings.

The extent of earnings management is a decreasing function of its ex ante costs. Hence, the higher the level of prior discretionary accruals, the smaller the extent of current upward earnings management.

2.2 Impact of the reversal rate of accruals

The reversal rate of accruals determines the number of subsequent quarters that are affected by the three effects of accruals discussed in Section 2.1. A slower reversal rate causes the current accruals to reverse in a later quarter and hence affects the reported earnings change of these later quarters. The slower rate also increases the number of subsequent quarters whose flexibility limits are lowered by current accruals, and hence, decreases the manager's discretion in reporting earnings in those quarters. Consequently, a firm's flexibility in any quarter is a function of both its prior discretionary accruals and the reversal rate of these accruals.

2.3 Impact of the width of flexibility boundaries

In Section 2.1, I argue that prior upward earnings management lowers the limits of flexibility. In addition to the prior earnings management, the flexibility limits themselves (i.e., $\underline{K}, \overline{K}$) also affect the flexibility available in the quarter. These limits represent the points beyond which costs of earnings management are prohibitively high. These limits vary with the corporate governance, the quality of both internal and external control mechanisms, the operating activities, and the growth phase of the firm. The nature of the firm's business and its operating activities determine the set of GAAP applicable to the firm. The governance structure and the monitoring mechanisms affect the choice of accounting methods from the menu of acceptable methods set by GAAP and the probability of being detected when the rules are violated. All of the above determine the allowable set of accruals and the flexibility limits. Given the discretionary accruals incurred in prior quarters and the reversal rate of accruals, the tighter a firm's flexibility limits, the smaller the flexibility available to the manager in the current quarter and the lower the probability of attaining the earnings management target.

3. Empirical Proxies for Flexibility

The above analysis argues that a firm's flexibility depends on the discretionary accruals incurred in prior quarters and the reversal rate of those accruals. In other words, the flexibility of a firm in a specific quarter decreases in its cumulative unreversed discretionary accruals at the beginning of the quarter.[4] In this section, I discuss the construction of the empirical proxies for discretionary accruals, reversal rate of accruals, and flexibility. While prior discretionary accruals theoretically have three different effects on current flexibility, it is very difficult, if not impossible, to distinguish the reversal and constraint effects. Consequently, the following flexibility proxy tries to capture these two impacts of prior discretionary accruals, without further differentiation between each effect. The ratchet effect is captured by the benchmark against which current performance is evaluated.

3.1 Discretionary Accruals

I use the cross-sectional Jones model adjusted for growth to estimate the level of discretionary accruals (a proxy for earnings management) incurred in the prior quarters.[5] One problem with the cross-sectional Jones model is that it assumes all

---

[4] One limitation of the proposed measure is that it captures the constraint on the manager's ability to manage earnings through accruals only. The manager can still engage in real activities, such as accelerating sales through increased price discounts, to inflate earnings (Roychowdhury, 2003) even though he runs out of the flexibility to manage via accruals.

[5] Kothari, Leone, and Wasley (2002) show that using performance-matched firms to estimate discretionary accruals can reduce the estimation errors in discretionary accruals for extreme performance firms. However, firms with poor performance in the prior quarters are more likely to have managed earnings upwards, and hence, have low flexibility in the current quarter. Using performance-matched samples to estimate discretionary accruals likely removes most of the variation in my flexibility measure. I perform a sensitivity check using a flexibility measure based on

firms in the same industry and same quarter have the same non-discretionary accruals/Δsales ratio. Obviously this is not true. The non-discretionary accruals level relative to change in sales is determined partly by the firm's stage in its life-cycle. Growth firms likely have a higher ratio than mature firms in order to support their growth. Even though the cross-sectional Jones model accounts for the different growth rates across industries, it does not account for the different growth rates across firms within the same industry. Accordingly, I include two of Anthony and Ramesh's (1992) proxies for a firm's life-cycle stage—average sales growth (*SG*) and average dividend payout ratio (*Divid*) of the prior five years—in the cross-sectional Jones model[6]:

$$\frac{TA_t}{TAsset_{t-1}} = \frac{\alpha}{TAsset_{t-1}} + \beta_1 \frac{\Delta Sales_t}{TAsset_{t-1}} + \beta_2 \frac{PPE_t}{TAsset_{t-1}} + \beta_3 SG_t + \beta_4 Divid_t + \varepsilon_t . \quad (3)$$

TA_t is the total accruals of the firm-quarter, computed as net income before extraordinary items less net operating cash flow. $\Delta Sales$ is the difference between sales of this quarter and that of the same quarter last year. *PPE* is the average gross property, plant, and equipment of the quarter. These three variables (*TA*, $\Delta Sales$, *PPE*) and the intercept term (α) are all deflated by total assets at the beginning of the quarter.

---

discretionary accruals estimated by the performance-matched model. This flexibility measure continues to have a significantly negative impact on the probability of missing analysts' forecast.

[6] It is likely that a firm's life-cycle stage affects both the intercept and the slope of $\Delta Sales$ and *PPE* in (3). As a sensitivity check, I re-estimate the non-discretionary accruals by a model including interaction terms between change in sales and the two growth variables, and PPE and the two growth variables. Residuals from this regression model are used as proxies for discretionary accruals. These discretionary accruals are then used to construct the operating cycle flexibility measure. The results are similar to those reported in Section 6. I also perform a sensitivity check using discretionary accruals estimated by the cross-sectional Jones model without the two growth proxies and the results are qualitatively the same.

3.2 Reversal Rate

I use the firm's operating cycle as a proxy for the reversal rate because it reflects the time needed to recover the firm's operating costs. A firm's operating cycle is computed as:

$$Operating\ cycle = \left(\frac{Avg\ A/R}{Sales} + \frac{Avg\ Inventory}{Cost\ of\ goods\ sold} - \frac{Avg\ A/P}{Cost\ of\ goods\ Sold}\right) * 90 \quad (4)$$

A firm's operating cycle captures the average number of days between ordering (and paying) for the raw materials/inventories and selling the inventories (and collecting the money from customers). A firm can hide an understatement of its bad debt allowance only up to its normal collection period. Once an account remains outstanding beyond the normal collection period, it attracts the attention of the auditor and the firm will probably have to write off the account.[7] Similarly, any understatement of obsolete inventory will be revealed if the firm cannot sell the products within the normal sales period. Thus, the operating cycle estimates the average time it takes the working capital accruals to reverse. The reversal rate of the discretionary components of the working capital accounts, in turn, estimates the

[7] Although an audit of financial statements is performed only annually, firms are required to have their interim financial statements reviewed by auditors. Even though a review is substantially less in scope than an audit, it consists of performing analytical procedures and making inquires of persons responsible for the accounting matters (SAS 100). Analytical procedures generally include ratio analysis, a comparison with the corresponding period in the previous year, and the accountant's expectation. If a firm's collection period in the current quarter is much longer than its historical pattern or that of its peers, it will probably attract the attention of auditors during the analytical procedures. Since an audit is more thorough than a review, I expect that any misstatement or earnings management is more likely detected in the fourth quarter than in the first three quarters. Hence, I analyze the fourth quarter separately from the first three quarters in Section 7.2.

reversal rate of the discretionary accruals because a large part of the discretionary accruals are from the working capital accounts.[8]

I estimate the operating cycle both cross-sectionally (*CS operating cycle*) and over time (*TS operating cycle*). To estimate the *CS operating cycle*, firms in the same two-digit SIC codes and the same quarter are grouped together to compute the average operating cycle based on Equation (4). This average operating cycle is then used as a proxy for the reversal rate of all firms in that industry-quarter. The *TS operating cycle* is computed as the average operating cycle of the firm itself (the operating cycle is computed as in (4)) in the prior twelve quarters.[9]

3.3 Proxy for Earnings Management Flexibility

After estimating discretionary accruals and reversal rates, I calculate the cumulative lagged discretionary accruals for each quarter in the sample period. The number of lags included in the cumulative measure depends on the reversal rate of the firm's discretionary accruals. For example, if a firm's accruals reverse on average in 3 quarters, then its cumulative lagged discretionary accruals at time t ($CLDA_t$) equals $CLDA_t = DA_{t-1} + DA_{t-2} + DA_{t-3}$. The cumulative lagged discretionary accruals proxy for the flexibility used in prior quarters.

[8] Hribar (2000) documents that changes in the working capital accounts make up 46% of total accruals and depreciation accounts for another 28%. Assuming that manipulation of depreciation is not as flexible as manipulation of accounts receivable and inventory accounts, then it is reasonable to assume that more than 46% of the discretionary accruals are from the working capital accounts.
[9] The average operating cycle of a firm in the prior twenty quarters has also been used as a proxy for the reversal rate and the results are qualitatively the same as those reported in Section 6.

Next, I compute a proxy for a firm's flexibility limit. Although GAAP prescribes the firm's set of accounting rules, auditors and regulators define what constitutes a reasonable interpretation of GAAP (Francis et al., 1999). Further, it is the auditors, audit committee, analysts, and regulators who monitor and ensure that firms comply with GAAP. Thus, the monitoring by these parties imposes a limit on a firm's discretion in reporting accruals. One standard procedure in auditing is to use analytical procedures (such as ratio analysis, comparison with prior periods and industry average) to identify any potential problem area (SAS 56). If a firm shows a significant increase in accruals in the current quarter, this sends a red flag to its auditor. Hence, I use the "normal" level of cumulative discretionary accruals as a proxy for the flexibility limit, above which will attract the scrutiny of auditors.

To compute the "normal" level of cumulative discretionary accruals, I first compute the mean and standard deviation of the cumulative lagged discretionary accruals (*CLDA*) of the firm for the previous three years. Because *CLDA* are serially correlated, I compute the Newey-West adjusted standard deviation. Then, I use the mean cumulative lagged discretionary accruals plus two standard deviations as proxies for the upper limits of the firm's earnings management flexibility. As *CLDA* proxies for the cumulative discretionary accruals outstanding at the beginning of a quarter, its range proxies for the limits of cumulative accruals a firm can have in a quarter. To minimize the impact of outliers, I use the mean plus two standard deviations of *CLDA* in the prior three years (instead of the range of *CLDA*) as a proxy for the upper limit.[10] Assuming a normal distribution, these estimates cover about 95% of the *CLDA* observations in the prior three years. The upward earnings management flexibility of a firm at t is then proxied by *Upper limit* - $CLDA_t$. As the operating cycle is used as a proxy for the reversal rate of discretionary accruals, I denote this earnings management flexibility as the *operating cycle flexibility*.

To test whether this empirical proxy captures a firm's earnings management flexibility, I examine its impact on a firm's probability of missing analysts' forecasts in Section 6. The test is a joint test of the hypothesis that the constructed measure actually captures a firm's earnings management flexibility and the hypothesis that, *ceteris paribus*, firms with higher flexibility are less likely to miss analysts' forecasts. If the operating cycle flexibility has a significant impact on the probability of missing analysts' forecasts, then it suggests that the measure probably captures flexibility and flexibility does affect a firm's probability of missing analysts' forecasts. However, there can be alternative explanations for the significant correlation between flexibility and the probability of missing analysts' forecasts. Thus, in addition to the main test in Section 6, I also perform sensitivity analyses to test these various alternative hypotheses in Section 7. On the other hand, if the measure is not statistically related to the probability of missing analysts' forecasts, it can be either that the measure does not capture flexibility or that flexibility does not affect a firm's probability of missing analysts' forecasts.

---

[10] A sensitivity test has also been performed using the maximum *CLDA* in the last three years as a proxy for the upper flexibility limit and the results of the tests in Section 6 do not change.

4. Other Determinants of Costs of Earnings Management and Flexibility

In addition to prior earnings management, a firm's current flexibility also depends on other firm characteristics and macro-economy factors. In this section, I examine three other determinants of flexibility—fourth quarter effect, expected growth, and the overall economy.

4.1 Fourth Quarter Effect

A firm's earnings management flexibility varies over the fiscal year. The integral approach for interim reporting requires managers to make estimates of certain interim cost accruals based on expected operating results for the fiscal year. This estimation procedure involves errors and grants the manager certain discretion in allocating costs across quarters. For example, firms have to estimate the repair and maintenance costs and income taxes for the year and allocate these costs to each quarter. The estimate is likely to deviate from the actual costs incurred. In the fourth quarter, when the actual sales and expenses numbers are observed, any estimation error in the first three quarters has to be corrected [Hayn, Narayanamoorthy, and Watts (2001), Mendenhall and Nichols (1988)]. Consequently, in addition to the impact of discretionary earnings management, earnings management flexibility in the fiscal fourth quarter is affected by the correction of estimation errors in the first three fiscal quarters.[11] Also, financial statements of the fourth quarter are subjected to

[11] The flexibilities in the second and third quarters can also be affected by the cumulative estimation errors in the previous quarter(s) of the same fiscal year. As the year progresses, the manager has more information on the performance of the year and keeps updating his estimates. Thus, in a sense, the "correction" of the estimation error is a continuous process but the major correction occurs in the

audits. Any disagreement between the auditor and the manager regarding the accounting record of the prior three quarters has to be resolved and corrected in the fourth quarter.[12]

As a result, the correlation between accruals of the fiscal fourth quarter and those of prior periods is different. Since the cross-sectional operating-cycle reversal rate is estimated separately for each quarter, it accounts for this fourth-quarter effect by allowing the reversal rates to vary across quarters. In section 7, I analyze the impact of flexibility on financial reporting strategy separately for the fourth quarter.

4.2 Expected Growth

A firm's life-cycle stage can also affect its earnings management flexibility. With sales growing and business expanding, a high-growth firm can justify an increase in net operating assets as a way to meet its expected increase in future demand. In contrast, a firm in the mature or stagnant stage faces more difficulty in justifying such an increase. While the increase in operating assets of a growth firm can be for a legitimate business expansion purpose, it also provides managers with more leeway in shifting earnings across periods. As such, the allowable set of accruals of a growth firm is larger, and hence these firms have more earnings management flexibility. Although I have controlled for the firm's *past growth* in estimating discretionary accruals in Equation (3), a firm's earnings management

fourth quarter when the actual performance is realized. Moreover, the manager has the discretion to postpone corrections in the second and third quarter while the discretion to postpone in the fourth quarter is much more limited.

[12] This problem can be mitigated to a certain extent by auditors' timely review of quarterly financial statements.

flexibility depends on investors' *expected future growth* of the firm. Thus, I include the market-to-book ratio as a proxy for the expected future growth in the following tests.

4.3 Overall Economy

Lev and Thiagarajan (1993) show that during economic booms, investors respond less negatively to a disproportionate inventory increase (relative to increase in sales) than during recessions. With the economy booming, an increase in operating assets can actually signal a firm's expansion plan to meet the expected increase in demand. On the other hand, when the economy is in recession, investors expect a decline in sales and an increase in bad debt write-offs. A disproportionately high level of inventory and accounts receivables can signal a slow response to the deteriorating economy. Moreover, when the economy deteriorates, there are likely more corporate failures, which attract the attention of the media and the extra scrutiny from the regulatory agencies. Consequently, the upper flexibility limit is probably higher in an economic boom than in a recession.

In a high inflation environment, investors react more negatively to a build-up of working capital (Lev and Thiagarajan, 1993) because the opportunity costs of holding inventories and accounts receivable are higher. As such, the upper flexibility limit, and hence ability to inflate earnings, is likely to be lower during a high inflation period.

Following Lev and Thiagarajan (1993), I use the annual percentage change in the Consumers' Price Index as a proxy for inflation. Economic growth is measured as the annual percentage change in real GNP.

5. Sample Selection and Data Description

5.1 Sample Selection

The empirical analysis is based on financial data collected from Compustat, analysts' forecast data from Institutional Brokers Estimate System (I/B/E/S), GDP data from the Bureau of Economic Analysis website, and CPI data from the Bureau of Labor Statistics website. The sample comprises firm quarters in 1992-2001.[13] The beginning of the sample period is determined by the availability of data for computing flexibility limits. Assuming a reversal rate of two years, the cross-sectional operating cycle flexibility computation requires at least five years of accruals data: two years for computing the cumulative lagged discretionary accruals and three years of data on cumulative lagged discretionary accruals to compute the flexibility boundaries. Since the cash-flow statement data required to compute accruals are available only after 1987, the sample starts from 1992.[14] The sample period ends in 2001 because the last analysts' forecasts (proxy for the expected future earnings in the following tests) available are for year 2002.

