INCOME SMOOTHING, INFORMATION UNCERTAINTY, STOCK RETURNS, AND COST OF EQUITY

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Linda H. Chen

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As members of the Final Examination Committee, we certify that we have read the

dissertation prepared by Linda H. Chen

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and recommend that it be accepted as fulfilling the dissertation requirement for the

Degree of Doctor of Philosophy with a Major in Management.

____ Date: 4/16/2009
Dan S. Dhaliwal

____ Date: 4/16/2009
Mark A. Trombley

____ Date: 4/16/2009
Daniel A. Bens

____ Date: 4/16/2009
Zhen Li

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copies of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

____ Date: 4/16/2009
Dissertation Director: Dan S. Dhaliwal

STATEMENT BY AUTHOR

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SIGNED: ____________________

Linda H. Chen

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ABSTRACT

This dissertation examines the effect of income smoothing on information uncertainty, stock returns, and cost of equity. Following existing literature, I construct two income smoothing measures – capturing income smoothing through both total accruals and discretionary accruals. I show that income smoothing tends to reduce firms' information uncertainty, as measured by stock return volatility, analyst forecast dispersion, and analyst forecast error. Further, I provide evidence that market prices income smoothing and rewards income smoothing firms with a premium. Controlling for unexpected earnings shocks and other firm characteristics, income smoothing firms have significantly higher abnormal returns around earnings announcement. Finally, I show that income smoothing, particularly through discretionary accruals, reduces firms' implied cost of equity.

1. INTRODUCTION

Income smoothing refers to managers' attempts to use their reporting discretion to "intentionally dampen the fluctuations of their firms' earnings realizations" (Beidleman 1973, 653)[1]. Existing literature has documented evidence that firms actively engage in income smoothing (Beidleman, 1973; Ronen and Sadan, 1981; Healy, 1985; DeFond and Park, 1997). Surveys conducted by Graham, Harvey, and Rajgopal (2005) also show that CFOs have strong preference for smooth earnings paths.

A number of studies have examined the effect of income smoothing on cost of equity, earnings informativeness, liquidity, and bond rating. For instance, Francis, LaFond, Olsson and Schipper (2004) examine the effect of income smoothing on the cost of equity. They find that income smoothing has a negative effect on the cost of equity, although the effect is weaker than for other attributes of earnings, such as accrual quality. Hunt, Moyer and Shevlin (2000) examine whether discretionary earnings smoothing increases or decreases the informativeness of earnings. They show that discretionary earnings smoothing has a positive effect on the contemporaneous price-earnings relation and thus increases the informativeness of earnings. Using the approach of Collins, Kothari, Shanken and Sloan (1994), Tucker and Zarowin (2006) examine the effect of income smoothing on earnings persistence and informativeness of past and current earnings about future earnings. They find that current stock returns of

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[1] This notion of income smoothing is different from the so-called "real income smoothing" (Lambert, 1984; Dey, 2004; Roychowdhury, 2006), where real operating decisions are affected, such as the quantity and timing of production, sales, capital investment, and R&D spending.

higher smoothing firms contain more information about future earnings than those of lower smoothing firms. Gu and Zhao (2006) show that income smoothing has a positive effect on corporate bond ratings. LaFond, Lang and Skaife (2007) examine the effect of income smoothing on the liquidity risk of firms' shares. They find that income smoothing may adversely affect the transparency of accounting data, thus affect investors' willingness to trade. As a result, reduced transparency will result in lower liquidity.

The first research question I examine in this paper is as follows: does income smoothing reduce firms' information uncertainty? The question is directly motivated by the aforementioned survey of more than 400 executives of US companies conducted by Graham, Harvey, and Rajgopal (2005). They find that an overwhelming majority of CFOs prefer smooth earnings paths and believe that smooth earnings will reduce firms' perceived risk. The reduction of perceived risk has a beneficial effect because it can lead to lower costs of equity and debt. Whether reducing firm's information uncertainty is indeed the intended objective of income smoothing and whether such objective is achieved remains an open question. To my knowledge, so far there has been no formal empirical study documenting the effect of income smoothing on information uncertainty.

In fact, existing literature has mixed predictions on the relation between income smoothing and information uncertainty[2]. For example, an implicit assumption of the empirical study of Francis, LaFond, Olsson and Schipper (2004) is that certain earnings attributes are desirable to the extent they reduce information risk, and thus help to reduce the cost of equity. Nevertheless, they point out that among all accounting-based earnings attributes, accrual quality is believed to have a direct link to information risk. Relatively, the link between income smoothing and information risk is less direct. They argue that a link to reduction of information risk requires that income smoothing not impair investors' information about firms' future cash flow. Similarly, when discussing the potential effect of income smoothing on earnings informativeness, Tucker and Zarowin (2006) point out that income smoothing may help investors to extract information from earnings if managers use their discretion to convey their assessment of future earnings. On the other hand, income smoothing can also introduce noise to earnings information if managers intentionally distort earnings numbers. LaFond, Lang and Skaife (2007) argue that opportunistic income smoothing may adversely affect the transparency of reported accounting information. As they point out, one economic consequence of lack of transparency is that it may affect investors' willingness to transact the firm's stocks. This likely will result in lower liquidity and higher transaction

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[2] In this study, information uncertainty or information risk refers to "value ambiguity, or the degree to which a firm's value can be reasonably estimated by even the most knowledgeable investors." (Jiang, Lee and Zhang , 2005). In particular, the uncertainty or risk reflects the imprecision, i.e. dispersion, of investors' estimates of firms' future performance (Francis, LaFond, Olsson and Schipper, 2004).

costs of firms' shares. If this argument holds, we would expect that less smooth earnings lead to higher information uncertainty. This is because low liquidity and high transaction costs hinder stock price discovery, and thus increase ambiguity about stock valuation. On the other hand, based on the asymmetric information argument Goel and Thakor (2003) have reached the opposite conclusion. According to their argument, smooth earnings will result in lower liquidity risk of firms' shares, and thus less information uncertainty. These mixed predictions about the effect of income smoothing on information uncertainty suggest that empirical study of this issue is important and useful.