Any industry-quarter with less than ten firms is also excluded because the estimation of the cross-sectional Jones model is likely to be imprecise. Any firm-quarter with absolute value of discretionary accruals scaled by lagged total assets greater than one is also deleted. The size of the cross-sectional operating cycle

---

[13] The descriptive statistics and test results of all firm-quarters with the required data are reported in the paper. I also perform the tests on a sub-sample of firms with December year-end only and the results are similar to those reported in the paper.

[14] Collins and Hribar (2001) document that accruals calculated by the balance-sheet approach can suffer from the articulation problem and advocate the use of the cash-flow-statement approach to calculate the accruals. Thus, I use the cash-flow-statement approach to compute the discretionary accruals and the earliest date accruals data are available is 1987.

flexibility sample is 17,429 firm quarters, whereas that of the time-series operating cycle sample is 16,592.

5.2 Sample Description

Table 1a provides the descriptive statistics of the sample. The first three columns present the summary statistics of the full sample. Sample firm-quarters have an average flexibility available (*Op_flex* computed as flexibility limit minus flexibility used) of 7.2% of their total assets. The mean flexibility limit (*Max_flex* computed as the mean plus two standard deviation of *CLD*A in the prior twelve quarters) is also 7.2% of total assets and the average flexibility used (*CLDA*) is 0. Although the average flexibility used is zero, it does not imply that the sample firms have not managed earnings in the prior periods. A further investigation (untabulated) shows that about 59% of the sample has positive cumulative lagged discretionary accruals (with a mean *CLDA* of 0.028) while the remaining sample has negative cumulative lagged discretionary accruals (with a mean *CLDA* of -0.038). When the mean *CLDA* of the full sample is computed, these positive and negative *CLDA* cancel out. The mean total assets are $4.935 billion and the median is about $0.98 billion. The mean lagged net operating asset (Barton and Simko's flexibility measure) is about 2.849 times lagged sales. The mean discretionary accruals are about zero.

In addition to the summary statistics of the whole sample, I also present those statistics for firms with either the highest or the lowest flexibility. I divide the full sample into quintiles by the flexibility available. Columns 4-6 present the summary statistics of firm-quarters in the lowest quintile while those of firm-quarters in the highest quintile are provided in columns 7-9. Columns 10-11 present the t-statistics and Wilcoxon z-statistics for the difference between the two groups. As shown in Table 1a, high flexibility firms have, on average, higher flexibility limits than low flexibility firms. However, they also tend to have slightly higher cumulative lagged discretionary accruals (i.e. flexibility used in prior periods) than the low flexibility firms. Even though the high flexibility firms have used up a bit more flexibility in the prior periods, because they have a higher flexibility limit to start with, they tend to have more flexibility available in the current quarter. Comparing the flexibility measures proposed in prior studies across the two groups suggests that the operating-cycle flexibility measure proposed in this study is consistent with the measures proposed in Barton and Simko (2002) and Kasznik (1999). The low flexibility firms tend to have higher lagged net operating assets (Barton and Simko's measure) and a larger lagged change in total accruals (Kasznik's measure). Low flexibility firms also tend to have lower total accruals and longer operating cycles than high flexibility firms.

5.3 Description of Earnings Management Flexibility Distribution

Table 1b presents the mean of the upper flexibility limits (proxied by the mean plus two standard deviations of the cumulative lagged discretionary accruals in the previous three years) of each SIC sector. The construction and mining sectors have the highest flexibility limits, while the transportation & utility and financial sectors have the lowest flexibility limits. The average upper flexibility limit of the construction sector is 0.122 while that of the transportation & utility sector is 0.027. That is the construction sector can have up to 12% of its total assets comprised of cumulative discretionary accruals while the transportation & utility sector can have only 2.7%. Untabulated results of the F-test show that the difference of flexibility limits across sectors is significant at the 0.01 level. Duncan's multiple-range test shows that the flexibility limits of the construction sector is significantly higher than that of the wholesale trade sector, and that the flexibility limits of the transportation & utility and finance sector are significantly lower than that of the retail sector.

The upper flexibility limits of the transportation & utility and finance sectors are significantly lower than those of the retail trade sector, perhaps because the former sectors are regulated and thus have lower flexibility compared to other sectors. Due to the nature of their businesses, the construction and mining sectors have a long operating cycle (2.25 and 2.95 quarters respectively) and uncertainties in their operations. Accounting for revenues and expenses in these sectors requires more subjective judgment, which in turn leads to higher flexibility than in other sectors. For example, in the construction industry, a project can last for couple of years and the manager has to estimate the costs of completing the project, the ultimate recoverability of these costs, and the likelihood of closing lots held under option or contract. An underestimation in the costs of completion or an overestimation in the gross margin can inflate the reported earnings in a period. Similarly, the mining industry has the flexibility in determining when to record variations of the actual stripping ratio (i.e. the ratio of waste to ore in an open pit operation) from forecast stripping ratio as expense, and the provision for restoration and closure costs.[15]

The components of the flexibility limit—mean ($\overline{CLDA}$) and standard deviation [$\sigma(CLDA)$] of *CLDA*—are also presented in the table. Results show that sectors with the highest flexibility do not necessarily have the highest $\overline{CLDA}$. On the contrary, both the mining and construction sectors tend to have a lower $\overline{CLDA}$ than other sectors. Mining and construction sectors have higher $\sigma(CLDA)$. Except for the agriculture sector, the ranking of sectors by average $\sigma(CLDA)$ is basically the same as that by the flexibility limit. Thus, firms with larger fluctuation in *CLDA* likely have higher flexibility limit.

Also presented in the table are the average standard deviations of: (i) discretionary accruals and (ii) total accruals incurred by firms in the sectors. The ranking of the sectors by the standard deviation of discretionary accruals and total accruals are quite different from that of the flexibility limit ranking. This suggests that firms with the highest flexibility limits do not necessarily incur the largest discretionary accruals. One potential explanation is that firms with the highest flexibility limits do not necessarily have the highest flexibility available because they have used up the flexibility in prior periods. Moreover, firms with the highest flexibility limit do not always have the incentives to manage earnings upward. The

[15] When the sample firms are grouped by two-digit SIC codes, the railroad industry (SIC 4000) has the lowest flexibility limit while construction (SIC 1500) and mining (SIC 1400 & SIC 1000) industries have the highest flexibility limits.

discrepancy in the rankings also suggests that the flexibility limit measure does not just pick up the volatility of the firm's earnings.

In addition to the cross-sectional variation of the flexibility limits, I examine the relation between the flexibility available and the firm's prior earnings management practices. Untabulated results show that my flexibility construct has a correlation of 0.09 (significant at the 0.01 level) with the lagged ratio of allowance for bad debts to accounts receivable. This suggests that firms that have deferred bad debt allowance have lower flexibility in the current quarter. This is consistent with the results of prior studies documenting that one way to inflate earnings is to defer bad debt allowance. Thus, this positive correlation provides preliminary evidence that the flexibility measure captures at least some of the firm's prior earnings management practices.

6. Flexibility and Missing Analysts' Forecasts

In this section, I examine the relation between a firm's upward earnings management flexibility and its probability of missing analysts' forecasts. Various studies document managers' incentives to meet/beat analysts' forecasts and show that the frequency of small positive forecast errors far exceeds that of small negative forecast errors [Degeorge, Patel, and Zeckhauser (1999), Matsumoto (2002)]. Abarbanell and Lehavy (2002) suggest that the middle asymmetry in the forecast error distribution (i.e. there are significantly more firms with small positive forecast errors than firms with small negative forecast errors) can be caused by earnings management. Specifically, they show that this middle asymmetry disappears when forecast errors are based on reported earnings stripped of unexpected accruals. Since a firm's ability to manage earnings upward is constrained by its flexibility, I hypothesize that a firm's probability of missing analysts' forecasts decreases as its flexibility increases. Further, a firm with a pre-managed negative earnings surprise greater than its flexibility available cannot hide the bad news. Given the limited flexibility available to most firms, the asymmetry is concentrated in a small region around zero forecast errors as documented by Abarbanell and Lehavy (2002).[16]

I discuss other potential variables that likely have an impact on the firm's probability of missing analysts' forecast in the next subsection. Then I describe the

[16] It should be noted that firms with large negative reported earnings surprises do not necessarily have large pre-managed earnings surprises. After the manager observes a negative pre-managed earnings surprise and the flexibility available, he decides whether to manage earnings up to meet the benchmark. If he decides not to manage earnings upward, he then has to decide whether to take a big bath in the quarter to clean the deck. If he decides to take a big bath, this will result in a large reported earnings surprise, even if the pre-managed surprise is small.

probit regression used to analyze the relation and provide some descriptive statistics on the control variables in Section 6.2. Section 6.3 details the regression results.

6.1 Control Variables

Even when the manager has the flexibility to inflate earnings, he does not necessarily want to do so because earnings management within GAAP is not free either. The manager engages in earnings management only if the benefits of such action outweigh its costs. The costs and benefits of the earnings management depends on:

(i) *Expected future earnings change*. In addition to earnings management flexibility, a firm's earnings management decision likely depends on the manager's expected future earnings. Fudenberg and Tirole (1995) suggest that managers consider both current earnings and expected future earnings when making earnings management decisions. Defond and Park (1997) and Elgers, Pfeiffer, and Porter (2000) find empirical results supporting the above claim.

When the manager expects next period's earnings to be lower than this period's, then by increasing earnings in the current period, he simply defers the losses to the next period. By deferring the losses, the manager can cause the potential litigation cost or settlement amount to increase because of the extended class action period. The plaintiff shareholders are also more likely to successfully build a case of fraudulent reporting. All these represent the costs of current earnings management.

The lower the expected future earnings, the higher the costs of inflating current earnings. As such, the manager has less incentive to "borrow" from the future if he expects earnings to decline in subsequent periods. Thus, *ceteris paribus*, the probability of missing analysts' forecasts in the current period is higher. I include the manager's expected future earnings change in the analysis to control for this difference in the manager's incentive. The first consensus analysts' forecast of the same quarter next year, released after current earnings announcement, is used as a proxy for expected future earnings.[17] The expected future earnings change is then computed as the difference between this consensus forecast and the reported earnings of the current quarter.

(ii) *Pre-managed earnings change.* A firm's pre-managed performance likely affects its probability of meeting analysts' forecasts. I use the change in earnings stripped of the discretionary accruals as a proxy for pre-managed earnings change.[18] A firm with a high pre-managed earnings increase is more likely to meet the analysts' forecast

---

[17] One potential problem of using the first consensus forecast of earnings of t+4 after current earnings announcement is that if a firm takes a big bath in the current quarter, it reports low performance in the quarter. After observing this low performance, analysts expect the firm to perform better in the future. Hence, these big-bath firms can actually miss the forecast for the current quarter and have a positive expected earnings change. This will lead to a positive correlation between the probability of missing analysts' forecasts and expected future earnings change. A detailed discussion is provided in Section 6.3.

[18] This proxy for pre-managed earnings change does not account for the effect of management through real activities. Managers can use real activities, such as accelerating sales through price discounts or overproducing in a quarter to lower the cost of goods sold (Roychowdhury, 2003). All these increase the firm's earnings. These real activity manipulations affect not only the accruals accounts but also the operating cash flows of the firm. To the extent that managers use real activity to manage earnings, the assumption that operating cash flows is not manipulated is violated. In these cases, the "pre-managed earnings" measure proposed (i.e. reported earnings stripeed of discretionary accruals) no longer captures earnings before manipulation but rather earnings after cashflow manipulation.

than one with a significant drop. Further, since earnings management flexibility is limited, a firm with a large drop in earnings probably cannot use discretionary accruals to fill in the gap between its pre-managed earnings and the analysts' forecasts. Consequently, controlling for the pre-managed earnings change is important in examining the impact flexibility has on a firm's probability of missing analysts' forecasts.

6.2 Empirical Analysis

To examine the relation between earnings management flexibility and the firm's probability of missing analysts' forecasts,[19] I estimate the following probit regression with the pre-managed earnings surprises and expected future surprises as control variables:

$$\Pr(miss_{it}=1)=\Phi(a+b_1 Flex_{it}+b_2 Per\_sur_{it}+b_3 Exp\_sur_{it}+b_4 \Delta GNP_t+b_5 \Delta CPI_t+b_6 lpb_{it}); \quad (5)$$

The variable *miss* takes a value of 1 if there is a negative earnings surprise (i.e., reported earnings – consensus analysts' forecast < 0) and zero otherwise. *Flex* is the flexibility measure, *Pre_sur* is the pre-managed earnings surprise, *Exp_sur* is the expected earnings change of the same quarter in the following year. Appendix 1 provides a detailed description of the variables in the above probit model. Consistent with prior studies on earnings management [Barton and Simko (2002), Kasznik (1999), Burgstahler and Dichev (1997), etc.], regulated industries and financial

[19] One advantage of using the consensus analysts' forecast, rather than earnings of the same quarter last year, as a benchmark is that the consensus analysts' forecast most likely has accounted for the reversal effect of prior quarter accruals. Thus, the earnings surprise calculated using the analysts' forecast would not have a mechanical relation with the cumulative discretionary accruals flexibility measure.

services industries (SIC codes 4000-5000 and 6000-6500) are excluded from the probit analysis.[20]

I run the probit analysis first using the full sample and then using only those firm quarters with small reported forecast errors. As suggested in prior studies, the impact of flexibility is likely to be the greatest for firms with small misses. However, by selecting sample firms based on the size of reported forecast errors, I can miss those firm-quarters with small pre-managed forecast errors and low flexibility. Because these firm-quarters have low flexibility, they cannot hide even very small forecast errors. Further, they have the incentives to take a big bath. By excluding firms with large forecast errors, I am likely to exclude these firms that are most constrained by the earnings management flexibility. Consequently, I report the results based on the full sample and then those based on various subsamples.

Descriptive statistics:

Figure 1 presents the distribution of the reported forecast errors (i.e. reported earnings – consensus analysts' forecasts) of the sample. The histogram of forecast errors is constructed only for those within the range of -15¢ to +15¢ with bin widths of 1¢. Accordingly, Bin 0 contains those firm-quarters with forecast errors of [-15¢, -14¢), Bin 1 contains those with forecast errors of [-14¢, -13¢), etc. Consistent with prior studies, the histogram shows a single peak at Bin 15—the bin with forecast errors [0, 0.01). Even though the number of firm-quarters with small negative

[20] A sensitivity analysis including the regulated industries and financial institutions in the probit analysis provides similar results.

forecast errors (i.e. those in Bin 14) is much smaller than those with zero or small positive forecast errors, the difference is not as pronounced as those documented in Burgstahler and Dichev (1997). One potential reason is the different benchmarks used: consensus analysts' forecast is used in this paper whereas zero or earnings of the previous period are used as the benchmark in Burgstahler and Dichev. However, the histogram in Figure 1 is similar to that reported in Abarbanell and Lehavy (2003), which also uses analysts' forecasts as a benchmark.

Table 2 Panel A provides descriptive statistics on firm-quarters that meet/beat analysts' forecasts (meeting firms) and those that miss the forecasts (missing firms) in the full sample. About 39% of the sample missed analysts' forecasts. On average, meeting firms have no change in pre-managed ROA whereas missing firms have a mean (and median) decrease of 1% in the pre-managed ROA. Further, consistent with my hypothesis, the mean flexibility (*Op_flex*) of the missing firms (0.0696) is lower than that of the meeting group (0.073) and the difference is statistically significant. An examination of the flexibility limit and flexibility used show that there is no significant difference between the flexibility limit of the two groups. However, the missing group has used up a significantly higher level of flexibility in the prior quarters. Hence, it has lower flexibility in the current quarter. Missing firms also have higher lagged net operating assets than meeting firms. Meeting firms have a mean market-to-book ratio of 3.20 whereas that of missing firms is only 2.67. The difference is significant at 0.01 level.

Panel B shows the correlation matrix among variables used in the test: Pearson correlation is shown above the diagonal while Spearman is shown below the diagonal. An examination of the Spearman correlation reveals that *Op_flex* has a significantly negative correlation of -0.186 with lagged net operating assets. As expected, there is a significantly positive correlation of 0.040 between flexibility available, *Op_flex*, and forecast error (defined as reported earnings less the consensus analysts' forecasts). Moreover, the forecast error is positively correlated with the pre-managed change in ROA and negatively correlated with the expected future earnings surprise. Lagged market-to-book ratio has a significant positive correlation (0.021) with *Op_flex* and a negative correlation with lagged net operating assets. Results based on Pearson correlation are similar to those based on Spearman correlation.

6.3 Regression Results

Table 3 Panel A presents results of the multivariate regression analysis of the full sample. Columns 1-3 show the regression results when Barton and Simko's flexibility measure (i.e., net operating assets deflated by sales, net operating assets are computed as shareholders' equity less cash and marketable securities, plus debt) is used and columns 4-6 show the results for Kasznik's measure (i.e. lagged change in total accruals). Results using my cross-sectional operating flexibility are presented in columns 7-9 while those using the time-series operating cycle are presented in the last three columns. Since the coefficients in a probit regression do not reflect the rate of change in the dependent variable as the independent variables change, the effect of one standard deviation change in the independent variables on the dependent variable is also presented. This effect is computed as the standard deviation of the independent variable multiplied by its marginal effect on the dependent variable. The marginal effect of a dependent variable is computed as the estimated coefficient, β, multiplied by the density function $\phi(x_i\beta)$. Hence, the marginal effect equals $\phi(x_i\beta)\beta$. The mean of x_j is used in the computation of the density function $\phi(x_i\beta)$.

When Barton and Simko's flexibility measure is used, one standard deviation increase in the lagged net operating assets increases the probability of missing analysts' forecasts by 0.023 (significant at 0.0001 level). On the other hand, Kasznik's flexibility proxy has no significant impact on the probability of missing analysts' forecasts. When the cross-sectional operating cycle flexibility measure is used, it has a coefficient of -0.339 (significant at 0.001 level) with the probability of missing analysts' forecasts. The probability of missing analysts' forecasts drops by 1.1% for a standard deviation increase in cross-sectional operating cycle flexibility measure. The time-series operating cycle flexibility measure also has a negative coefficient of -0.359 in the probit regression and the effect of one standard deviation change is -1.16%. These results suggest that the impact of one standard deviation increase in the Barton and Simko's measure is almost double that of the operating cycle flexibility measure and is more significant. However, as shown in Section 7.7, Barton and Simko's measure captures mostly the industry effect, rather than the difference in flexibility across individual firms.

Most of the coefficients of control variables have the expected sign. The pre-managed earnings change (*Pre_surp*), the lagged market-to-book ratios (*lpb*), and the change in GNP all have negative and significant coefficients in the probit analysis. The coefficient of the inflation indicator, however, is not significant. The expected earnings change (*Exp_sur* computed as the difference between the analysts' forecasts for the same quarter next year and the reported earnings of the current quarter), contrary to expectation, has a positive and significant coefficient. This positive coefficient can be caused by the mechanical relationship between *Exp_sur* and the probability of missing analysts' forecasts. Since both the probability of missing analysts' forecasts and *Exp_sur* decrease in current reported earnings (RE_t), the positive correlation between the probability of missing forecasts and *Exp_sur* can be caused by this spurious correlation between the two variables and RE_t.[21] Another potential explanation is that managers are more likely to take a big bath in the quarter when they expect future earnings to deteriorate. With the big bath in the current quarter, the expected earnings change is likely to be positive. This again leads to the positive correlation between the probability of missing analysts' forecasts and the expected earnings change. The third potential cause for the positive correlation is that for firms that take a big bath in the quarter, their reported earnings are much lower than normal. Analysts expect this significant drop in performance to be transitory and the firm reports a positive change in the earnings in the future periods. In other

[21] The negative impact of Pre_surp_t can also be caused by the mechanical relationship. Since the probability of missing analysts' forecasts decreases in current reported earnings (RE_t) while Pre_surp_t increases in RE_t, this can lead to the observed negative coefficient of Pre_surp_t.

words, the positive correlation between expected future earnings change and the probability of missing analysts' forecasts can be driven by analysts adjusting their expectations after observing the post-managed earnings. Hence, the analysts' forecasts do not reflect the manager's expectation when determining his earnings management strategy.

Panel B presents the results for a subset of firms with small reported forecast errors. For the analysis, I consider forecast errors to be small if the absolute value of the forecast errors is less than one percent of the stock price at the beginning of the quarter. The result does not change if small forecast errors are defined as less than ten percent of the beginning stock price. About 36% of this sub-sample miss the forecasts. Except for the smaller firm size, this sub-sample has similar firm characteristics to those of the full sample. Untabulated results of the univariate analysis on the difference in firm characteristics between those firms that meet/beat forecasts versus those that miss the forecasts are similar to the results reported in Table 2 Panel A.

As shown in Table 3 Panel B, the results of the sub-sample are qualitatively the same as the full sample. Except for Kasznik's measure, all other flexibility measures have a significant impact on the probability of missing analysts' forecasts. Although the marginal impact of the flexibility measures is slightly higher for the sub-sample, the McFadden R^2 drops for the sub-sample. Further, the lagged market-to-book ratio no longer has a significant impact on the probability of missing forecasts in the sub-sample tests. I also perform the analysis on various other sub-samples and the results are presented in Section 7.1.

To check the sensitivity of the above results to the earnings benchmark, I use earnings of the same quarter last year, instead of the consensus analysts' forecasts, as a proxy for expected earnings. Untabulated results of the probit analysis based on this benchmark are comparable to those reported above.

In order to examine whether the results are driven by the volatility of the firm's performance, I also run the probit regression including the standard deviation of reported earnings as a control variable and the tenor of the results does not change.[22]

Further, I perform the analysis using discretionary accruals estimated by the cross-sectional Jones model without adjustment for the firm's life-cycle phase. Untabulated results show that my flexibility measure continues to have a negative and significant correlation with the probability of missing the analysts' forecasts. However, one standard deviation increase in my flexibility measure based on the Jones model decreases the probability of missing analysts' forecasts by -0.0096. McFadden R^2 of the probit regression using this measure is only 0.0099, much lower than McFadden R^2 (0.017) of the regression based on the flexibility measure constructed from discretionary accruals adjusted for the firm's life-cycle.

---

[22] I also run the probit analysis including the control variables in Barton and Simko (2002). The operating cycle flexibility measures continue to have a significantly negative impact on the probability of missing analysts' forecasts.

Overall, results of the earnings surprise tests support the hypothesis that firms with high flexibility are more likely to meet/beat analysts' forecasts. With the flexibility available, managers can manage earnings upward to meet the target. When the flexibility is low, managers are less likely to manage earnings upward (within the boundary of GAAP) even if their incentives to inflate earnings to meet the analysts' forecasts are high. Thus, firms that successfully manage earnings to meet analysts' forecasts are those with both the incentives and the flexibility to do so.[23]

[23] The above test is based on all firm-quarters pooled together. I run the tests for firms with December year-end only and the results are qualitatively the same.

7. Sensitivity analysis

Additional analysis is performed in this section to examine other plausible interpretation of the above results. Because Kasznik's measure does not have any significant impact in the above probit analysis, the following sensitivity tests focus on a comparison between the operating cycle flexibility measures and Barton and Simko's measure. After applying the sensitivity tests to Kasznik's measure, none of the inferences change. Also, since the results based on the small reported forecast error sub-sample are similar to those based on the full sample, only results of the full sample are presented.

7.1 Variation in the impact of flexibility

In this section, I use the absolute value of the forecast errors to define small earnings forecast errors. Specifically, I run the probit analysis on subsets of firm-quarters: those with earnings surprises (in absolute terms) of less than 10 cents, 5 cents, 2 cents, etc. Most of the results (untabulated) are similar to those reported in Table 3, except that the coefficient of *Exp_sur* becomes negative and significant. For firms that miss the forecast by a small dollar amount, the expected earnings change is negatively correlated with the probability of missing analysts' forecasts. Comparing these results to the results in Table 3 Panel B suggests that for small firms, the positive coefficient of *Exp_sur* in Table 3 Panel A is mainly driven by the big bath effect. While for large firms, the mechanical relationship between *Exp_sur* and the probability of missing analysts' forecasts seems to dominate.

Also, I run the regression with an interaction term on flexibility and a dummy variable indicating whether the observation has a small forecast error. The dummy variable takes a value of one if the absolute magnitude of a firm's earnings surprise is less than or equal to one cent. Then I include this interaction term in Equation (5). Untabulated results of the probit analysis show that the interaction term has a significant negative coefficient. The impact of one standard deviation change in the interaction term on the probability of missing analysts' forecast is -0.1. This rejects the null hypothesis that the impact of flexibility on the probability of missing forecast is the same regardless of its forecast error. The R^2 of the test also improves to 0.036.

Also, firms with negative pre-managed earnings surprise (i.e. reported earnings stripped of discretionary accruals less consensus forecast) probably have higher incentives to manage earnings than those with positive pre-managed earnings surprise. Thus, the impact of flexibility on the probability of missing analysts' forecasts is likely to be higher for this negative pre-managed earnings surprise group. I rerun the probit analysis on the subset of firms with negative pre-managed earnings surprise. About 34% of this sub-sample has reported earnings that meet/beat the analysts' forecasts. Although the impact of one standard deviation change in flexibility is similar to that reported in Table 3, R^2 of the analysis increases to 0.032.

7.2 Analysis of the Fourth-quarter Effect

As discussed in Section 4.1, the relation between a firm's flexibility and its probability of missing analysts' forecasts likely differs in the fourth quarter. In this section, I repeat the probit analysis for the first three quarters and the fourth quarter separately. Results in Table 4 confirm that the probability of missing analysts' forecasts in the fourth quarter is affected, to a larger extent, by factors other than the firm's flexibility (e.g. estimation errors in the first three quarters).

While results using Barton and Simko's measure (Panel A) suggest that the correlation between a firm's net operating asset level and its probability of missing analysts' forecast is significant in the fourth quarter, results of the operating cycle flexibility measures in Panels B and C show otherwise. One standard deviation increase in Barton and Simko's flexibility measure (*lnoa*) increases the probability of missing analysts' forecasts by 0.0145 in the first three quarters and by 0.0365 in the fourth quarter. Both are significant at 0.01 level. Panel B (Panel C) presents the results of the fourth quarter analysis using the cross-sectional (time-series) operating cycle flexibility measure. One standard deviation increase in the cross-sectional (time-series) operating cycle flexibility measure has a significant -0.0162 (-0.0158) impact on the probability of missing analysts' forecasts but it does not have any significant impact on the fourth quarter result. A comparison of the results using operating cycle flexibility measures with those in Table 3 shows that the effect of earnings management flexibility in the first three quarters is stronger than the impact when all quarters are pooled.

To examine whether the insignificance of the results in the fourth quarter is due to the small sample size, I rerun the analysis (with the operating cycle flexibility measure) for each of the first three quarters separately. Untabulated results show that the operating cycle flexibility measure continues to have a significant impact on the probability of missing analysts' forecast in each of the first three quarters. I also run the test by including an interaction term between a fourth quarter indicator and the operating cycle flexibility measure. Untabulated results show that the interaction term has a significant positive coefficient. These results confirm that the negative impact of the operating cycle flexibility on the probability of missing forecasts is much smaller in the fourth quarter and it is not driven just by the small sample size. Moreover, the significant impact of Barton and Simko's measure in the fourth quarter suggests that small sample size is probably not the cause of the insignificant coefficient of operating cycle flexibility measure in the fourth quarter.

In addition to the factors discussed in Section 4.1, another potential reason for the difference in the impact of flexibility on the probability of missing analysts' forecasts in the fourth quarters is that the flexibility limits can differ in the fourth quarter. The fourth-quarter financial statements are the only reports that are subject to audit, whereas reports of the first three quarters are subject to reviews. Given the wider scope of an audit, auditors are more likely to detect any irregularities during the audit than in a review. Consequently, the upward earnings management flexibility limit is likely to be smaller for the fourth quarter than in the first three quarters.

To account for this difference in flexibility limit across quarters, I estimate the flexibility limit using only *CLDA* of the fourth quarter in the prior three years. Since only one observation per firm is available per year, I use the maximum *CLDA* in the last three years (instead of the mean plus two standard deviations) as a proxy for flexibility limit. Flexibility used, proxied by *CLDA*, is then subtracted from this flexibility limit to derive the flexibility available in the fourth quarter. Results of the tests are presented in Table 4 Panel D. As shown in Panel D, after adjusting for the difference in the flexibility limit in the fourth quarter, the operating cycle flexibility has a significant impact on the probability of missing analysts' forecasts. One standard deviation change in the cross-sectional operating cycle flexibility decreases the probability of missing analysts' forecast by -0.0222 whereas that of the time-series operating cycle flexibility decreases the probability by -0.0151. Comparing these results to those reported in Table 4 Panel B & C shows that the impact of one standard deviation increase in flexibility on the probability of missing analysts' forecasts in the fourth quarter is similar in magnitude to that in the first three quarters.[24]

7.3 Control for Performance in Prior Quarters

Since the flexibility measures are closely tied to prior performance, the significant impact of flexibility on the probability of missing analysts' forecasts reported in the previous sections can simply be driven by the firm's past performance. I rerun the above test after controlling for the firm's ROA in the prior eight quarters. Results in Table 5 show that all the flexibility proxies continue to have a significant impact on the probability of missing analysts' forecasts. However, while the impact of one standard deviation change in the cross-sectional (time-series) operating-cycle

---

[24] I have also analyzed the fourth-quarter effect on firms with December year end only. Results are similar to those reported in Table 4.

flexibility measures increases from -0.011 (-0.0116) in the analysis without performance control (Table 3) to -0.0186 (-0.0176) in the analysis with performance control (Table 5), that of Barton and Simko's measure actually decreases from 0.023 (Table 3) to 0.0131 (Table 5). One possible explanation for this drop is that part of the correlation between Barton and Simko's measure and the probability of missing analysts' forecasts is driven by a firm's prior performance, rather than earnings management. As for the impact of prior period performance, the first two lags and the fourth lag of ROAs have a significantly negative correlation with the probability of missing analysts' forecasts.[25]

7.4 Alternative Proxies for Expected Growth in Subsequent Quarters

My proxy for the limits of flexibility has a significant (although low) correlation with both the firm's growth in the past five years and the firm's expected growth. Since a firm's growth can affect its probability of missing analysts' forecasts, the above documented relations between flexibility and the probability can be spurious.

To analyze whether the negative and significant coefficient of my flexibility measures in the above probit analysis is driven solely by the firm's growth, I use alternative proxies for expected growth: the firm's actual growth in the following year

---

[25] I also perform the analysis using flexibility measures constructed using discretionary accruals estimated by the performance-matched model [Kothari, Leone, and Wasley (2002)]. As expected, the correlation between flexibility and probability of missing analysts' forecasts is weaker but the coefficient of the quintile-ranked flexibility measure continues to be negative and significant. Accordingly, a firm's flexibility has incremental impact on its probability of missing analyst's forecast after controlling for its past performance.

(*Growth*), the firm's sales growth in the prior five years (*Past_growth*) and analysts' expected long-term growth (*Lt_growth*) in the sensitivity check. Results in Table 6 show that even after controlling for the firm's growth, regardless of the proxies used, the operating cycle flexibility measures continue to have a significant impact on the probability of missing analysts' forecasts. One standard deviation increase in the cross-sectional (time-series) operating cycle flexibility measure decreases the probability of missing analysts' forecasts by -0.0155 (-0.0161).

Second, I run the regression using the detrended flexibility measure (i.e. flexibility measure stripped of any time trend). Increase in flexibility caused by the growth of firms in the past can be captured by the time trend. Hence, the detrended flexibility measure can minimize the effect of the firm's growth. Untabulated results indicate that this detrended measure continues to have a significant impact on the probability of missing analysts' forecasts. I also perform the probit analysis with the standardized difference of the flexibility measure (i.e. the difference between the flexibility measure and its mean in the prior three years and deflated by its standard deviation in those three years). The tenor of the results does not change.

Third, I use the firm's lagged current assets to total assets ratio as proxy for the flexibility limit. Burgstahler and Dichev (1997) suggest that the standardized level of a firm's current assets measures the flexibility limit and the costs of earnings management the firm faces. I include lagged current assets standardized by lagged total assets (*Flex_lim*) and cumulative discretionary accruals from prior quarters

(*CLDA*) in the probit analysis as proxies for flexibility limits and the flexibility used, respectively.