While various existing studies show that income smoothing can be a desirable earnings attribute, the extant literature has not yet investigated the effect of income smoothing on stock returns. To fill the gap of the literature, the second research question of my study is: does income smoothing affect stock prices? The research question is directly related to the first research question, i.e., the effect of income smoothing on information uncertainty. My hypothesis is that if income smoothing reduces information uncertainty and investors are rational, income smoothing should be priced and thus affects stock prices. I note that in conventional risk return models by, e.g., Markowitz (1952), and Sharpe (1964), only systematic risk factors are priced. If income smoothing only reduces firm specific or idiosyncratic risk and such risk is diversifiable, then it should have no effect on stock prices. Nevertheless, Merton (1987) shows that in an information-segmented market, firm specific risk may be priced because investors cannot fully diversify it away. In addition, Easley and O'Hara (2004) show that in a multi-asset, multi-period setting with informed and uninformed investors, the information risk faced by the uninformed investors is not diversifiable and therefore priced. Lambert, Leuz and Verrecchia (2007) demonstrate that the effect of accounting information quality and financial disclosures is not diversifiable. As a result, these firm characteristics can affect stock prices.

Finally, I extend the study of Francis, LaFond, Olsson and Schipper (2004) and examine the effect of income smoothing on implied cost of equity. The rationale underlying the relation between income smoothing and cost of equity is parallel to that of the second research question. That is, if income smoothing does reduce information uncertainty and investors are rational, stocks of high smoothing firms should have lower expected returns. Again, following Merton (1987), Easley and O'Hara (2004), and Lambert, Leuz and Verrecchia (2007), the relation holds even if income smoothing only reduces firm specific risk when such risk is not fully diversified away by investors. Implied cost of equity, as a proxy of expected returns, offers a direct test of such relation. My analysis extends Francis, LaFond, Olsson and Schipper (2004) in two dimensions. In addition to the income smoothing measure used in their study based on total accruals, I also use income smoothing measure based on discretionary accruals. More importantly, instead of using cost of equity derived from *Value-Line* price target projection, I follow Dhaliwal, Heitzman and Li (2006) and construct four different implied cost of equity measures introduced, respectively, by Gebhardt, Lee, and

Swaminathan (2001), Claus and Thomas (2001), Gode and Mohanram (2003), and Easton (2004).

The main data used in my study is from Compustat, I/B/E/S and CRSP, covering the period of 1993 to 2006 and consisting of total 55,499 firm year observations. In the empirical analysis, I construct two measures of income smoothing, namely, the ratio of standard deviation of firms' cash flow to standard deviation of earnings (see, e.g., Francis, LaFond, Olsson and Schipper, 2004; and Leuz, Nanda and Wysocki, 2003; and LaFond, Lang and Skaife, 2007), and the negative correlation of a firm's change in discretionary accruals with its change in pre-managed earnings (see, e.g., Myers and Skinner, 2002; Leuz, Nanda and Wysocki, 2003; and Tucker and Zarowin, 2006). The former measure captures income smoothing effect through total accruals, whereas the latter captures income smoothing effect through discretionary accruals.

To examine the effect of income smoothing on information uncertainty, I follow existing literature and construct several variables as measures of information uncertainty. They include future realized stock return volatility, analyst forecast dispersion, and analyst forecast error. The notion of information uncertainty in my study is similar to that in Jiang, Lee and Zhang (2005) who define information uncertainty as "value ambiguity, or the degree to which a firm's value can be reasonably estimated by even the most knowledgeable investors." Realized stock return volatility directly measures uncertainty of stock valuation, whereas analyst forecast dispersion and forecast error measure the precision and accuracy of professional or sophisticated investors' forecasts of firms' future performance. I find evidence that income smoothing tends to reduce information uncertainty. Sorting firms according to income smoothing, firms in the high smoothing quintile have significantly lower stock return volatility, lower analyst forecast dispersion, and lower analyst forecast error than those in the low smoothing quintile. I also perform Fama-Macbeth regressions and confirm that the results are robust to controlling for other firm characteristics, such as size, book-to-market ratio, leverage, cash flow volatility, accruals, trading volume, trading turnover ratio, past volatility, analyst long-term-growth forecast, analyst two-year ahead earnings forecast, and analyst forecast revision.

To test the second hypothesis, i.e., whether market prices income smoothing, I use returns around earnings announcement dates. I believe that such return information offers a sharp test of the hypothesis. This is because returns around earnings announcement directly captures whether and how investors price certain attributes of reported earnings. In addition, measuring return over a short event window makes it relatively easier to control for other determinants of returns, such as adverse firm-specific events. Using earnings announcement dates from the Compustat quarterly industrial database, I compute cumulative returns during the earnings announcement window. Following Bernard and Thomas (1989), I also compute size-adjusted cumulative abnormal returns (*CAR*) during the earnings announcement window. Sorting firms into quintiles according to income smoothing, I find that firms in the high smoothing quintile earn significantly higher returns and abnormal returns than those in the low smoothing quintile. Since earnings announcement return is primarily a function of earnings surprises, I further perform sequential sorting, first on standardized unexpected earnings *(SUE)* and then on income smoothing. Even after controlling for the *SUE* effect, the return differentials between the high and low smoothing quintiles remain significant. Moreover, the return differential is mainly driven by firms with large positive and negative earnings shocks. Results from Fama-MacBeth regressions with explicit control for additional firm characteristics further confirm the same findings. I interpret the results as evidence that investors price income smoothing with a premium in stock prices and attach positive value to income smoothing.

Finally, I find that the relation between income smoothing and cost of equity is generally consistent with those documented in Francis, LaFond, Olsson and Schipper (2004). That is, income smoothing tends to reduce the implied cost of equity. I also find that income smoothing through discretionary accruals has a stronger effect on the reduction of cost of equity. Nevertheless, I find evidence that the relation between income smoothing and cost of equity also depends heavily on specific measures of cost of equity, particularly in multivariate regressions with common control variables.