When the cross-sectional operating cycle flexibility measure is used (the first three columns in Table 7), the coefficient of the lagged current assets deflated by total assets (*Flex_lim*) is -0.124 (the effect of one standard deviation change is -0.01) while that of cumulative discretionary accruals (*CLDA*) is 1.82 (the effect of one standard deviation change is 0.04). Both are statistically significant. Results for the time-series operating cycle flexibility measure are similar. These results suggest that the probability of missing analysts' forecasts increases with the flexibility limit of the firm and decreases with the flexibility used in prior quarters. All these results suggest that, although the limits of flexibility depend on a firm's growth phase, the significant impact of flexibility on the financial reporting strategies is not solely driven by the firm's growth.

7.5 Examining the Impact of Flexibility Limit and Flexibility Used Separately

In the above tests I examine the impact of flexibility *available* on a firm's financial reporting strategy. Since the previous literature focuses on the impact of flexibility used, I analyze the impact of flexibility limit and flexibility used separately in this section. Table 8 columns 1-3 present the results of the cross-sectional operating cycle flexibility while columns 4-6 present those of the time-series operating cycle flexibility measure. Consistent with results in Barton and Simko (2002) and Kasznik (1999), the flexibility used (*CLDA*) has a significant positive impact on a firm's probability of missing analysts' forecasts. The effect of one standard deviation increase in cross-sectional (time-series) operating flexibility used (*CLDA*) on the probability is 0.0311 (0.0345). However, the flexibility limit (*Max_flex*) does not have any significant impact on the probability of missing analysts' forecasts.

One potential reason for these results is that firms with pre-managed earnings above analysts' forecasts do not have to manage earnings to meet the analysts' forecasts. Hence, the flexibility limit is not binding for this group of firms, and thus, has no significant impact on the probability of missing analysts' forecast. Nevertheless, the reversal of prior earnings management affects all firms' probabilities of missing analysts' forecasts. Thus, the flexibility used has a significant negative impact in the above analysis.

To increase the power of the test on the impact of the flexibility limit (*Max_flex*), I exclude those firm-quarters with pre-managed earnings that meet/beat the analysts' forecasts from the sample. As the results in columns 7-12 show, the flexibility limit has a significantly negative impact on the probability of missing analyst's forecasts of this sub-sample. A one standard deviation increase in the cross-sectional (time-series) operating cycle flexibility limit (*Max_flex*) decreases the probability by -0.0088 (-0.0163). Flexibility used (*CLDA*) continues to have a significantly positive impact on the probability of missing forecasts in this sub-sample.

7.6 Incremental impact of the cross-sectional operating cycle flexibility measure

The above results confirm that both the operating cycle flexibility measure and Barton and Simko's measure affect the probability of missing analysts' forecasts. In this subsection, I test whether the operating cycle flexibility measure provides any incremental information to that of Barton and Simko by including both measures in the same probit analysis.

Results in Table 9 show that the operating cycle flexibility measures have incremental explanatory power to that of Barton and Simko. Both the operating cycle flexibility measures and Barton and Simko's measure continue to have a significant effect on the probability of missing analysts' forecasts. The effect of one standard deviation change in the cross-sectional (time-series) flexibility measure is -0.0181 (-0.0148). Both are significant at the 0.01 level. One standard deviation increase in Barton and Simko's measure increases the probability of missing forecasts by 0.0181 (for probit analysis including cross-sectional flexibility measure) and 0.0208 (for probit analysis including time-series flexibility measure). These results confirm that while both the operating cycle flexibility measures and Barton and Simko's measure try to capture the earnings management flexibility, the measures differ, at least in part, on what they capture.

7.7 Industry-adjusted flexibility measure

One potential explanation for the significance of Barton and Simko's measure is that it captures the industry effect in asset turnover ratio and not a firm's flexibility used in prior periods. To further explore this issue, I calculate the deviation of both Barton and Simko's flexibility measure and the operating cycle flexibility measures from their industry mean respectively. Then I use these deviations in the probit analysis.

Results in Table 10 show that the coefficients of the industry-adjusted Barton and Simko's measure no longer has a significant impact on the probability of missing forecasts whereas a standard deviation change in the industry-adjusted cross-sectional (time-series) operating cycle flexibility continues to have a significant -0.0135 (-0.0111) impact on the probability of missing analysts' forecasts. These results suggest that Barton and Simko's flexibility measure probably picks up the variation in asset turnover ratios across industries rather than the firm's earnings management flexibility.[26]

7.8 Flexibility Measure based on Industry Flexibility Limit

In most of the above tests, I use the range of a firm's cumulative lagged discretionary accruals in prior periods as a proxy for the flexibility limit. However, in addition to a comparison with the firm's prior practices, auditors are likely to identify any significant deviation from the industry practice as red flags. Also, by using a firm's prior practice as a benchmark, I assume that firms that have managed earnings to a greater extent in prior quarters have greater flexibility in the current quarter, which is not necessarily true. Thus, in addition to using a firm's own range of

[26] Barton and Simko's measure can be capturing the variation in flexibility across industries but not the flexibility across firms in the same industry.

cumulative lagged discretionary accruals in prior periods as a proxy for flexibility limit, I compute the industry mean (median) of the flexibility limit and use this as a proxy for the flexibility limit of all firms in the same two-digit SIC code and quarter.[27] Untabulated results show that the flexibility measure constructed this way continues to have a significant impact on a firm's probability of missing analysts' forecasts.

7.9 Combined Measure of Flexibility and Growth

As discussed in Section 4.2, a firm's growth rate likely has an impact on its available earnings management flexibility. In the previous sections, I have included the proxies for flexibility available and growth rate as distinct variables. In this section, I attempt to combine the two measures by factor analysis. Specifically, I construct a factor that captures the underlying common factor of both the operating cycle flexibility measure and lagged market-to-book ratio. Untabulated results show that, without (with) control for lagged performance, one standard deviation increase in the factor causes a decrease of -0.012 (-0.014) in the probability of missing analysts' forecasts, significant at 0.01 level. McFadden R^2 of the analysis is 0.016 (0.038).

[27] An alternative way to construct the industry flexibility limit is to first compute the mean and standard deviation of the cumulative lagged discretionary accruals of the industry, and then calculate the upper flexibility limit as the mean plus two standard deviations. The results are similar to those reported above.

7.10 Combined Measure of Flexibility and Pre-managed earnings surprise

A firm's probability of missing analysts' forecast depends on whether it has enough flexibility to cover the negative pre-managed earnings surprise. In this section, instead of examining the effect of flexibility and pre-managed earnings change separately, I construct a measure that captures whether a firm would be able to meet the analysts' forecast based on its flexibility available and pre-managed earnings surprise. First, I compute the pre-managed earnings surprise using reported earnings stripped of discretionary accruals less the consensus analysts' forecasts (i.e. $RE_t - DA_t - Forecast_t$). Then I compare these pre-managed earnings surprises with the flexibility available[28] [i.e. $Est\_meet = Flex_t + (RE_t - DA_t - Forecast_t)$]. If the flexibility is large enough to cover up the pre-managed negative surprises (i.e. if *Est_meet* is non-negative), the variable *Pmeet* takes a value of 1. Otherwise, *Pmeet* assumes a value of 0.

I rerun the probit analysis, replacing *Op_flex* and *Pre_surp* with *Pmeet* as the independent variable. Results in Table 11 show that as expected, *Pmeet* has a significantly negative impact on the probability of missing analysts' forecasts. The coefficient of *Pmeet* constructed using the cross-sectional (time-series) operating cycle flexibility is -0.415 (-0.620) and is significant at 0.01 level. Since *Pmeet* is a dummy variable, I do not report the impact of a one standard deviation change in *Pmeet*. Instead, the change in the probability of missing forecasts when *Pmeet* is 1 versus that when *Pmeet* equals 0 is reported. The effect of *Pmeet* on the probability

[28] The flexibility measure is converted into dollars per share by first multiplying the measure by the amount of total assets and then divided by the number of shares outstanding.

of missing analysts' forecasts is -0.1630 (-0.2440) for the cross-sectional (time-series) operating cycle flexibility.[29]

7.11 Reversal rate estimated by the autoregression of total accruals

In the prior analysis, the reversal rate of accruals is estimated by the operating cycle. While the operating cycle captures the reversal rate of current accruals, it does not reflect that of long-term accruals. An alternative proxy for the reversal rate, which captures the reversal rate of both working capital and long-term accruals, is to compute the autocorrelation between accruals.[30] Specifically, I regress the total accruals of firm i in quarter t (TA_{it}) on lagged total accruals:

$$TA_{it} = \sum_{k=1}^{N} \delta_1 TA_{i,t-k} + \varepsilon_{it} . \qquad (6)$$

Coefficients on the lagged accruals are then examined. The index k of the longest lagged accruals that have a significant negative correlation with current accruals is assumed to represent the average reversal rate of the firm's accruals. For example, if the coefficients of TA_{t-1}, TA_{t-2}, and TA_{t-3} are negative and statistically significant but that of TA_{t-4} is insignificant, then I assume the reversal rate of the firm's accruals to

[29] It should be noted that the result in this section can be driven by the mechanical relation between the pre-managed earnings surprise portion of *Pmeet* and the dependent variable.

[30] In addition to computing an alternative proxy for the reversal rate of accruals, I also compute the flexibility measure using working capital discretionary accruals only. The working capital discretionary accruals are computed as:

$$\frac{\Delta WC_t}{TAsset_{t-1}} = \frac{\alpha}{TAsset_{t-1}} + \beta_1 \frac{\Delta Sales_t}{TAsset_{t-1}} + \beta_2 SG_t + \beta_3 Divid_t + \varepsilon_t ;$$

where ΔWC_t = change in working capital.

The flexibility based on the working capital discretionary accruals is then constructed in the same way as that based on total discretionary accruals. Untabulated results show that the tenor of the results do not change.

be three quarters. The reversal rate of firm i in quarter t is based on the average reversal rate, estimated on a quarterly basis, in the five-year period prior to quarter t. I use total accruals instead of discretionary accruals in estimating the reversal rate because both discretionary and nondiscretionary accruals have to reverse. Using total accruals can reduce the noise caused by the estimation error in discretionary accruals. The mean time-series reversal rate is four quarters and the standard deviation is two quarters.

One main difference between the time-series autoregression reversal rate and the operating cycle reversal rate is the time-series reversal rate captures mainly the impact of discretionary accruals reversing in the quarter whereas the operating-cycle flexibility includes the impact of both unreversed discretionary accruals and discretionary accruals reversal in the quarter. The impact of those unreversed discretionary accruals will be captured in the time-series autoregression reversal rate only if the flexibility constraints are binding in the estimation period.

After computing the reversal rate, I calculate a weighted-average cumulative lagged discretionary accruals at the beginning of quarter t using the estimated coefficients from equation (6) as weights. Assuming a reversal rate of three quarters, the weighted-average cumulative lagged discretionary accruals at t equal $CLDA_t = \delta_1 DA_{t-1} + \delta_2 DA_{t-2} + \delta_3 DA_{t-3}$. The flexibility available in quarter t is then computed in the same way as in Section 3.3. Due to the longer time-series of data required, the size of the time-series reversal sample is much smaller and comprises only 380 firm quarters in 1997-2001.[31] The time-series flexibility measure has a significant positive 0.5 correlation with the cross-sectional operating cycle flexibility measure.

When the probit analysis of the probability of missing analysts' forecasts is repeated with the time-series flexibility measure, the coefficients of the flexibility measures are no longer significant (Table 12 Panel A). Due to the smaller sample size, the time-series reversal rate is estimated with relatively large errors. To reduce the impact of the estimation errors, I rerun the probit regression with ranked flexibility measures. I rank the sample firm-quarters into five groups by their flexibility available. Panel B shows the results when these quintile-ranked flexibility measures are used. Results show that the quintile-ranked flexibility measures are negatively (the effect of one standard deviation change in flexibility -0.0737) and significantly correlated with the probability of missing analysts' forecasts. A sensitivity check using the decile-ranked flexibility measures is performed and the results are qualitatively the same.

7.12 Excluding stale forecasts from analysts' forecasts

The above analyses are based on the mean consensus forecast reported in I/B/E/S summary tape, which can include stale forecasts. Previous studies show that

---

[31] For the time-series reversal rate sample, assuming a maximum reversal period of two years (i.e., mean plus two standard deviation of the reversal rate), at least seven years of accruals data are required to compute the cumulative lagged discretionary accruals (because the reversal rate is proxied by the average autoregression rate of accruals in the prior five years). Hence, the first year with the cumulative lagged discretionary accruals data is 1994. Since three years data on the cumulative lagged discretionary accruals are required to compute the flexibility boundaries, the first year when the flexibility boundary information is available is 1997.

consensus forecasts constructed from more recent individual forecasts are more accurate than the consensus forecast reported in I/B/E/S (O'Brien, 1988). Hence, I reconstruct the consensus forecasts by excluding individual analysts' forecasts that are issued ninety days before the earnings announcement day. I then compute the mean of these more recent individual forecasts and use this mean consensus forecast in the probit analysis of the impact of earnings management flexibility. In addition, I exclude those analysts' forecasts that are issued before earnings announcement of the current quarter in constructing the expected earnings change (*Exp_sur*). Untabulated results show that the inferences in the previous sections are insensitive to these changes.

8. Conclusion

This study examines the impact of prior earnings management on the current earnings management flexibility and the effect of this flexibility on a firm's financial reporting strategy. Because the costs of earnings management beyond GAAP are prohibitively high, the discretion in reporting earnings is constrained. While Barton and Simko (2002) and Kasznik (1999) also examine the impact of flexibility, they focus on the impact of prior earnings management. This paper proposes and shows that the limits of the allowable set of accruals, in addition to prior earnings management practices, affects earnings management flexibility.

This paper first discusses the three different effects of prior earnings management on current flexibility: the reversal, the constraint, and the ratchet effects. Second, results of the empirical tests show that a firm's ability to meet/beat analysts' forecasts is constrained by its flexibility. Specifically, I find a negative correlation between a firm's probability of missing analysts' forecast and its flexibility. This negative correlation remains significant after controlling for the firm's past performance, past growth, and expected growth. When the impact of the flexibility limit and prior earnings management practices is examined separately, prior earnings management practices have a significant impact on the probability of missing analysts' forecast. However, the impact of the flexibility limit is significant only for those firms with pre-managed earnings below the analysts' forecasts.

By providing evidence that earnings management flexibility affects a firm's financial reporting strategy, these results suggest that prior studies on the relation between managers' incentives to manage earnings and the observed outcome of earnings management can suffer from the omitted variable (i.e., earnings management flexibility) problem. Future studies on earnings management can benefit by taking into account the evidence provided herein that flexibility appears to constrain the manager's ability to manage earnings. In cases where the manager has strong incentives to manage earnings but due to the flexibility constraint cannot manage earnings successfully, one may observe no earnings management. Accounting for the impact of flexibility can improve the power of the incentive test in these cases. Including the flexibility measure in earnings management studies can also tell us the extent of earnings management that firms can undertake.

Results of this study show that earnings management flexibility affects a firm's financial reporting strategy, and hence reported earnings. Since the manager's compensation is tied to the reported earnings of the firm, it would be interesting to examine whether the compensation committee accounts for this difference in the manager's discretion when setting the compensation policy. Results of the test can help us better understand the determinants of the compensation policy. Another interesting issue is to examine whether the market or analysts accounts for the difference in earnings management flexibility in reaction to earnings disclosures.

Reference:

Abarbanell, J., Lehavy, R., 2002. Biased forecasts or biased earnings? The role of earnings management in explaining apparent optimism and inefficiency in analysts' earnings forecasts. *Working paper, University of Michigan.*

Anthony, J. and Ramesh, K., 1992. Association between accounting performance measures and stock prices: a test of the life cycle hypothesis. *Journal of Accounting and Economics* 15: 203-227.

Barton, J., Simko, P., 2002. The balance sheet as an earnings management constraint. *Accounting Review* 77, 1-27.

Bureau of Economic Analysis (2002). National accounts data from http://www.bea.doc.gov.

Bureau of Labor Statistics (2002). Consumer price indexes program from http://www.bls.gov/home.htm.

Burgstahler, D., Dichev, I., 1997. Earnings management to avoid earnings decreases and losses. *Journal of Accounitng & Economics* 24, 99-126.