The remainder of the paper is organized as follows. Section II provides a brief literature review as I develop main hypotheses of this study. Section III examines the effect of income smoothing on information uncertainty. Section IV further examines how investors price income smoothing. Section V investigates the relation between income smoothing and implied cost of equity. Section VI concludes. Details of models used for the estimation of implied cost of equity can be found in Appendix A, and details of variables definition and construction are in Appendix B.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Prior research has documented that firms consistently engage in income smoothing activities (Beidleman, 1973; Ronen and Sadan, 1981; Healy, 1985; Hunt, Moyer, and Shevlin, 1995; Chaney, Jeter, and Lewis, 1996; DeFond and Park, 1997). For example, DeFond and Park (1997) find evidence that when a firm's current performance is poor relative to expected future performance, managers tend to smooth income by increasing accruals, i.e., "borrow" future earnings for use in the current period. They also find that when a firm's current performance is good relative to expected future performance, managers choose income decreasing accruals, i.e. "save" earnings for future period. This type of income smoothing was notably referred to as the use of "cookie jar" reserves by former SEC Chair Arthur Levitt (1998). That is, firms reduce earnings in good periods so that earnings can be increased in later bad periods. The measures used in the existing literature typically captures two types of income smoothing: one is achieved through the use of total accruals (Francis, LaFond, Olsson and Schipper, 2004; and Leuz, Nanda and Wysocki, 2003; and LaFond, Lang and Skaife, 2007), which I refer to as the "total accruals income smoothing" in this study, and the other is achieved through the use of discretionary accruals (Myers and Skinner, 2002; Leuz, Nanda and Wysocki, 2003; and Tucker and Zarowin, 2006), which I refer to as the "discretionary accruals income smoothing".

As far as why firms smooth earnings, there is an extensive literature devoted to this issue. Some studies suggest that firm managers, out of their own interest, may have the incentive to smooth income, either to meet a bonus target (Healy, 1985), or to protect their jobs (Fudenberg and Tirole, 1995; Ayra, Glover, and Sunder, 1998). Other studies argue that income smoothing can also be beneficial from a shareholder's perspective. For example, Trueman and Titman (1988) suggest that high earnings volatility increases perceived bankruptcy probability. Income smoothing reduces the variation of earnings from period to period, thus reducing the perceived bankruptcy risk. As a result, income smoothing reduces a firm's borrowing costs. Moreover, if smoothing behavior raises the expected cash flow to investors, share price maximization may also prompt earnings smoothing. Argument based on asymmetric information suggests that uninformed shareholders prefer managers to report smooth earnings. Goel and Thakor (2003) argue that greater earnings volatility leads to a bigger informational advantage for informed investors over uninformed investors. If sufficiently many current shareholders are uninformed, they would prefer the managers to smooth reported earnings as much as possible. Furthermore, agency theory seems to suggest that earnings management in general, and income smoothing in particular, very often is the equilibrium outcome of optimal contracting (Dye, 1988; Dye and Verrecchia, 1995; Fudenberg and Tirole, 1995; Ayra, Glover and Sunder, 1998; and Demski and Frimor, 1999). With information asymmetry between owners and managers, firm insiders and outsiders, income smoothing is a viable way of revealing private information (Ronen and Sadan, 1981; Dye, 1988; Chaney and Lewis, 1995; Demski, 1998; Kirschenheiter and Melumand, 2002). Finally, from a tax savings perspective, Rozycki

(1997) suggests that due to the convexity of the tax code, income smoothing reduces the present value of a firm's expected future income tax liability.

As summarized briefly in the introduction, there have been a number of studies examining the effect of income smoothing on various accounting variables. This study extends the existing literature and examines the effect of income smoothing on firms' information uncertainty, stock returns, and cost of equity. The first hypothesis I will empirically test in this paper is as follows:

H1: *Income smoothing reduces firms' information uncertainty.*

The research question is directly motivated by a survey of more than 400 executives of US companies conducted by Graham, Harvey, and Rajgopal (2005). When asked about their preference of earnings paths, an overwhelming majority (96.9%) of CFOs respond that they prefer smooth earnings paths to bumpy earnings paths. The surveyed CFOs believe that smooth earnings will reduce perceived risk of firms or uncertainty about firm valuation. As such, investors will demand a smaller risk premium and the cost of equity and debt will be lower. In particular, the CFOs also convey their belief that smoother earnings make it easier for analysts and investors to predict future earnings and boost stock prices. Considering such enthusiasm among managers for smooth income, Graham, Harvey, and Rajgopal (2005) note that the issue seems understudied in the academic literature based on the number of published studies on income smoothing.

Whether reducing firm's information uncertainty is indeed the intended objective of income smoothing and whether such objective is achieved remains an open question. To my knowledge, so far there has been no formal empirical study examining the effect of income smoothing on information uncertainty.

Before proceeding, I note that in my study the concept of information uncertainty is different from earnings informativeness as examined in Tucker and Zarowin (2006). Tucker and Zarowin (2006) focus on the effect of income smoothing on earnings persistence, and on the informativeness of future earnings. In other words, their concern is whether income smoothing will improve the *efficiency* of *current* stock prices in terms of incorporating future earnings information. In contrast, information uncertainty or information risk in my study refers to market or investors' *ambiguity* about *future* stock prices. Information uncertainty or information risk reflects "value ambiguity, or the degree to which a firm's value can be reasonably estimated by even the most knowledgeable investors." (Jiang, Lee and Zhang , 2005). In particular, the uncertainty or risk reflects the imprecision, i.e., dispersion, in investors' estimates of firms' future performance (Francis, LaFond, Olsson and Schipper, 2004). Therefore, although related, information uncertainty and earnings informativeness are two different concepts. When past and current earnings are more informative about future earnings and cash flows, it is typically achieved through high persistence of earnings as documented in Tucker and Zarowin (2006). However, the unpredicted component of future earnings and cash flows may not necessarily be reduced[3]. The information uncertainty variables constructed in this study directly measure uncertainty about future stock prices or uncertainty about future cash flows.

A further motivation of the above research question is that there have been mixed predictions on the relation between income smoothing and information uncertainty in the existing literature. As mentioned earlier, an implicit assumption of the empirical study by Francis, LaFond, Olsson and Schipper (2004) is that smoothness is desirable earnings attribute because it likely reduces uncertainty about future cash flow. Nevertheless, they point out that among all accounting-based earnings attributes, the link between income smoothing and information risk is less direct than the link between accrual quality and information risk. For example, while managers can use their private information about future income to smooth out transitory earnings fluctuations, they might also make reporting choices opportunistically in order to report extremely smooth earnings. If those reporting choices fail to convey information about future cash flow, then the result will not be a reduction in information risk. They further argue that in order for income smoothing to reduce information uncertainty, it requires that income smoothing is done to improve market or investors' information about firms'

[3] A concrete example is the case where a firm's business is subject to unexpected large cyclical shocks. Suppose for simplicity there are two components in future earnings, the permanent component containing information related to fundamental stock valuation, and the transitory component representing uncertain earnings shocks. By smoothing out cyclical earnings shocks, it may make it easier to predict the permanent component of future earnings (and thus increases earning's informativeness) but could be at the price of introducing large fluctuations of transitory earnings shocks.

future cash flow. Similarly, when discussing the potential effect of income smoothing on earnings informativeness, Tucker and Zarowin (2006) point out that income smoothing may make it easier for investors to extract information from earnings if managers use their discretion to communicate their private information about future earnings. On the other hand, income smoothing can also add noise to earnings information if managers intentionally distort earnings numbers. In addition, LaFond, Lang and Skaife (2007) argue that opportunistic application of income smoothing may adversely affect the transparency of reported accounting data. As they point out, one economic consequence of lack of transparency is that it may affect investors' willingness to trade firm's shares. As such, reduced transparency will result in lower liquidity, thus increasing the firm's cost of capital due to increased liquidity risk. Moreover, high transaction costs associated with low liquidity may hinder stock price discovery, and thus also increase ambiguity about stock prices. On the other hand, based on the asymmetric information argument Goel and Thakor (2003) reach the opposite conclusion. They argue that since greater earnings volatility leads to a bigger information advantage for informed investors over uninformed investors, an increase in the volatility of reported earnings will magnify uninformed investors' trading losses and drive them out of the market. As a result, contrary to LaFond, Lang and Skaife (2007), they believe that smooth earnings will keep uninformed investors in the market, consequently increasing trading liquidity.

The second hypothesis I test in this study builds upon the first hypothesis (*H1*), i.e., income smoothing reduces information uncertainty. The combination of *H1* and investor rationality leads to the following hypothesis.

H2: *Market or investors price income smoothing. That is, income smoothing affects stock prices.*

Existing studies have provided evidence that income smoothing is a desirable earnings attribute. For example, Francis, LaFond, Olsson and Schipper (2004) show that income smoothing tends to reduce the cost of equity. Tucker and Zarowin (2006) provide evidence that income smoothing increases the persistence of earnings. Gu and Zhao (2006) show that income smoothing has a positive effect on corporate bond ratings. However, extant literature is yet to investigate the question: does income smoothing affect stock prices? My research fills the gap in the existing literature.

The above hypothesis is also directly built upon the first hypothesis (*H1*), i.e., income smoothing reduces information uncertainty. If *H1* holds and investors are rational, we should expect that there is a premium attached to income smoothing. I note that in conventional risk return models by, e.g., Markowitz (1952), and Sharpe (1964), only systematic risk factors are priced. If income smoothing only reduces firm specific or idiosyncratic risk and such risk is diversifiable, then it should have no effect on stock prices. Nevertheless, Merton (1987) shows that in an information-segmented market, firm specific risk may be priced because investors cannot fully diversify it away. Lambert, Leuz and Verrecchia (2007) demonstrate that the effect of higher quality accounting information and financial disclosures is not diversifiable. As a result, accounting information quality and financial disclosure may affect stock prices. Easley and O'Hara (2004) also show that in a multi-asset, multi-period setting with informed and uninformed investors, the information risk faced by uninformed investors is not diversifiable and will therefore be priced.

Among various studies that examine the relation between returns and earnings attributes, Subramanyam (1996) shows that the market prices discretionary accruals. Performing cross-sectional regression of stock returns against discretionary and nondiscretionary accruals components of net income, he finds that the discretionary component of net income is priced by the market. That is, contemporaneous stock returns are higher for firms with a higher component of discretionary accruals. In this respect, my research question is similar to that of Subramanyam (1996). However, my empirical analysis here is different from Tucker and Zarowin (2006). There are mainly two differences. First of all, Tucker and Zarowin (2006) examine the effect of income smoothing on *FERC* in current stock price (i.e., the “interaction” effect). Whereas I examine the premium attached to income smoothing based on its direct relation with returns (i.e., the “mean” effect). Second, Tucker and Zarowin (2006) focus on the relation between stock returns and *future* accounting information. In contrast, I focus on the relation between stock prices (or returns) and *contemporaneous* accounting characteristics.

To test the above hypothesis, I use returns around earnings announcement dates in my empirical analysis. I argue that returns around earnings announcement provide a sharp test for the following reasons. First of all, different from other firm characteristics, such as size and book to market, income smoothing is an earnings attribute that is revealed to investors at earnings announcement. Thus, returns around earnings announcement dates are more efficient measures of whether investors price earnings attribute such as smoothness. Secondly, by focusing on a short event window it is easier to control for other determinants of returns, such as unexpected earnings shocks. In comparison, returns observed over longer holding period may be a function of many unknown determinants, and thus too noisy for the purpose of my test.

The third hypothesis of this paper is as follows.

H3: *Income smoothing reduces firms' implied cost of equity.*

The motivation of the above hypothesis parallels that of H2. That is, if income smoothing does reduce information uncertainty and investors are rational, we should expect firms engaging in income smoothing to have lower expected returns, and thus lower cost of capital.

Other than the fact that implied cost of equity is a very important variable in accounting, there is another reason to use implied cost of equity to test the relation between information uncertainty and expected returns. As pointed out in many existing studies, realized stock returns can be poor proxies of expected stock returns. For example, in his 1999 AFA presidential address, Elton (1999) states that "the use of average realized returns as a proxy for expected returns relies on a belief that information surprises tend to cancel out over the period of a study and realized returns are therefore an unbiased measure of expected returns. However, I believe there is ample evidence that this belief is misplaced." It seems that a number of anomalies documented in the literature are because "realized returns are a very poor measure of expected returns …" The implied cost of equity measures are discount rates extracted from valuation models based on analyst earnings forecasts. Thus, these measures are *ex ante* by nature, and conceptually better proxy for expected returns.

As mentioned earlier, Francis, LaFond, Olsson and Schipper (2004) have examined the relation between income smoothing and cost of equity. The implicit assumption of their study is essentially the hypothesis I explicitly test here, i.e., if income smoothing helps to reduce information risk then it will lead to lower expected returns or cost of equity. Their analysis is based on the total accruals income smoothing measure and the implied cost of equity derived from *Value-Line* price target projection. In this study, I construct an additional measure of income smoothing based on the negative correlation of a firm's change in discretionary accruals with its change in pre-managed earnings. Moreover, in my empirical analysis I follow Dhaliwal, Heitzman and Li (2006) and construct four different implied cost of equity measures introduced, respectively, by Gebhardt, Lee, and Swaminathan (2001), Claus and Thomas (2001), Gode and Mohanram (2003), and Easton (2004).