Business Wire, 2002. Law offices of Marc S. Henzel announces class action lawsuit against Amdocs Limited. August 2, 2002.

Collins, D., Hribar, P., 2001. Earnings-based and accrual-based market anomalies: One effect or two? *Journal of Accounting and Economics* 29:101-123.

Dechow, P., 1994. Accounting earnings and cash flows as measures of firm performance. The role of accounting accruals. *Journal of Accounting and Economics* 18: 3-42.

Dechow, P., Sloan, R., Sweeney, A., 1996. Causes and consequences of earnings manipulation: an analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research* 13, 235-250.

Defond, M., Jiambalvo, J., 1994. Debt covenant violation and manipulation of accruals. *Journal of Accounting & Economics* 17, 145-176.

Defond, M., Park, C., 1997. Smoothing income in anticipation of future earnings. *Journal of Accounting & Economics* 23, 115-139.

Degeorge, F., Patel, J., *Zeckhauser, R., 1999. Earnings management to exceed thresholds. The* Journal of Business 72, 1-33.

Elgers, P., Pfeiffer, R., and Porter, S., 2000. Anticipatory income smoothing: A re-examination. *Working paper, University of Massachusetts.*

Erickson, M., Wang, S., 1999. Earnings management by acquiring firms in stock for stock merger. *Journal of Accounting & Economics* 27, 149-176.

Francis, J.R., Maydew, E., Sparks, H., 1999. The role of Big 6 auditors in the credible reporting of accruals. *Auditing* 18:17-34.

Fudenberg, D., Tirole, J., 1995. A theory of income and dividend smoothing based on incumbency rents. *Journal of Political Economy* 103: 75-93.

Guidry, F., Leone, A., Rock, S., 1999. Earnings-based bonus plans and earnings management by business unit managers. *Journal of Accounting and Economics* 26: 113-142.

Hayn, C., Narayanamoorthy, G., Watts. R., 2001. How and why fourth quarter earnings differ from interim quarter earnings? *Working paper*.

Healy, P., 1985. The effect of bonus schemes on accounting decisions. *Journal of Accounting & Economics* 7, 85-113.

Hribar, P., 2000. The market pricing of components of accruals. *Working paper, Cornell University*.

Kasznik, R., 1999. On the association between voluntary disclosure and earnings management. *Journal of Accounting Research* 31, 57-81.

Kothari, S.P., Leone, A., Wasley, C., 2002. Performance matched discretionary accrual measures. *Working paper, University of Rochester*.

Leone, A., Rock, S., 2002. Empirical tests of budget ratcheting and its effect of managers' discretionary accrual choices. *Journal of Accounting and Economics* 33: 43-76.

Lev, B., Thiagarajan, R., 1993. Fundamental information analysis. *Journal of Accounting Research* 31: 190-215.

Levitt, A., 2000. Testimony concerning Commission's auditor independence proposal before the Senate Subcommittee on Securities Committee on Banking,

Housing, and Urban Affairs. September 28.
http://www.sec.gov/news/testmony/ts152000.htm .

Matsumoto, D. 2002. Management's incentives to avoid negative earnings surprises. *The Accounting Review* 77: 483-514.

McCulloch, B. 1998. Multi-period incentives and alternative dials for earnings management. *Working paper, New Zealand Treasury.*

McNamee, M., Dwyer, C., Schmitt, C.H., Lavelle, L., 2000. Accounting wars: powerful auditor-consultants are the targets of Arthur Levitt's crusade. *Business Week Online*, September 25.

Mendenhall, R., Nichols, W., 1988. Bad news and differential market reactions to announcements of earlier-quarters versus fourth-quarter earnings. *Journal of Accounting Research* 26: 63-86.

Murphy, K., 2000. Performance standards in incentive contracts. *Journal of Accounting and Economics*, 30: 245-278.

O'Brien, P., 1988. Analysts' forecasts as earnings expectations. *Journal of Accounting and Economics*, 10: 53-83.

Palmrose Z., Richardson, V., Scholz, S., 2001. Determinants of market reactions to restatement announcements. *Working paper, University of Southern California.*

Roychowdhury S., 2003. Management of earnings through the manipulation of real activities that affect cash flow from operations. *Working paper, University of Rochester*.

Sloan R., 1993. Accounting earnings and top executive compensation. *Journal of Accounting and Economics* 16: 55-100.

Smith R., Lipin S., Naj A.K., 1994. Managing profits: how General Electric damps fluctuations in its annual earnings—it offsets one-time gains with write-offs, times asset purchases and sales—accounting for RCA deal. *The Wall Street Journal*, November 3, 1994. A1.

Sweeney, A.P., 1994. Debt-covenant violations and managers' accounting responses. *Journal of Accounting & Economics* 17, 281-308.

Teoh S.H., Welch, I., Wong, T.J., 1998a. Earnings management and the long-run market performance of initial public offerings. *The Journal of Finance* 53: 1935-1974.

Teoh S.H., Welch, I., Wong, T.J., 1998b. Earnings management and the underperformance of seasoned equity offerings. *Journal of Financial Economics* 50: 63-99.

Wilke, J., 1994. PerSeptive restates its results for much of past 2 fiscal years—losses are widened sharply on reversal of sales; share price slides 36%. *The Wall Street Journal*, December 28, 1994

Appendix 1 Definition of variables used in the empirical tests

This table provides a detailed description of the variables used in the probit analysis in the paper.

Variables	Definition
$miss_{it}$	equals 1 if firm i misses the mean consensus analysts' forecast in quarter t. A firm misses the consensus analysts' forecast[32] if the difference between the actual earnings per share and the last consensus analysts' forecast before earnings announcement (both retrieved from I/B/E/S summary tape) is negative;
$Flex_{it}$	flexibility proxy. Two different proxies are used in the test: (i) lagged net operating asset flexibility deflated by sales (*lnoa*). This flexibility is constructed as in Barton and Simko (2002). Net operating assets are defined as shareholders' equity less cash and marketable securities, plus debt. The net operating assets are then deflated by sales to get lnoa. The higher the net operating assets deflated by sales, the lower the flexibility; (ii) operating cycle flexibility (*Op_flex*), which is calculated as the upper flexibility bound less the sum of discretionary accruals cumulated over Q_i quarters, where Q_i is the number of quarters in the firm's operating cycle. The firm's operating cycle is computed as : $Operating\ cycle = (\frac{Avg\ A/R}{Sales} + \frac{Avg\ Inventory}{Cost\ of\ goods\ sold} - \frac{Avg\ A/P}{Cost\ of\ goods\ Sold}) * 90$ The operating cycle is computed cross-sectionally. Firms in the same two-digit SIC codes and the same quarter are grouped together to compute the average operating cycle. This average operating cycle is used as a proxy for the reversal rate for all firms in that industry-quarter. Assuming that the operating cycle is 3 quarters, the cumulative lagged discretionary accruals (*CLDA*) is calculated as: $CLDA_t = DA_{t-1} + DA_{t-2} + DA_{t-3}$.

[32] The consensus analysts' forecast is computed as the arithmetic average of all outstanding estimates for the quarter.

	The upper flexibility limit is then calculated as the mean of the cumulative lagged discretionary accruals over the prior three years ($\overline{CLDA}$) plus two times the standard deviation of these lagged accruals ($\sigma(CLDA)$). That is, $Upper\ Flexibility\ Limit = \overline{CLDA} + 2\sigma(CLDA)$. The discretionary accruals used to construct *Op_flex* are estimated cross-sectionally by equation (3);
Pre_surp_{it}	pre-managed earnings change of the current quarter. The pre-managed earnings of a quarter are defined as the reported earnings less the discretionary accruals estimated by equation (3), depending on the flexibility measure used. The pre-managed earnings change is then calculated as the difference between the current pre-managed earnings and the reported earnings of the same quarter last year[33] [i.e., $(RE_t\text{-}DA_t\text{-}RE_{t-4})$];
Exp_sur_{it}	expected future earnings change. This expected earnings change is measured by subtracting the current reported earnings from the expected earnings of the same quarter of the following year, t+4 [i.e., $(E[TE_{t+4}]\text{-}RE_t)$]. The expected earnings are proxied by the first consensus analysts' forecast of t+4 released after the earnings announcement of t;
ΔGNP_t	percentage change in real gross national product;
ΔCPI_t	percentage change in consumer price index;
lpb_{it}	lagged market to book ratio.[34]

[33] The reported earnings, rather than the pre-managed earnings, of the same quarter last year is used in the computation of the change because the reported earnings are what the market observes and uses as the benchmark for evaluating current performance.
[34] I also run the test using contemporaneous market-to-book ratio and the results remain qualitatively the same.

Table 1 Descriptive Statistics for Sample firms

Panel A Comparison of firm characteristics between firms with the lowest earnings management flexibility vs. those with the highest flexibility

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	All firms			Firms in lowest flexibility quintile			Firms in highest flexibility quintile				
	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation	t-test	Wilcoxon z-statistic
Flexibility available (Op_flex)	0.072	0.051	0.085	0.019	0.021	0.040	0.188	0.161	0.113	-89.41	-76.06
Flexibility limit (Max_flex)	0.072	0.055	0.071	0.052	0.045	0.042	0.148	0.129	0.103	-54.84	-58.59
Flexibility used in prior periods (CLDA)	0	0	0.052	0.034	0.023	0.051	0.039	0.028	0.073	-51.85	-53.57
Lagged NOA	2.849	2.180	2.890	2.833	2.204	3.176	2.413	1.857	2.644	6.45	13.79
Lagged change in total accruals	-0.001	0	0.049	0.013	0.007	0.046	-0.018	-0.012	0.075	22.04	28.35
Total assets at beginning of qtr (in $ millions)	4935	980	16102	4426	963	13474	2543	510	14016	6.15	16.60
Lagged mkt-to-bk	2.995	2.432	15.850	3.335	2.71	10.44	3.24	2.47	22.44	0.24	5.28
Operating cycle (no. of quarters)	1.646	2	1.191	2.071	2	1.258	1.867	2	1.181	7.52	8.68
Avg growth in sales in past 5 years	0.197	0.115	0.510	0.192	0.119	0.378	0.247	0.142	0.685	-4.47	-6.36
Avg dividend payout ratio in past 5 years	0.335	0.084	3.338	0.426	0.078	4.080	0.313	0	2.572	1.50	8.54
Total accruals (deflated by lagged total assets)	-0.0131	-0.0122	0.0419	-0.013	-0.011	0.038	-0.010	-0.010	0.058	-2.50	-3.05
Discretionary accruals (DA_adjusted) (deflated by lagged total assets)	-0.0002	0.001	0.042	-0.002	0	0.039	0.001	0.003	0.057	-2.34	-3.67
Change in pre-managed earnings	-0.001	-0.002	0.046	-0.0009	-0.002	0.041	-0.001	-0.005	0.069	0.18	3.08
Estimated % firms meeting/beating analysts' forecasts	91%	100%	28%	75.89%	100%	43%	99.95%	100%	2%	-35.83	-33.02
Actual % firms meeting/beating analysts' forecasts	61%	100%	49%	62%	100%	49%	62%	100%	49%	0.21	0.21
Actual forecast error	-0.008	0	0.113	-0.011	0	0.108	-0.006	0.002	0.117	-2.22	-3.14
ROA	0.014	0.015	0.032	0.015	0.016	0.029	0.011	0.015	0.045	4.20	3.80

where

Op_flex = The cross-sectional operating cycle flexibility, which is calculated as the upper flexibility bound (Max_flex) less the sum of discretionary accruals cumulated over Q_i quarters (CLDA), where Q_i is the number of quarters in the firm's operating cycle (computed cross-sectionally). The discretionary accruals used to construct *Op_flex* are thoses estimated by Equation 3 in the paper;

Max_flex = The upper flexibility bound, which is calculated as the mean of the cumulative lagged discretionary accruals over the prior three years plus two times the standard deviations of these lagged accruals;

CLDA = Flexibility used to manage earnings in the prior quarters. It is calculated as the sum of discretionary accruals cumulated over Q_i quarters (p_flex), where Q_i is the number of quarters in the firm's operating cycle;

Lagged NOA = lagged net operating assets deflated by sales. Net operating assets are defined as shareholders' equity less cash and marketable securities, plus debt;

Lagged change in total accruals = the difference between the total accruals of this quarter and those of the same quarter last year;

Operating cycle = operating cycle estimated cross-sectionally for each industry-quarter. Industry is defined by the two-digit SIC code. The operating cycle is computed as the number of days in inventory + number of days in accounts receivable – number of days in accounts payable. That is,

$$Operating\ cycle = \left(\frac{Avg\ A/R}{Sales} + \frac{Avg\ Inventory}{Cost\ of\ goods\ sold} - \frac{Avg\ A/P}{Cost\ of\ goods\ Sold}\right) * 365\ ;$$

DA_adjusted = discretionary accruals estimated using the following equation:

$$\frac{TA_t}{TAsset_{t-1}} = \frac{\alpha}{TAsset_{t-1}} + \beta_1 \frac{\Delta Sales_t}{TAsset_{t-1}} + \beta_2 \frac{PPE_t}{TAsset_{t-1}} + \beta_3 SG_t + \beta_4 Divid_t + \varepsilon_t \quad \text{(Equation 3 in the paper);}$$

Change in pre-managed earnings = the difference between pre-managed earnings of this quarter and those of the same quarter last year. Pre-managed earnings are calculated as reported earnings less discretionary accruals;

Estimated % firms meeting/beating analysts forecasts = an estimation of % of firms able to meet/beat analysts' forecasts based on the pre-managed earnings surprise (i.e. reported earnings – DA_adjusted – analysts' forecast) and the flexibility available. It is predicted that firms with positive pre-managed surprise will be able to beat/meet the analysts' forecast. For firms with negative pre-managed surprise, if the flexibility available is greater than or equal to the pre-managed earnings surprise, then the firm is predicted to be able to meet/beat the analysts' forecast. Otherwise, it is predicted that the firm will not be able to meet the forecast;

Actual % firms meeting/beating analysts' forecasts = % of sample firm-quarters that reported earnings equal to or above the last consensus analysts' forecast observed before earnings announcement;

Actual forecast error = the difference between reported earnings and the last consensus analysts' forecast observed before earnings announcement;

ROA= reported earnings deflated by total assets at the beginning of the quarter.

Table 1 Descriptive Statistics for Sample firms (cont'd)

Panel B: Summary Statistics of Flexibility Limit across SIC sectors

This panel presents the mean and median of the upper flexibility limit, which is computed as the mean of the cumulative lagged discretionary accruals (CLDA) over the prior three years plus two times the standard deviations of these lagged accruals (all deflated by total assets), in different industry sectors as defined by SIC. The cumulative lagged discretionary accruals are computed as the sum of unreversed accruals at the beginning of the quarter. Also presented is the mean of the standard deviation of discretionary accruals (estimated by the cross-sectional Jones model) and that of total accruals. The grouping of firms into the different sectors is provided at the end of this table.

SIC Sector	Mean of flex limit	Median of flex limit	Std deviation of flex limit	Mean operating cycle (no. of qtrs)	$\overline{CLDA}$	Mean $\sigma(CLDA)$	Std deviation of $\sigma(CLDA)$	$\sigma(DA)$	σ(Total accruals)
Transportation, Communications, Electric, Gas, and Sanitary Services	0.027	0.014	0.041	0.59	0.002	0.014	0.023	0.044	0.031
Finance, Insurance, and Real Estate	0.054	0.033	0.067	1.64	-0.001	0.027	0.025	0.036	0.034
Retail Trade	0.066	0.050	0.071	0.62	-0.002	0.032	0.035	0.047	0.061
Services	0.072	0.048	0.104	0.98	0.005	0.039	0.058	0.068	0.071
Manufacturing	0.089	0.067	0.084	1.93	-0.001	0.044	0.043	0.048	0.048
Agriculture, Forestry, and Fishing	0.099	0.053	0.119	4.39	0.021	0.060	0.044	0.100	0.111
Wholesale Trade	0.108	0.088	0.095	1.56	-0.005	0.052	0.047	0.061	0.065
Mining	0.112	0.089	0.090	2.95	-0.007	0.052	0.044	0.049	0.050
Construction	0.122	0.113	0.108	2.25	-0.013	0.055	0.057	0.047	0.048

Definition of SIC sectors:

Agriculture, Forestry, and Fishing:	SIC 0100-0900;	Mining:	SIC 1000-1400;
Construction:	SIC 1500-1700;	Manufacturing:	SIC 2000-3900;
Transportation, Communications, Electric, Gas, and Sanitary Services:	SIC 4000-4900;	Wholesale Trade:	SIC 5000-5100;
Retail Trade:	SIC 5200-5900;	Finance, Insurance, and Real Estate:	SIC 6000-6700;
Services:	SIC 7000-8800.		

Table 2 Summary Statistics and Correlation Matrix for Variables in the Earnings Surprise Test

This table presents the summary statistics of the 17,429 sample firm-quarters used in the analysts' forecast tests (i.e., analysis in Section 6). Firm-quarters are required to have the consensus analysts' forecast for the sample quarter and for the same quarter next year. Panel A presents the descriptive statistics for those firm-quarters with all the required data. Panel A columns 2-3 present the statistics for firm-quarters that meet/beat analysts' forecasts while columns 4-5 present those for firm-quarters that miss the analysts' forecasts. Column 6 presents the t-statistics for the difference between the firm-quarters that meet/beat forecasts and those that miss the forecasts. Column 7 presents the Wilcoxon z-statistics for the difference. Panel B presents the correlation matrix between the variables.

Panel A: Comparison of the characteristics of firms that meet/beat analysts' forecasts vs. those of firms that miss the forecasts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Firm-quarters meeting/beating forecasts (61% of sample)			Firm-quarters missing forecasts (39% of sample)				Wilcoxon
	Mean	Median	Std deviation	Mean	Median	Std deviation	t-test	z-statistic
Exp_sur	0.01	0.03	0.22	0.05	0.04	0.27	-10.01	-13.76
Pre-managed ROA	0.00	0.00	0.05	-0.01	-0.01	0.04	15.71	18.59
Total assets at beginning of qtr	5171	1003	17258	4564	946	14077	2.72	1.13
Lagged net operating assets deflated by sales	2.77	2.10	2.98	2.98	2.33	2.74	-5.12	-11.03
Operating cycle (no. of quarters)	1.66	2.00	1.19	1.62	1.00	1.20	2.31	4.05
Op_flex	0.073	0.05	0.09	0.0696	0.05	0.08	2.93	4.52
Max_flex	0.072	0.055	0.072	0.072	0.054	0.070	-0.16	0.47
used_flex	-0.001	0.0	0.05	0.003	0.0	0.05	-5.02	-6.07
Market-to-book ratio	3.20	2.59	18.23	2.67	2.20	11.09	2.53	17.77
% change in GNP	0.034	0.041	0.01	0.033	0.041	0.02	7.31	7.67
% change in CPI	0.0182	0.019	0.00	0.0185	0.019	0.00	-4.69	-6.16

Table 2 Summary Statistics and Correlation Matrix for Variables in the Earnings Surprise Test (cont'd)

Panel B: Correlations among variables for the earnings surprise test (Pearson: above the diagonal, Spearman: below the diagonal)

	Exp_sur	Pre-managed ROA	Forecast error	Op_flex	Max_flex	used_flex	Lagged NOA	Lagged mkt-to-bk	%ΔGNP	%ΔCPI
Exp_sur	1	-0.012	-0.207	0.020	0.002	-0.030	0.005	-0.009	0.082	-0.045
		(0.098)	(<.0001)	(0.005)	(0.781)	(<.0001)	(0.514)	(0.192)	(<.0001)	(<.0001)
Pre-managed ROA	0.032	1	0.113	0.014	-0.002	-0.025	-0.021	-0.003	0.051	-0.001
	(<.0001)		(<.0001)	(0.053)	(0.775)	(0.000)	(0.003)	(0.677)	(<.0001)	(0.897)
Forecast error	-0.128	0.164	1	0.027	0.000	-0.045	-0.009	0.007	0.035	-0.016
	(<.0001)	(<.0001)		(0.000)	(0.969)	(<.0001)	(0.212)	(0.307)	(<.0001)	(0.026)
Op_flex	0.003	-0.040	0.040	1	0.794	-0.556	-0.091	0.010	0.000	-0.008
	(0.646)	(<.0001)	(<.0001)		(<.0001)	(<.0001)	(<.0001)	(0.169)	(0.974)	(0.242)
Max_flex	-0.022	-0.077	0.002	0.740	1	0.064	-0.088	0.013	0.016	-0.004
	(0.002)	(<.0001)	(0.728)	(<.0001)		(<.0001)	(<.0001)	(0.067)	(0.020)	(0.568)
used_flex	-0.032	-0.027	-0.055	-0.474	0.123	1	0.029	0.002	0.023	0.008
	(<.0001)	(0.000)	(<.0001)	(<.0001)	(<.0001)		(<.0001)	(0.807)	(0.001)	(0.254)
Lagged NOA	0.011	-0.057	-0.082	-0.186	-0.180	0.070	1	-0.017	0.037	0.001
	(0.103)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)		(0.019)	(<.0001)	(0.886)
Lagged mkt-to-bk	-0.040	0.014	0.069	0.021	0.037	0.014	-0.154	1	0.019	-0.024
	(<.0001)	(0.044)	(<.0001)	(0.003)	(<.0001)	(0.051)	(<.0001)		(0.006)	(0.001)
%ΔGNP	0.050	0.026	0.046	0.023	0.018	-0.015	-0.010	0.088	1	-0.545
	(<.0001)	(0.000)	(<.0001)	(0.001)	(0.011)	(0.035)	(0.149)	(<.0001)		(<.0001)
%ΔCPI	-0.057	0.018	-0.025	-0.039	-0.046	0.005	0.000	-0.094	-0.78655	1
	(<.0001)	(0.012)	(0.000)	(<.0001)	(<.0001)	(0.464)	(0.988)	(<.0001)	(<.0001)	

where

Exp_sur = Expected future earnings change. This expected earnings change is measured by subtracting the current reported earnings from the expected earnings of the same quarter of the following year, t+4 [i.e., $(E[TE_{t+4}]-RE_t)$]. Expected earnings are proxied by the first consensus analysts' forecast of t+4 released immediately after the earnings announcement of t;

Pre-managed ΔROA = pre-managed change in earnings deflated by total assets. The pre-managed change in earnings is calculated as the difference between: (i)earnings before extraordinary items and discontinued operations less discretionary accruals estimated by the cross-sectional Jones model adjusted for sales growth and dividend payout ratio [i.e., estimated by equation (3) in the paper] and; (ii) reported earnings of the same quarter last year;

Forecast error = the difference between reported earnings and the last consensus analysts' forecast observed before earnings announcement;

Op_flex = The operating cycle flexibility, which is calculated as the upper flexibility bound less the sum of discretionary accruals cumulated over Q_i quarters, where Q_i is the number of quarters in the firm's operating cycle. The discretionary accruals used to construct *Op_flex* are estimated cross-sectionally by the following equation:

$$\frac{TA_t}{TAsset_{t-1}} = \frac{\alpha}{TAsset_{t-1}} + \beta_1 \frac{\Delta Sales_t}{TAsset_{t-1}} + \beta_2 \frac{PPE_t}{TAsset_{i-1}} + \beta_3 SG_t + \beta_4 Divid_t + \varepsilon_t$$ (Equation 3 in the paper).

The upper flexibility bound is calculated as the mean of the cumulative lagged discretionary accruals over the prior three years plus two times the standard deviation of these lagged accruals.

Max_flex = The upper flexibility bound is calculated as the mean of the cumulative lagged discretionary accruals over the prior three years plus two times the standard deviations of these lagged accruals;

CLDA = Flexibility used to manage earnings in the prior quarters. It is calculated as the sum of discretionary accruals cumulated over Q_i quarters (p_flex), where Q_i is the number of quarters in the firm's operating cycle;

Lagged NOA = lagged net operating assets deflated by sales. Net operating assets are calculated as the shareholders' equity less cash and marketable securities, plus total debt;

Lagged mkt-to-bk = lagged market value of equity deflated by book value of equity.

Table 3 Regression Analysis of the Probability of Missing Analysts' Forecasts

Probit regressions investigating the relation between a firm's probability of missing analysts' forecasts and its earnings management flexibility. Columns 3-5 present the results when Barton and Simko's flexibility measure is used; columns 6-8 present the results when Kasznik's flexibility measure is used; columns 9-11 present the results when the cross-sectional operating cycle flexibility measure is used in the analysis; whereas columns 12-14 present the results for the time-series operating cycle flexibility measure. Because the coefficients in a probit regression do not reflect the rate of change in the dependent variable as the independent variable changes, the impact of one standard deviation in x (independent variable) on y (dependent variable) is also provided. The probit regression is:

$$\Pr(miss_{it}=1)=\Phi(a+b_1 Flex_{it}+b_2 Per\_sur_{it}+b_3 Exp\_sur_{it}+b_4 GNP_t+b_5 CPI_t+b_6 lpb_{it})$$

Panel A: Full sample

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Barton and Simko's measure			Kasznik's measure			CS operating cycle			TS operating cycle		
	Predicted sign	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		-0.319	<.0001		-0.219	0.003		-0.200	0.007		-0.297	0.023	
		(0.076)			(0.074)			(0.074)			(0.130)		
lnoa	+	0.027	<.0001	0.023									
		(0.004)											
Δ Total accr	+				0.229	0.236	0.004						
					(0.194)								
Op_flex	-							-0.339	0.003	-0.011	-0.359	0.002	-0.0116
								(0.112)			(0.118)		
Pre_surp	-	-3.207	<.0001	-0.057	-3.239	<.0001	-0.058	-3.243	<.0001	-0.058	-3.122	<.0001	-0.0593
		(0.219)			(0.219)			(0.219)			(0.213)		
CPI	+	3.331	0.276	0.005	2.239	0.463	0.003	2.512	0.410	0.036	3.238	0.424	0.0049
		(3.055)			(3.052)			(3.050)			(4.051)		
GNP	-	-3.640	<.0001	-0.020	-3.980	<.0001	-0.022	-3.928	<.0001	-0.022	-1.484	0.379	-0.0054
		(0.789)			(0.788)			(0.788)			(1.687)		
lpb	-	-0.001	0.067	-0.006	-0.001	0.055	-0.007	-0.001	0.060	-0.006	-0.002	0.009	-0.0092
		(0.001)			(0.001)			(0.001)			(0.001)		
Exp_sur	-	0.434	<.0001	0.038	0.442	<.0001	0.039	0.443	<.0001	0.039	0.370	<.0001	0.0331
		(0.043)			(0.043)			(0.043)			(0.043)		
N		17429			17429			17429			16592		
McFadden R^2		0.0181			0.0164			0.0167			0.0143		

Panel B: Sub-sample of firms with reported forecast errors less than 1% of the beginning stock price

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Barton and Simko's measure			Kasznik's measure			CS operating cycle			TS operating cycle		
	Predicted sign	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		-0.363 (0.079)	<.0001		-0.256 (0.078)	0.001		-0.233 (0.078)	0.003		-0.449 (0.136)	0.001	
lnoa	+	0.028 (0.004)	<.0001	0.024									
Δ Total accr	+				0.182 (0.212)	0.390	0.0033						
Op_flex	-							-0.411 (0.122)	0.001	-0.0130	-0.527 (0.127)	<.0001	-0.0163
Pre_surp	-	-3.082 (0.236)	<.0001	-0.053	-3.113 (0.236)	<.0001	-0.0533	-3.131 (0.236)	<.0001	-0.0536	-3.074 (0.231)	<.0001	-0.0552
CPI	+	1.552 (3.210)	0.629	0.002	0.384 (3.205)	0.905	0.0005	0.709 (3.204)	0.825	0.0010	5.071 (4.229)	0.230	0.0075
GNP	-	-3.183 (0.830)	0.000	-0.017	-3.540 (0.829)	<.0001	-0.0192	-3.493 (0.828)	<.0001	-0.0189	0.499 (1.763)	0.777	0.0018
lpb	-	-0.001 (0.001)	0.133	-0.005	-0.001 (0.001)	0.112	-0.0056	-0.001 (0.001)	0.120	-0.0055	-0.002 (0.001)	0.032	-0.0078
Exp_sur	-	0.219 (0.050)	<.0001	0.017	0.226 (0.050)	<.0001	0.0172	0.228 (0.050)	<.0001	0.0173	0.163 (0.050)	0.001	0.0129
N		16084			16084			16084			15335		
McFadden R^2		0.0131			0.0111			0.0116			0.0107		

where:

Flex = flexibility measure. It can be the lagged NOA proposed by Barton and Simko (2002), the change in total accruals proposed by Kasznik (1999), the operating cycle flexibility proposed in this paper.

lnoa = lagged net operating assets deflated by sales. Net operating assets are calculated as the shareholders' equity less cash and marketable securities, plus total debt;

ΔTotal accruals = the difference between total accruals of this quarter and those of the same quarter last year. Total accruals are computed as the difference between income before extraordinary items and cash flow from operations, both data are extracted from the statement of cash flows;

Op_flex = The operating cycle flexibility, which is calculated as upper flexibility bound less the sum of discretionary accruals cumulated over Q_i quarters, where Q_i is the number of quarters in the firm's operating cycle. The discretionary accruals used to construct *Op_flex* are estimated cross-sectionally by equation 3 in the paper. The upper flexibility bound is calculated as the mean of the cumulative lagged discretionary accruals over the prior three years plus two times the standard deviation of these lagged accruals. The operating cycle is estimated either cross-sectionally (for CS operating cycle) or by the time-series average of the firm (TS operating cycle);

Pre_surp = The pre-managed earnings change of the current quarter deflated by lagged total assets. The pre-managed earnings of a quarter are defined as the reported earnings less the discretionary accruals. The pre-managed earnings change is then calculated as the difference between the current pre-managed earnings and the reported earnings of the same quarter last year [i.e., $(RE_t\text{-}DA_t\text{-}RE_{t\text{-}4})$];

CPI = Percentage change in CPI;

GNP = Percentage change in real GNP;

lpb = Lagged market-to-book ratio;

Exp_sur = Expected future earnings change. This expected earnings change is measured by subtracting the current reported earnings from the expected earnings of the same quarter of the following year, t+4 [i.e., $(E[TE_{t+4}]\text{-}RE_t)$]. The expected future earnings are proxied by the first consensus analysts' forecast of t+4 released immediately after the earnings announcement of t.

Table 4 Analysis of the Fourth-quarter Effect on the Relation between Probability of Missing Analysts' Forecasts and Flexibility

The same probit regression analysis as in Table 3 except that the analysis is carried out separately on the first three quarters and the fourth quarter. Because the coefficients in a probit regression do not reflect the rate of change in the dependent variable as the independent variable changes, the impact of one standard deviation in x (independent variable) on y (dependent variable) is also provided. Results of the first three quarters are presented in columns 3-5 of each panel and results of the fourth quarter sample are presented in columns 6-8.

$$\Pr(miss_{it}=1)=\Phi(a+b_1 Flex_{it}+b_2 PEr\_sur_{it}+b_3 Exp\_sur_{it}+b_4 GNP_t+b_5 CPI_t+b_6 lpb_{it})$$

Panel A Barton and Simko's flexibility measure

		First three quarters			Fourth quarter		
	Predicted sign	**Coefficient (std error)**	**p-value**	**Effect of 1 std dev Δ in x**	**Coefficient (std error)**	**p-value**	**Effect of 1 std dev Δ in x**
Intercept		-0.190 (0.080)	0.0183		-0.459 (0.214)	0.0321	
lnoa	+	0.009 (0.003)	0.0016	0.0145	0.048 (0.010)	<.0001	0.0365
Pre_surp	-	-3.650 (0.251)	<.0001	-0.0643	-1.578 (0.337)	<.0001	-0.0355
CPI	+	-1.334 (3.421)	0.697	-0.0019	12.243 (6.904)	0.076	0.0187
GNP	-	-4.021 (0.804)	<.0001	-0.0241	-4.542 (2.726)	0.096	-0.0175
lpb	-	-0.002 (0.001)	0.019	-0.0109	-0.0005 (0.001)	0.536	-0.0050
Exp_sur	-	0.503 (0.050)	<.0001	0.0453	0.428 (0.076)	<.0001	0.0413
N		14184			4435		
McFadden R^2		0.0203			0.0163		

All the variables are defined the same way as in Table 3.