3. INCOME SMOOTHING AND INFORMATION UNCERTAINTY

3.1 Variable Construction

The datasets used in this study are Compustat accounting data, I/B/E/S analyst forecast and Center for Research in Security Prices (CRSP) stock return data. The sample period is from 1988 to 2006, with 55,499 firm-year observations.

I construct two income smoothing measures using data from Compustat: *Total Accrual Income Smoothing (TA Smoothing)* and *Discretionary Accrual Income Smoothing (DA Smoothing)*. Following Leuz, Nanda and Wysocki (2003), Francis, LaFond, Olsson and Schipper (2004), and LaFond, Lang and Skaife (2007), *TA Smoothing* is measured by *Std(CFO)/Std(NIBE)* over the prior five years, with a higher value corresponding to higher income smoothing. CFO is cash flow from operations, and *NIBE* is net income before extraordinary items. Both variables are scaled by total assets at the beginning of the year. To construct *DA Smoothing* measure, I follow Kothari, Leone, and Wasley (2005) and Tucker and Zarowin (2006) and estimate the following performance-adjusted accruals model:

$$Accruals_t = \beta_0(1/Assets_{t-1}) + \beta_1 \Delta Sales_t + \beta_2 PPE_t + \beta_3 ROA_t + \varepsilon_t,$$

where total accruals (*Accruals*), change in sales (*ΔSales*), and net property, plant and equipment (*PPE*) are all scaled by the beginning-of-year total assets. Return on assets (*ROA*) is the performance-adjusting control variable. The above equation is estimated cross-sectionaly each year within the same industry group (Fama-French 48 industries) to obtain the fitted value of *Accruals* and the estimation errors. The fitted value is the non-discretionary accruals, and the difference between observed value and the fitted value, i.e., the residual $\widehat{\varepsilon_t}$, is the discretionary accruals. Pre-discretionary income is defined as net income minus discretionary accruals. *DA Smoothing* is the negative correlation of a firms' change in discretionary accruals and its change in pre-managed income, with five-year rolling window.

As discussed earlier, the concept of "information uncertainty" or information risk in this study carries similar meaning of "value ambiguity, or the degree to which a firm's value can be reasonably estimated by even the most knowledgeable investors." (Jiang, Lee and Zhang , 2005). The ambiguity derives from imprecision, i.e., dispersion, in estimating firms' future performance (Francis, LaFond, Olsson and Schipper, 2004). Following Jiang, Lee and Zhang (2005) and Zhang (2006a), I use stock return volatility as a proxy for information uncertainty. I also construct two variables based on analyst earnings forecasts, namely forecast dispersion (Zhang, 2006a) and forecast error (Zhang, 2006b). Stock return volatility directly measures the fluctuations or uncertainty of stock prices, whereas forecast dispersion and forecast error measure the precision and accuracy of professional investors' forecasts of firms' future earnings. *Volatility* is computed as annualized return volatility using one year ahead daily return observations. There are on average 252 trading days per calendar year. *Forecast Dispersion* is the standard deviation of I/B/E/S analysts' one year ahead annual EPS forecasts scaled by consensus annual EPS forecast. *Forecast Error* is the absolute difference between realized annual EPS and I/B/E/S analysts' EPS forecast. Stock returns data are from CRSP, and analyst earnings forecasts are from I/B/E/S.

Table 1 reports summary statistics of income smoothing measures and information uncertainty variables. *Discretionary Accrual Income Smoothing (DA Smoothing)* has fewer observations than *Total Accrual Income Smoothing (TA Smoothing)* due to additional accounting information required in the estimation. Similarly, *Forecast Dispersion* and *Forecast Error* have fewer observations than *Volatility* since the I/B/E/S data only covers a subset of CRSP stocks. The correlation matrix shows that two income smoothing measures are positively correlated, with a Pearson (Spearman) correlation of 0.283 (0.690). The three information uncertainty variables are also positively correlated.

3.2 Empirical Results

To examine the relation between income smoothing and information uncertainty, I sort all firms in the sample into quintiles based on income smoothing measures in year *t*. The average information uncertainty variables (year *t+1*) of firms in each quintile as well as the differences between the top and bottom income smoothing quintiles are computed. The *Newey-West t*-statistics with one year lag are also computed[4]. The results based on *Total Accrual Income Smoothing (TA Smoothing)* are reported in Panel A of Table 2. The results show that all three information uncertainty variables are monotonically decreasing as income smoothing increases. The differences between the top and bottom income smoothing quintiles are highly significant for all three variables based on the *Newey-West t*-statistics. The *Newey-West t*-statistics are, respectively, -9.45, -9.31, and -8.22 for three information uncertainty variables. This is evidence that income smoothing significantly reduces information uncertainty across firms. [5]

One obvious concern for the single sorting results is that there is a large variation of information uncertainty across firms and the pattern could be partially driven by other information uncertainty determinants. For example, it is known that cash flow volatility is highly positively correlated with stock return volatility and makes analyst earnings forecast noisier. To control for this effect, I perform sequential sorting. First, I sort all firms into 5 groups according to cash flow volatility in year *t* (*Std(CFO))*, and then within each subgroup I sort firms into quintiles according to income smoothing measure. Cash flow volatility is the standard deviation of operating cash flow over the past 5 years, scaled by total assets at the beginning of the year. The average information uncertainty variables (year *t+1*) of firms in each quintile as well as the

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[4] Since variables such as return volatility are not only heteroscedastic but also persistent over time, the *Newey-West t*-statistics are computed to take into account of both heteroscedasticity and autocorrelations.

[5] For this analysis as well as subsequently analyses, results sorted on *Discretionary Accrual Income Smoothing (DA Smoothing)* are not reported for brevity as they are similar to those sorted on *Total Accrual Income Smoothing (TA Smoothing)*.

differences between the top and bottom income smoothing quintiles within each cash flow volatility subgroup are computed. The *Newey-West t*-statistics with one year lag are also computed. The results based on *TA Smoothing* are reported in Panel B of Table 2. The results show that there is indeed a positive correlation between cash flow volatility and information uncertainty variables. More importantly, within each cash flow volatility subgroup, the same effect of income smoothing on information uncertainty is observed. That is, income smoothing significantly reduces firms' information uncertainty. To further control for the effect of cash flow volatility, I average the information uncertainty variables across different cash flow volatility subgroups with the same income smoothing rank. The results are reported in the last row of each subpanel in Panel B. The differences between the top and bottom income smoothing quintiles remain significant for all information uncertainty variables. The *Newey-West t*-statistics are, respectively, -8.93, -8.38, and -6.06 for stock return volatility, forecast dispersion, and forecast error. In other words, the relation between income smoothing and information uncertainty is robust to the effect of cash flow volatility.

To further control for other potential determinants of information uncertainty, I perform Fama-MacBeth regressions with additional control variables. Following Alford and Boatsman (1995), Diether, Malloy and Scherbina (2002), Johnson (2004), and Hughes, Liu and Su (2008), the additional control variables used in my analysis include *ln(Size), ln(BM)*, *Leverage, Accruals, ln(Volume), Turnover,* $Volatility_{5yr}$, *LTG,* EPS_{t+2}, and

Forecast Revision. All these variables are believed to be related to firm's information uncertainty. *ln(Size)* is natural log of market value of common equity at fiscal year end. *ln*(*BM)* is natural log of the book to market ratio, which is the ratio of common equity book value to market value at fiscal year end. *Leverage* is the ratio of long-term debt to total assets. *Accruals* is the difference between net income before extraordinary items and cash flow from operations, scaled by total assets at the beginning of the year. *ln(Volume)* is natural log of average daily trading volume during the past year. *Turnover* is average daily turnover ratio during the past year. Daily turnover ratio is daily trading volume divided by shares outstanding. $Volatility_{5yr}$ is return volatility over the past five years. *LTG* is I/B/E/S long term growth rate forecast. EPS_{t+2} is I/B/E/S two year ahead EPS forecast. *Forecast Revision* is the revision to the consensus analyst forecast of year *t +1* earnings made just after year *t* earnings are announced. Specifically, it is the difference between the first mean I/B/E/S consensus one-year-ahead forecast of year *t + 1* earnings after the earnings announcement and the last mean consensus two-year-ahead forecast of year *t + 1* earnings prior to the earnings announcement, scaled by share price at the end of year *t* (Barth and Hutton, 2004). Summary statistics of these control variables are reported in Table 1.

Each year, I perform cross-sectional regressions of information uncertainty variables on income smoothing measures with and without control variables. The time series averages of the coefficients, and the *Newey-West t*-statistics with one year lag, are computed. The regression results based on *TA Smoothing* and *DA Smoothing* are reported, respectively, in Tables 3 and 4. The results are consistent between two income smoothing measures. As seen from Tables 3 and 4, in all univariate regressions the coefficients of income smoothing are significantly negative. Controlling for other potential determinants of information uncertainty in the multivariate regressions, the coefficients of income smoothing remain significantly negative. Based on *TA Smoothing* in Table 3, the *Newey-West t*-statistics of income smoothing coefficients are, respectively, -2.84, -12.35, and -2.52 for the volatility, forecast dispersion and forecast error regressions. This is further evidence that income smoothing significantly reduces firms' information uncertainty, and the results are robust even after I explicitly control for other determinants of information uncertainty. I also note that in the multivariate regressions, the signs of most of control variables are consistent with the prediction of the literature. The only exception is leverage which has a significant (at 5%) negative relation with return volatility[6].

[6] I also computed the correlation of stock return volatility with contemporaneous firm leverage, and find that it is also negative, with a Pearson (Spearman) correlation of -0.052 (-0.159). One possibility is that the negative sign is driven by specific sample in my study. Nevertheless, Figlewski and Wang (2000) provides evidence that higher stock return volatility is more related to negative returns and has little direct connection to firm financial leverage.

4. INCOME SMOOTHING AND STOCK RETURNS

4.1 Variable Construction

To test the second hypothesis, I use earnings announcement returns. Existing literature has used various windows around the earnings announcement dates to measure earnings announcement returns, with varying number of days before and after announcement date (Jegadeesh and Titman, 1993; Titman, Wei, and Xie, 2004). Typically, the range is up to 2 days before and 2 days after announcement date. In this analysis, I use a 5-day window centered around earnings announcement date to measure announcement returns. Each quarter, I compute cumulative 5-day returns ($Cumulative\ Returns_{(-2,2)}$) around earnings announcement dates. Following Bernard and Thomas (1989), cumulative abnormal returns ($CAR_{(-2,2)}$) are also computed. In the beginning of each year, I sort stocks in CRSP into deciles according to size, daily abnormal return for each stock is calculated as the difference between a firm's raw daily return and equally weighted daily return of the size decile that the firm belongs to. $CAR_{(-2,2)}$ around earnings announcement dates are then computed. Stock return data is from CRSP, and earnings announcement dates are obtained from the Compustat quarterly industrial database. Summary statistics of both $Cumulative\ Returns_{(-2,2)}$ and $CAR_{(-2,2)}$ are reported in Panel A of Table 5. Correlations of the return and income smoothing measures are reported in Panel B of Table 5.

4.2 Empirical Results

To examine the relation between income smoothing and earnings announcement returns, each quarter I sort all firms into quintiles according to income smoothing. Panel A of Table 6 reports the average *Cumulative Returns*$_{(-2,2)}$ and average *CAR*$_{(-2,2)}$ of each quintile as well as the differences between the top and bottom income smoothing quintiles based on *TA Smoothing*. There is a steady increase of announcement returns across quintiles as income smoothing increases. The differences in returns between the top and bottom income smoothing quintiles are positive and statistically significant for both *Cumulative Returns*$_{(-2,2)}$ and *CAR*$_{(-2,2)}$, based on the *Newey-West t*-statistics with one quarter lag. The differential of 5-day cumulative returns (CAR) between the top and bottom income smoothing quintiles is 0.551% (0.606%) with t-statistic of 4.154 (4.851).

Earnings announcement returns are undoubtedly determined by other variables, most important of which is unexpected earnings shocks. It is thus important to control for earnings shocks. Following Foster (1977), Foster, Olsen, and Shevlin (1984), and Bernard and Thomas (1989), I estimate standardized unexpected earnings (*SUE*) each quarter. Specifically, forecasted earnings are estimated based on the following univariate time-series model used by Foster (1977) and Foster, Olsen, and Shevlin (1984), with rolling 20-quarter observations:

$$E(Q_{it}) = Q_{i,t-4} + \varphi_i(Q_{it-1} - Q_{i,t-5}) + \varsigma_i,$$

where Q_{it} is the quarterly earnings of the *i*th firm in period *t*. The difference between the actual and forecasted earnings is then scaled by the standard deviation of forecast error over the estimation period to obtain standardized unexpected earnings (*SUE*). Quarterly earnings data are obtained from Compustat.