Table 4 Analysis of the Fourth-quarter Effect on the Relation between Probability of Missing Analysts' Forecasts and Flexibility (cont'd)

Panel B Cross-sectional operating cycle flexibility measure

		First three quarters			Fourth quarter		
	Predicted sign	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		-0.123 (0.080)	0.1252		-0.317 (0.212)	0.134	
Op_flex	-	-0.458 (0.119)	0.0001	-0.0162	0.056 (0.218)	0.796	0.0019
Pre_surp	-	-3.678 (0.252)	<.0001	-0.0648	-1.689 (0.336)	<.0001	-0.0380
CPI	+	-1.558 (3.419)	0.6486	-0.0022	11.250 (6.884)	0.102	0.0172
GNP	-	-4.176 (0.803)	<.0001	-0.0250	-4.720 (2.719)	0.083	-0.0182
lpb	-	-0.002 (0.001)	0.0189	-0.0109	-0.001 (0.001)	0.498	-0.0054
Exp_sur	-	0.507 (0.050)	<.0001	0.0457	0.434 (0.077)	<.0001	0.0419
N		14184			4435		
McFadden R^2		0.0206			0.0123		

All the variables are defined the same way as in Table 3.

Table 4 Analysis of the Fourth-quarter Effect on the Relation between Probability of Missing Analysts' Forecasts and Flexibility (cont'd)

Panel C Time-series operating cycle flexibility measure

		First three quarters			Fourth quarter		
	Predicted sign	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		-0.380 (0.155)	0.0144		0.024 (0.241)	0.9205	
Op_flex	-	-0.490 (0.139)	0.0004	-0.0158	-0.063 (0.229)	0.7846	-0.0020
Pre_surp	-	-3.657 (0.275)	<.0001	-0.0640	-2.273 (0.339)	<.0001	-0.0518
CPI	+	3.238 (4.828)	0.5024	0.0049	1.342 (7.498)	0.8580	0.0021
GNP	-	0.753 (2.005)	0.7071	0.0027	-8.445 (3.147)	0.0073	-0.0312
lpb	-	-0.005 (0.001)	<.0001	-0.0206	0.0003 (0.001)	0.7641	0.0024
Exp_sur	-	0.362 (0.053)	<.0001	0.0305	0.409 (0.073)	<.0001	0.0423
N		12199			4393.000		
McFadden R^2		0.0164			0.0151		

All the variables are defined the same way as in Table 3.

Table 4 Analysis of the Fourth-quarter Effect on the Relation between Probability of Missing Analysts' Forecasts and Flexibility (cont'd)

Panel D Flexibility limit of the fourth quarter estimated separately

		CS operating cycle Fourth quarter			TS operating cycle Fourth quarter		
	Predicted sign	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		0.146 (0.284)	0.607		0.296 (0.284)	0.297	
Op_flex	-	-0.751 (0.308)	0.0147	-0.0222	-0.510 (0.310)	0.1001	-0.0151
Pre_surp	-	-2.329 (0.446)	<.0001	-0.0482	-2.110 (0.434)	<.0001	-0.0456
CPI	+	-4.568 (9.415)	0.6276	-0.0068	-9.177 (9.475)	0.3328	-0.0136
GNP	-	-9.249 (3.567)	0.0095	-0.0363	-11.347 (3.556)	0.001	-0.0448
lpb	-	0.0001 (0.001)	0.9314	0.0008	0.000 (0.001)	0.9458	0.0006
Exp_sur	-	0.360 (0.089)	<.0001	0.0360	0.362 (0.089)	<.0001	0.0363
N		3028			3018		
McFadden R^2		0.0149			0.0142		

The flexibility limit used in constructing *Op_flex* in this Panel is based on the maximum *CLDA* of Qtr 4 of the last three years. Except for this, all other variables are defined as in Table 3.

Table 5 Regression Analysis of the Probability of Missing Analysts' Forecasts after Controlling for Lagged Performance

This table presents the results of the probit regression analysis on the probability of missing the analysts' forecasts. The analysis is similar to those presented in Table 3 except that I include the ROA of the prior two years as control variables:

$$Pr(miss_{it} = 1) = \Phi(a + b_1 Flex_{it} + b_2 Per\_sur_{it} + b_3 Exp\_sur_{it} + +b_4 GNP_t + b_5 CPI_t + b_6 lpb_{it} + b_7 LROA_{it} + b_8 L2ROA_{it} + b_9 L3ROA_{it} + b_{10} L4ROA_{it} + b_{11} L5ROA_{it} + b_{12} L6ROA_{it} + b_{13} L7ROA_{it} + b_{14} L8ROA_{it})$$

Because the coefficients in a probit regression do not reflect the rate of change in the dependent variable as the independent variable changes, the impact of one standard deviation in x (independent variable) on y (dependent variable) is also provided.

		Barton and Simko's measure			CS operating cycle			TS operating cycle		
	Predicted sign	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		-0.273	0.0002		-0.202	0.005		-0.225	0.088	
		(0.073)			(0.072)			(0.132)		
lnoa	+	0.009	0.001	0.0131						
		(0.003)								
Op_flex	-				-0.532	<.0001	-0.0186	-0.546	<.0001	-0.0176
					(0.108)			(0.121)		
Pre_surp	-	-3.631	<.0001	-0.0685	-3.662	<.0001	-0.0691	-3.779	<.0001	-0.0712
		(0.235)			(0.235)			(0.246)		
CPI	+	4.777	0.110	0.0069	4.821	0.107	0.0069	4.417	0.280	0.0067
		(2.990)			(2.990)			(4.091)		
GNP	-	-3.164	<.0001	-0.0177	-3.217	<.0001	-0.0180	-1.447	0.396	-0.0053
		(0.764)			(0.764)			(1.705)		
lpb	-	-0.001	0.036	-0.0083	-0.001	0.041	-0.0081	-0.001	0.159	-0.0052
		(0.001)			(0.001)			(0.001)		
Exp_sur	-	0.430	<.0001	0.0393	0.428	<.0001	0.0391	0.289	<.0001	0.0260
		(0.042)			(0.042)			(0.043)		
LROA	-	-1.782	<.0001	-0.0240	-2.055	<.0001	-0.0276	-2.816	<.0001	-0.0317
		(0.338)			(0.341)			(0.409)		
L2ROA	-	-0.177	0.599	-0.0024	-0.310	0.358	-0.0042	-0.714	0.068	-0.0086
		(0.336)			(0.337)			(0.391)		
L3ROA	-	0.779	0.017	0.0111	0.694	0.036	0.0099	0.019	0.958	0.0002
		(0.328)			(0.331)			(0.368)		
L4ROA	-	-2.067	<.0001	-0.0304	-2.067	<.0001	-0.0304	-2.155	<.0001	-0.0280
		(0.366)			(0.368)			(0.417)		
L5ROA	-	0.244	0.156	0.0061	0.282	0.101	0.0071	0.379	0.046	0.0089
		(0.172)			(0.172)			(0.190)		
L6ROA	-	-0.303	0.070	-0.0079	-0.256	0.127	-0.0066	-0.119	0.488	-0.0031
		(0.167)			(0.168)			(0.172)		
L7ROA	-	0.041	0.791	0.0011	0.046	0.769	0.0013	0.074	0.662	0.0020
		(0.156)			(0.156)			(0.169)		
L8ROA	-	0.088	0.585	0.0023	0.095	0.554	0.0025	0.434	0.025	0.0097
		(0.160)			(0.161)			(0.193)		
N		18349			18349			16356		
McFadden R^2		0.0222			0.0227			0.0218		

where
LROA = ROA of last quarter (i.e., t-1). ROA is calculated as the change in earnings deflated by assets at the beginning of the quarter.
L2ROA,....L8ROA = ROA of quarter t-2,...t-8.
All other variables are as defined in Table 3.

Table 6 Sensitivity Analysis of the Probability of Missing Analysts' Forecasts after Controlling for Lagged Performance and Growth

Probit regressions investigating the relation between a firm's probability of missing analysts' forecasts and its earnings management flexibility. The regression is the same as in Table 5 except that both the firm's past and expected growth are included as control variables. The expected growth are proxied by the analysts' long-term growth forecast (*Lt_growth*) and the firm's actual growth in sales in the following year (*Growth*). The firm's past growth is proxied by the growth in the firm's sales in the prior five years (*Past_growth*):

$$\Pr(miss_{it}=1)=\Phi(a+b_1Flex_{it}+b_2Per\_sur_{it}+b_3Exp\_sur_{it}++b_4GNP_t+b_5CPI_t+b_6Lt\_growth_{it}+b_7Growth + b_8Past\_growth_{it}+b_9LROA_{it}+b_{10}L2ROA_{it}+b_{11}L3ROA_{it}+b_{12}L4ROA_{it}+b_{13}L5ROA_{it} + b_{14}L6ROA_{it}+b_{15}L7ROA_{it}+b_{16}L8ROA_{it})$$

		CS operating cycle			TS operating cycle		
	Predicted sign	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		-0.040 (0.141)	0.775		-0.0001 (0.135)	0.9991	
Op_flex	-	-0.482 (0.128)	0.0002	-0.0155	-0.502 (0.122)	<.0001	-0.0161
Pre_surp	-	-4.002 (0.273)	<.0001	-0.0712	-3.857 (0.248)	<.0001	-0.0726
CPI	+	4.170 (4.298)	0.332	0.0063	1.233 (4.111)	0.7643	0.0019
GNP	-	-1.985 (1.790)	0.268	-0.0072	-1.784 (1.711)	0.2970	-0.0065
Past_growth	-	0.042 (0.021)	0.048	0.0081	0.045 (0.021)	0.0370	0.0083
Growth	-	-0.381 (0.042)	<.0001	-0.0382	-0.368 (0.037)	<.0001	-0.0432
Lt_growth	-	-0.823 (0.152)	<.0001	-0.0236	-0.008 (0.001)	<.0001	-0.0229
Exp_sur	-	0.440 (0.048)	<.0001	0.0377	0.390 (0.045)	<.0001	0.0350
LROA	-	-2.460 (0.437)	<.0001	-0.0277	-2.708 (0.410)	<.0001	-0.0305
L2ROA	-	-1.181 (0.422)	0.005	-0.0140	-0.770 (0.393)	0.0502	-0.0093
L3ROA	-	-0.260 (0.420)	0.536	-0.0031	-0.147 (0.371)	0.6908	-0.0019
L4ROA	-	-2.543 (0.456)	<.0001	-0.0322	-2.399 (0.420)	<.0001	-0.0312
L5ROA	-	0.541 (0.223)	0.015	0.0115	0.421 (0.193)	0.0292	0.0099
L6ROA	-	-0.091 (0.205)	0.657	-0.0021	-0.018 (0.172)	0.9162	-0.0005
L7ROA	-	0.066 (0.181)	0.715	0.0017	0.150 (0.172)	0.3808	0.0040
L8ROA	-	0.454 (0.205)	0.027	0.0101	0.507 (0.194)	0.0089	0.0113
N		15059			16368		
McFadden R^2		0.0293			0.0288		

where:
Lt_growth = analysts' expected long-term growth in EPS retrieved from I/B/E/S;
Growth = actual sales growth in the following year;
Past_growth = Average sales growth in the prior 5 years; Definition of other variables is as provided at the end of Table 5.

Table 7 Sensitivity Analysis of the Probability of Missing Analysts' Forecasts—using lagged current assets deflated by market value as proxy for flexibility limit and cumulative unreversed discretionary accruals as proxy for flexibility used

Probit regressions investigating the relation between a firm's probability of missing analysts' forecasts and its earnings management flexibility. The flexibility measure used in this analysis comprises of two parts: the flexibility limit (proxied by the lagged current assets deflated by market value) and the flexibility used in prior periods (proxied by the cumulative unreversed accruals at the beginning of the quarter). Actual growth of the firm in the following year is included as a proxy for the firm's expected growth:

$$\Pr(miss_{it}=1)=\Phi(a+b_1Flex\_lit_{it}+b_2Cum\_accru_{it}+b_3Per\_sur_{it}+b_4Exp\_sur_{it}++b_5GNP_t+b_6CPI_t$$
$$+b_7Growth_{it}+b_8LROA_{it}+b_9L2ROA_{it}+b_{10}L3ROA_{it}+b_{11}L4ROA_{it}+b_{12}L5ROA_{it}$$
$$+b_{13}L6ROA_{it}+b_{14}L7ROA_{it}+b_{15}L8ROA_{it}),$$

	Predicted sign	CS operating cycle Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	TS operating cycle Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		-0.108 (0.141)	0.445		-0.064 (0.135)	0.6369	
Flex_lim	-	-0.124 (0.053)	0.018	-0.0097	-0.209 (0.048)	<.0001	-0.0170
Cum_accru	+	1.821 (0.209)	<.0001	0.0373	1.915 (0.221)	<.0001	0.0357
Pre_surp	-	-4.077 (0.275)	<.0001	-0.0726	-3.894 (0.249)	<.0001	-0.0737
CPI	+	3.746 (4.345)	0.389	0.0057	1.749 (4.150)	0.6735	0.0027
GNP	-	-2.124 (1.812)	0.241	-0.0077	-1.483 (1.731)	0.3914	-0.0054
Growth	-	-0.428 (0.042)	<.0001	-0.0430	-0.407 (0.037)	<.0001	-0.0482
Exp_sur	-	0.486 (0.049)	<.0001	0.0418	0.415 (0.046)	<.0001	0.0370
LROA	-	-2.884 (0.442)	<.0001	-0.0325	-3.201 (0.419)	<.0001	-0.0363
L2ROA	-	-1.445 (0.424)	0.001	-0.0171	-0.869 (0.394)	0.0275	-0.0106
L3ROA	-	-0.229 (0.419)	0.584	-0.0028	-0.031 (0.371)	0.9341	-0.0004
L4ROA	-	-2.484 (0.457)	<.0001	-0.0315	-2.329 (0.419)	<.0001	-0.0306
L5ROA	-	0.491 (0.223)	0.028	0.0104	0.430 (0.191)	0.0243	0.0102
L6ROA	-	-0.154 (0.204)	0.450	-0.0036	-0.027 (0.174)	0.8750	-0.0007
L7ROA	-	0.012 (0.179)	0.946	0.0003	0.123 (0.169)	0.4672	0.0033
L8ROA	-	0.377 (0.205)	0.066	0.0084	0.482 (0.194)	0.0129	0.0109
N		14747			16050		
McFadden R^2		0.0513			0.0316		

where:
Flex_lit= current assets to market value, proxy for the flexibility limit;
Cum_accru= cumulative unreversed discretionary accruals as of beginning of quarter. Discretionary accruals are estimated by equation 3 in the paper;
Growth = actual growth in sales for the following year; Definition of other variables is as provided at the end of Table 5.