To control for the effect of earnings shocks, I perform sequential sorting. Each quarter, I first sort all firms into 5 subgroups according to *SUE*, and then sort firms in each *SUE* subgroup into quintiles according to the income smoothing measure. The average returns of each quintile as well as differences between the top and bottom quintiles within each *SUE* subgroup are then computed. The results based on *TA Smoothing* are reported in Panel B of Table 6. It is clear that announcement returns are highly correlated to earnings shocks. Nevertheless, within each *SUE* subgroup earnings announcement returns also increase steadily as income smoothing increases. The patterns are strongest for the first, second, and fifth *SUE* subgroups. The differences between the top and bottom income smoothing quintiles are statistically significant for both $Cumulative\ Returns_{(-2,2)}$ and $CAR_{(-2,2)}$ in these three *SUE* subgroups. The signs are also positive for other two subgroups but not statistically significant. After controlling for the effect of *SUE* by averaging earnings announcement returns across different *SUE* subgroup with the same income smoothing rank, the differences between the top and bottom income smoothing quintiles remain statistically significant. The results are reported in the last row of each subpanel in Panel B. Overall, the results suggest that there is a significantly positive relation between earnings announcement returns and income smoothing. The significance is mainly driven by firms with either large negative earnings shocks or large positive earnings shocks.

To include more control variables in my analysis, I perform quarterly Fama-MacBeth regressions. The additional control variables include: *ln(Size), ln(BM), Leverage, Std(CFO), and Accruals.* These variables are believed to be determinants of stock returns. *ln(Size)* is not included in *CAR* regression since the cumulative abnormal returns are adjusted for size effect already. Each quarter, I perform cross-sectional regressions of earnings announcement returns on income smoothing with various sets of control variables. The time series averages of the coefficients, and the *Newey-West t*-statistics with one quarter lag, are also computed. The results for different regression models are reported in Tables 7 and 8 for *TA Smoothing* and *DA Smoothing* measures, respectively. The results are generally consistent between Table 7 and Table 8. First of all, in all univariate tests the coefficients of income smoothing are positive and statistically significant. Using *TA Smoothing*, the *Newey-West t*-statistics is 3.05 for *Cumulative Returns*$_{(-2,2)}$ regression and 3.53 for *CAR*$_{(-2,2)}$ regression (Table 7). Using *DA Smoothing*, the *Newey-West t*-statistics is 3.7 for *Cumulative Returns*$_{(-2,2)}$ regression and 4.95 for *CAR*$_{(-2,2)}$ regression (Table 8). Secondly, in all univariate regressions of announcement returns on *SUE* the coefficients of *SUE* are, as expected, positive and highly significant. As gauged by much higher adjusted R^2 of these regressions, *SUE* is a much more important determinant of announcement returns. Thirdly, when both income smoothing and *SUE* are included in the regression, the coefficients of both variables remain significant and there is a marginal increase of adjusted R^2 over respective univariate regressions. Finally and most importantly, the coefficients of income smoothing remain significant in the multivariate regressions with additional control variables. For results in Table 7 based on *TA Smoothing,* the t-statistics are, respectively, 3.31 and 3.39 for the *Cumulative Returns*$_{(-2,2)}$ and *CAR*$_{(-2,2)}$ regressions. In other words, the explanatory power of income smoothing for announcement returns is not subsumed by information contained in control variables. This is further evidence that the market prices income smoothing and there are higher earnings announcement returns for firms with smoother earnings. The effect is robust to controlling for other firm characteristics and earnings characteristics, including earnings shocks and accruals.

It is also worth noting that consistent with results documented in Subramanyam (1996), I find a positive relation between accruals and earnings announcement returns. Firms with higher cash flow volatility tend to have significantly lower earnings announcement returns.

5. INCOME SMOOTHING AND IMPLIED COST OF EQUITY

5.1 Variable Construction

I follow Dhaliwal, Heitzman and Li (2006) and construct four different measures of implied cost of equity in my study. These measures are estimated from four variations of the residual income valuation model by Gebhardt, Lee, and Swaminathan (2001), Claus and Thomas (2001), Gode and Mohanram (2003), and Easton (2004). I denote these measures by r_{gls}, r_{ct}, r_{gm} and r_{peg}, respectively. For specifications of all four models, please refer to Appendix B. In addition, I also include the average of above four measures (denoted by r_{avg}) in my analysis. As noted in Dhaliwal, Heitzman and Li (2006), several recent studies have also used one or more of above implied cost of equity measures to examine various issues in accounting and finance (e.g., Botosan and Plumlee, 2002; Francis, LaFond, Olsson and Schipper, 2004; Hail and Leuz, 2006).

Summary statistics of the implied cost of equity measures are reported in Table 9. The correlations among these variables and with income smoothing measures are also reported. The correlations among the cost of equity measures are all positive but with varying magnitudes. The Pearson correlation is highest between r_{gm} and r_{peg} at 0.589, and lowest between r_{gls} and r_{peg} at 0.059. As pointed out in Dhaliwal, Heitzman and Li (2006), while all four measures have been used in previous studies as estimates of firm's cost of equity, there appears to be considerable variation in the magnitude of the associations between these variables and individual risk proxies. There is so far no consensus as to which measure is superior as proxy for cost of equity. The correlations between cost of equity measures and income smoothing measures are generally negative.

5.2 Empirical Results

To examine the relation between income smoothing and implied cost of equity, I sort all firms into quintiles according to income smoothing measures in year *t*. The average cost of equity measures (in year *t*) of all firms in each quintile as well as the differences between the top and bottom quintiles are computed. The *Newey-West t*-statistics are also computed. The results based on *TA Smoothing* are reported in Table 10. The results show that all four measures of cost of equity decrease as income smoothing increases. The differences between the top and bottom income smoothing quintiles are negative and statistically significant for all four measures of cost of equity and their average. The *Newey-West t*-statistics range from -2.67 for r_{avg} to -4.66 for r_{gm}.