Table 8 Sensitivity Analysis of the Probability of Missing Analysts' Forecasts – analyze the impact of flexibility limit and flexibility used separately

This table presents the results of the probit regression analysis on the probability of missing the analysts' forecasts. The analysis is similar to those presented in Table 3 except that I include the flexibility limit (Max_flex) and flexibility used in prior quarters (CLDA) as two independent variables:

$$\Pr(miss_{it}=1)=\Phi(a+b_1Max\_flex_{it}+b_2CLDA+b_3Per\_sur_{it}+b_4Exp\_sur_{it}++b_5GNP_t+b_6CPI_t+b_7Growth_{it}+b_8LROA_{it}+b_9L2ROA_{it}$$
$$+b_{10}L3ROA_{it}+b_{11}L4ROA_{it}+b_{12}L5ROA_{it}+b_{13}L6ROA_{it}+b_{14}L7ROA_{it}+b_{15}L8ROA_{it})$$

		CS operating cycle (Full sample)			TS operating cycle (Full sample)			CS operating cycle (negative pre-mgd surprise firms only)			TS operating cycle (negative pre-mgd surprise firms only)		
	Predicted sign	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		-0.315	0.0107		-0.176	0.183		0.701	<.0001		0.891	<.0001	
		(0.123)			(0.132)			(0.102)			(0.191)		
Max_flex	-	-0.047	0.7255	-0.0013	-0.020	0.8917	-0.0005	-0.357	0.0749	-0.0088	-0.636	0.0025	-0.0163
		(0.135)			(0.143)			(0.200)			(0.211)		
CLDA	+	1.590	<.0001	0.0311	1.844	<.0001	0.0345	0.996	0.0003	0.0182	1.578	<.0001	0.0289
		(0.194)			(0.217)			(0.273)			(0.311)		
Pre_surp	-	-3.769	<.0001	-0.0651	-3.865	<.0001	-0.0727	8.100	<.0001	0.1174	7.086	<.0001	0.1127
		(0.251)			(0.247)			(0.417)			(0.428)		
CPI	+	9.296	0.0157	0.0141	2.659	0.5174	0.0040	7.805	0.0595	0.0107	0.077	0.9896	0.0001
		(3.847)			(4.107)			(4.142)			(5.870)		
GNP	-	-0.980	0.5384	-0.0036	-1.398	0.4137	-0.0051	-4.141	0.0001	-0.0222	-4.691	0.0608	-0.0164
		(1.593)			(1.711)			(1.085)			(2.502)		
Growth	-	-0.398	<.0001	-0.0406	-0.403	<.0001	-0.0473	-0.001	0.0913	-0.0072	-0.005	0.0019	-0.0167
		(0.037)			(0.037)			(0.001)			(0.002)		
Exp_sur	-	0.420	<.0001	0.0377	0.401	<.0001	0.0359	0.313	<.0001	0.0270	0.261	<.0001	0.0217
		(0.041)			(0.045)			(0.059)			(0.067)		
LROA	-	-3.017	<.0001	-0.0330	-3.338	<.0001	-0.0376	-7.128	<.0001	-0.0748	-7.144	<.0001	-0.0750
		(0.409)			(0.417)			(0.614)			(0.661)		
L2ROA	-	-1.249	0.0015	-0.0143	-0.936	0.0172	-0.0113	-3.962	<.0001	-0.0419	-3.177	<.0001	-0.0349
		(0.394)			(0.393)			(0.605)			(0.640)		
L3ROA	-	-0.133	0.7329	-0.0015	-0.058	0.8757	-0.0007	-1.819	0.0012	-0.0198	-2.846	<.0001	-0.0318
		(0.389)			(0.369)			(0.560)			(0.643)		
L4ROA	-	-2.280	<.0001	-0.0279	-2.365	<.0001	-0.0307	7.105	<.0001	0.0788	6.891	<.0001	0.0813
		(0.423)			(0.416)			(0.623)			(0.649)		
L5ROA	-	0.461	0.0261	0.0095	0.408	0.0325	0.0095	0.835	0.0020	0.0176	0.377	0.2048	0.0076
		(0.207)			(0.191)			(0.270)			(0.297)		
L6ROA	-	-0.132	0.4951	-0.0030	-0.087	0.6184	-0.0023	0.081	0.7573	0.0019	-0.257	0.3295	-0.0069
		(0.193)			(0.174)			(0.261)			(0.263)		
L7ROA	-	0.086	0.6095	0.0022	0.092	0.5864	0.0024	0.838	0.0030	0.0185	0.282	0.2846	0.0066
		(0.169)			(0.169)			(0.282)			(0.264)		
L8ROA	-	0.375	0.0571	0.0079	0.456	0.0184	0.0102	-0.292	0.2542	-0.0061	-0.427	0.14	-0.0090
		(0.197)			(0.194)			(0.256)			(0.290)		
N		18471			16356			9938			8168		
McFadden R^2		0.0277			0.0298			0.0639			0.0609		

Table 9 Analysis of the Incremental Impact of Cumulative Discretionary Accruals Flexibility Measure on the Probability of Missing Analysts' Forecasts

This table examines whether the operating cycle flexibility measure has any incremental explanatory power to Barton and Simko's flexibility measure. To test for the incremental power, I run the following probit regression:

$$\Pr(miss_{it}=1)=\Phi(a+b_1Op\_flex_{it}+b_2Per\_sur_{it}+b_3Exp\_sur_{it}++b_4GNP_t+b_5CPI_t+b_6Growth_{it}$$
$$+b_7wc_{it}+b_8nfa_{it}+b_9nolta_{it}+\sum_{i=1}^{8}b_{9+i}ROA_{t-i})$$

		CS operating cycle			TS operating cycle		
		Coefficient (std error)	**p-value**	**Effect of 1 std dev Δ in x**	**Coefficient (std error)**	**p-value**	**Effect of 1 std dev Δ in x**
Intercept		-0.269 (0.135)	0.046		-0.233 (0.134)	0.0817	
Op_flex	-	-0.537 (0.119)	<.0001	-0.0181	-0.460 (0.123)	0.0002	-0.0148
lnoa	+	0.022 (0.005)	<.0001	0.0181	0.020 (0.004)	<.0001	0.0208
Pre_surp	-	-3.689 (0.254)	<.0001	-0.069	-3.753 (0.248)	<.0001	-0.0706
CPI	+	5.393 (4.164)	0.195	0.008	3.097 (4.109)	0.4511	0.0047
GNP	-	-2.100 (1.730)	0.225	-0.008	-1.158 (1.710)	0.4984	-0.0042
Growth	-	-0.275 (0.030)	<.0001	-0.037	-0.424 (0.037)	<.0001	-0.0498
Exp_sur	-	0.470 (0.046)	<.0001	0.043	0.403 (0.045)	<.0001	0.0361
LROA	-	-2.050 (0.383)	<.0001	-0.026	-2.577 (0.411)	<.0001	-0.0290
L2ROA	-	-0.658 (0.369)	0.075	-0.009	-0.685 (0.392)	0.0809	-0.0082
L3ROA	-	0.114 (0.370)	0.757	0.002	-0.077 (0.369)	0.8346	-0.0010
L4ROA	-	-2.196 (0.402)	<.0001	-0.032	-2.238 (0.419)	<.0001	-0.0291
L5ROA	-	0.261 (0.194)	0.179	0.006	0.411 (0.191)	0.0317	0.0096
L6ROA	-	-0.158 (0.187)	0.398	-0.004	-0.061 (0.172)	0.7234	-0.0016
L7ROA	-	0.043 (0.166)	0.796	0.001	0.105 (0.170)	0.535	0.0028
L8ROA	-	0.199 (0.187)	0.289	0.005	0.483 (0.194)	0.0126	0.0108
N		15977			16374		
McFadden R^2		0.0257			0.0287		

All the variables are defined the same way as in Tables 3 and 7.

Table 10 Sensitivity Analysis of the Probability of Missing Analysts' Forecasts—using industry-adjusted flexibility measures

This table examines the relation between industry-flexibility measures and the probability of missing analysts' forecasts. The deviation of each firm's flexibility measure from its industry mean is used in the probit analysis. Panel A Columns 3-5 present the results using Barton and Simko's flexibility measure. Columns 6-8 present the results using the cross-sectional operating cycle flexibility measure. Columns 9-11 present the result using time-series operating cycle flexibility measure. The impact of one standard deviation change in x on y is provided in addition to the coefficient of x.

		Barton and Simko's measure			CS operating cycle			TS operating cycle		
	Predicted sign	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		-0.226 (0.138)	0.102		-0.219 (0.138)	0.112		-0.200 (0.132)	0.1298	
Ind_flex	-				-0.464 (0.141)	0.001	-0.0135	-0.376 (0.133)	0.0046	-0.0111
Ind_noa	+	0.000 (0.001)	0.991	4.59E-05						
Pre_surp	-	-3.957 (0.272)	<.0001	-0.070	-3.981 (0.272)	<.0001	-0.0708	-3.857 (0.247)	<.0001	-0.0726
CPI	+	4.713 (4.299)	0.273	0.007	4.580 (4.299)	0.287	0.0069	3.025 (4.108)	0.4615	0.0046
GNP	-	-1.545 (1.801)	0.391	-0.006	-1.597 (1.793)	0.373	-0.0058	-1.202 (1.711)	0.4826	-0.0044
Growth	-	-0.415 (0.041)	<.0001	-0.042	-0.413 (0.041)	<.0001	-0.0414	-0.391 (0.037)	<.0001	-0.0459
Exp_sur	-	0.446 (0.048)	<.0001	0.038	0.446 (0.048)	<.0001	0.0383	0.399 (0.045)	<.0001	0.0359
LROA	-	-2.317 (0.433)	<.0001	-0.026	-2.463 (0.436)	<.0001	-0.0277	-2.724 (0.409)	<.0001	-0.0307
L2ROA	-	-1.144 (0.419)	0.006	-0.014	-1.243 (0.421)	0.003	-0.0147	-0.809 (0.392)	0.0389	-0.0097
L3ROA	-	-0.210 (0.417)	0.615	-0.003	-0.239 (0.418)	0.567	-0.0029	-0.133 (0.369)	0.7192	-0.0017
L4ROA	-	-2.468 (0.452)	<.0001	-0.031	-2.472 (0.454)	<.0001	-0.0314	-2.406 (0.418)	<.0001	-0.0313
L5ROA	-	0.454 (0.221)	0.040	0.010	0.473 (0.222)	0.033	0.0100	0.403 (0.191)	0.0352	0.0094
L6ROA	-	-0.222 (0.203)	0.275	-0.005	-0.194 (0.204)	0.341	-0.0045	-0.100 (0.173)	0.5631	-0.0026
L7ROA	-	-0.018 (0.178)	0.921	-0.0005	-0.007 (0.178)	0.969	-0.0002	0.096 (0.169)	0.5728	0.0025
L8ROA	-	0.386 (0.204)	0.059	0.009	0.393 (0.204)	0.055	0.0088	0.461 (0.193)	0.017	0.0103
N		14987			14987			16306		
McFadden R^2		0.0267			0.0272			0.0269		

where: Indy_flex & Indy_noa are computed as the deviation of the respective flexibility measure (i.e., Op_flex, lnoa) from their industry mean in each quarter. Industry is defined by two-digit SIC code. All other variables are as defined in Tables 3 and 5.

Table 11 Sensitivity Analysis of the Probability of Missing Analysts' Forecasts—using combined flexibility and pre-managed earnings surprise measure

This table examines the relation between a combined surprise-flexibility measure and the probability of missing analysts' forecasts. The combined surprise-flexibility measure is constructed using the firm's pre-managed forecast error (i.e. earnings before DA less consensus analysts' forecast) and the flexibility measure. For firms with negative pre-managed forecast error, the difference between flexibility available and the forecast error is computed. An indicator variable, *Pmeet*, takes on a value of 1 if (i) the pre-managed forecast error is positive, or (ii) when the difference between flexibility available and forecast error is positive (i.e. the firm has enough flexibility to hide the negative forecast error). *Pmeet* has a value of 0 when the firm does not have enough flexibility to hide the negative forecast error. Because *Pmeet* is a dummy variable, the difference between the probability of missing analysts' forecast when *Pmeet* is 1 versus that when *Pmeet* is 0 is reported, instead of the effect of one standard deviation change.

$$\Pr(miss_{it}=1)=\Phi(a+b_1 Pmeet_{it}+b_2 Exp\_sur_{it}++b_3 GNP_t+b_4 CPI_t+b_5 Growth_{it}+b_6 LROA_{it}+b_7 L2ROA_{it}$$
$$+b_8 L3ROA_{it}+b_9 L4ROA_{it}+b_{10} L5ROA_{it}+b_{11} L6ROA_{it}+b_{12} L7ROA_{it}+b_{13} L8ROA_{it})$$

		CS operating cycle			TS operating cycle		
	Predicted sign	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		0.196	0.1671		0.420	0.0021	
		(0.142)			(0.137)		
Pmeet	-	-0.415	<.0001	-0.1630	-0.620	<.0001	-0.2440
		(0.039)			(0.033)		
CPI	+	3.180	0.4569	0.0048	0.444	0.9147	0.0007
		(4.275)			(4.147)		
GNP	-	-2.343	0.1888	-0.0085	-2.089	0.2272	-0.0077
		(1.783)			(1.730)		
Growth	-	-0.414	<.0001	-0.0415	-0.416	<.0001	-0.0494
		(0.041)			(0.037)		
Exp_sur	-	0.448	<.0001	0.0385	0.404	<.0001	0.0361
		(0.048)			(0.046)		
LROA	-	-3.468	<.0001	-0.0390	-3.740	<.0001	-0.0425
		(0.424)			(0.400)		
L2ROA	-	-1.458	0.0004	-0.0173	-0.977	0.0117	-0.0119
		(0.415)			(0.388)		
L3ROA	-	-0.417	0.3097	-0.0050	-0.315	0.3923	-0.0040
		(0.411)			(0.368)		
L4ROA	-	0.674	0.0809	0.0085	0.845	0.0180	0.0111
		(0.386)			(0.357)		
L5ROA	-	0.489	0.0257	0.0104	0.309	0.1012	0.0073
		(0.219)			(0.189)		
L6ROA	-	-0.108	0.5930	-0.0025	-0.056	0.7438	-0.0015
		(0.202)			(0.170)		
L7ROA	-	0.006	0.9714	0.0002	0.004	0.9807	0.0001
		(0.174)			(0.166)		
L8ROA	-	0.344	0.0929	0.0077	0.410	0.0338	0.0093
		(0.205)			(0.193)		
N		15065			16050		
McFadden R^2		0.0218			0.0320		

where

Pmeet =1 if (i) (reported earnings - DA) – analysts' forecast >=0, or (ii) flexibility available – (reported earnings – DA – analysts' forecast)>=0; otherwise, Pmeet = 0.

All other variables are as defined in Tables 5 & 6.

Table 12 Sensitivity Analysis of the Probability of Missing Analysts' Forecasts using time-series flexibility measure

Probit regressions investigating the relation between a firm's probability of missing analysts' forecasts and its earnings management flexibility. This probit analysis is the same as that in Table 3, except that the flexibility measure is based on reversal rate estimated by the time-series autoregression.

$$\Pr(miss_{it} = 1) = \Phi(a + b_1 Flex_{it} + b_2 Per\_sur_{it} + b_3 Exp\_sur_{it} + b_4 GNP_t + b_5 CPI_t + b_6 lpb_{it})$$

Panel A Time-series flexibility measure

TS autoregression flexibility

	Predicted sign	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		2.947	0.0209	
		(1.276)		
TS_flex	-	0.602	0.1891	0.0364
		(0.459)		
Pre_surp	-	-6.267	0.0003	-0.1053
		(1.740)		
CPI	+	-52.230	0.0076	-0.0951
		(19.583)		
GNP	-	-54.296	0.0195	-0.0845
		(23.249)		
lpb	-	-0.011	0.0443	-0.0566
		(0.006)		
Exp_sur	-	0.466	0.1564	0.0351
		(0.329)		
N		380		
McFadden R^2		0.0672		

Panel B Quintile-ranked time-series reversal rate flexibility measures

Ranked TS autoregression flexibility

	Predicted sign	Coefficient (std error)	p-value	Effect of 1 std dev Δ in x
Intercept		4.298	0.0009	
		(1.298)		
TS_flex	-	-0.141	0.0048	-0.0737
		(0.050)		
Pre_surp	-	-6.676	0.0002	-0.1117
		(1.807)		
CPI	+	-64.496	0.0012	-0.1170
		(19.846)		
GNP	-	-69.825	0.0024	-0.1082
		(23.006)		
lpb	-	-0.010	0.0915	-0.0490
		(0.006)		
Exp_sur	-	0.305	0.3462	0.0229
		(0.324)		
N		380		
McFadden R^2		0.0796		

where:
Ts_flex = The time-series regression flexibility, which is calculated as the upper flexibility bound less the sum of discretionary accruals cumulated over Q_i quarters. Q_i is the number of quarters it takes total accruals to reverse. This is estimated by the following time-series regression in an estimation period of five years prior to Quarter t:

$$TA_{is} = \sum_{k=1}^{N} \delta_1 TA_{is-k} + \varepsilon_{is} .$$

The index k of the longest lagged accruals that have a significant negative correlation with accruals at time s is assumed to be the number of quarters it takes the firm's accruals to reverse on average. Then Q_i is set equal to k. The discretionary accruals used are those estimated cross-sectionally by equation 3 in the paper. The upper flexibility bound is calculated as the mean of the cumulative lagged discretionary accruals over the prior three years plus two times the standard deviation of these lagged accruals;

All other variables are defined the same way as in Table 3.

Figure 1 Histogram of Forecast Errors within the Range of -0.015 to +0.015

(Firm-quarters are grouped into forecast error intervals of width 0.01, with Bin 15 including firm-quarters with forecast errors [0, 0.01).)