To further control other determinants of cost of equity, I perform Fama-MacBeth regressions. Following Francis, LaFond, Olsson and Schipper (2004) and Dhaliwal, Heitzman and Li (2006), I control for *ln(Size)*, *ln(BM), Quality*, *Persistence, Predictability, Leverage, ln(Dispersion), LTG,* β_{MKT}, β_{SBM}, and β_{HML}, where *ln(Size)*, *ln(BM), Leverage, Dispersion and LTG* are the same as previously defined. *Quality* is *1/Std(Discretionary Accruals)* over the prior five years. *Discretionary Accruals* is the estimation error of Kothari, Leone and Wasley (2005) performance-adjusted accruals model each year within the same Fama-French 48 industry groups, same as in Section III.1. *Persistence* is the slope coefficient of the following autoregressive model of annual earnings, $X_t=\varphi_0 + \varphi_1 X_{t-1}+\upsilon_t$, with 10-year rolling window. *Predictability* is $-Std(\varphi_1)$ over the prior ten years. φ_1 is obtained from the above autoregressive model of annual earnings. β_{MKT}, β_{SBM}, and β_{HML} are the Fama and French (1993) risk factor loadings based on the past 60 monthly returns ending in June of year *t*, with at least 24 months observations.

I perform annual cross-sectional regressions of cost of equity measures on income smoothing, both with and without control variables. The results are reported in Table 11 for *TA Smoothing* and Table 12 for *DA Smoothing*. The coefficients of industry dummies are not reported for brevity. The results in both tables show that in all univariate regressions, the coefficients of income smoothing are negative and statistically significant, confirming the results reported in Table 10. The results also show that income smoothing has the highest predictive power for the cross-sectional Gode and Mohanram (2003) cost of equity measure, and the least power for the Gebhardt, Lee, and Swaminathan (2001) measure. Overall, *DA Smoothing* (Table 12) has higher predictive power of cost of equity than *TA Smoothing.* For instance, the Gode and Mohanram (2003) measure (r_{gm}) regression on *TA Smoothing* has an adjusted R^2 of 0.0145, whereas the same regression on *DA Smoothing* has an adjusted R^2 of 0.0186. This is evidence that income smoothing through discretionary accruals has a stronger effect in reducing firms' cost of equity. The multivariate regression results are mixed and varying across different measures of cost of equity. Results in Table 11 show that while the *TA Smoothing* coefficients are negative in all regressions, it is only statistically significant for the Gode and Mohanram (2003) measure (r_{gm}), the Easton (2004) measure (r_{peg}), and the average cost of equity measure (r_{avg}). Similarly, results in Table 12 based on *DA Smoothing* show that the income smoothing coefficient is only significant for the Gode and Mohanram (2003) measure (r_{gm}) and the average cost of equity measure (r_{avg}). In other regressions, the predictive power of income smoothing for implied cost of capital is subsumed by information in control variables.

Overall, the multivariate regression results depend on specific measure of implied cost of equity. There are several possible explanations. First of all, the four measures of cost of equity may be proxy of expected returns over different horizons. For example, the Gode and Mohanram (2003) (r_{gm}) and the Easton (2004) measure (r_{peg}) are estimated using analyst earnings forecasts up to only two years, whereas the other two measures use analyst earnings forecasts over longer horizons. This may explain why *TA Smothing* has significant predictive power for r_{gm} and r_{peg} in the model regressions, but not for other two measures. Secondly, while it is possible that income smoothing is only related to short-term expected returns, it is also likely that analysts' earnings forecasts over longer horizon are less accurate. In addition, assumptions imposed on the estimation procedure may introduce biases or noises to certain implied cost of equity measure. For example, the Gebhardt, Lee, and Swaminathan (2001) measure (r_{gls}) assumes that firms' long-run earnings revert to industry mean and all intermediate earnings projections are simple interpolations of short term forecast and industry mean. Finally, the significant explanatory power of certain control variables for the cost of equity measures suggest that analysts may incorporate information contained in these variables when performing earnings forecasts, especially over longer horizon. As a result, including these variables in a multivariate regression subsumes away the explanatory power of income smoothing measures.

6. CONCLUSION

In this study, I examine the effect of income smoothing on information uncertainty, stock returns, and implied cost of equity. I construct two measures of income smoothing in my study, total accrual income smoothing and discretionary accrual income smoothing. Using stock return volatility, analyst earnings forecast dispersion and forecast error as measures of information uncertainty, I show that income smoothing firms tend to have less information uncertainty. In addition, I show that market and investors attaches a value to income smoothing. Specifically, firms with higher income smoothing tend to have significantly higher earnings announcement returns. Finally, I show that firms with lower income smoothing tend to have lower implied cost of equity. The results corroborate with existing studies in that income smoothing through discretionary accruals has a stronger effect in reducing firms' cost of equity. However, my results also show that income smoothing has a stronger negative relation with implied cost of equity measures based on analysts' earnings forecasts over short horizon.

APPENDIX A: MODLES USED TO ESTIMATE THE COST OF EQUITY CAPITAL

Following Dhaliwal, Heitzman and Li (2006), the implied cost of equity is estimated by implementing four variations of residual income valuation model.

The common definitions to all four models are the following:

P_t = price per share of common stock in June of year *t* as reported by I/B/E/S

B_t = book value at the beginning of the year divided by the number of common share outstanding in June of year *t*

DPS_0= dividends per share paid during year *t-1*

EPS_0= actual earnings per share reported by I/B/E/S for year *t-1*

LTG= consensus long-term growth forecast reported in June of year *t*

$FEPS_{t+i}$= forecasted earnings per share for *i* years ahead of year *t*. $FEPS_1$ and $FEPS_2$ are equal to the one and two-year-ahead consensus EPS forecasts reported in I/B/E/S in June of year *t*.

k= expected dividend payout ratio, calculated as DPS_0/EPS_0. If $EPS_0 \leq 0$, then *k* is equal to *6%* of the total assets at the beginning of year *t*

r_{rf}= Risk-free rate equal to the yield on a 10-year Treasury note in June of year *t.*

Model 1 Gebhardt, Lee, and Swaminathan (2001):

$$P_t = B_t + \sum_{i=1}^{11} \frac{FROE_{t+i} - r_{gls}}{(1+r_{gls})^i} B_{t+i-1} + \frac{FROE_{t+12} - r_{gls}}{r_{gls}(1+r_{gls})^{11}} B_{t+11},$$

where

r_{gls}= implied cost of equity

$FROE_{t+i}$= forecasted return on equity. For the first three periods, *FROE* is equal to $FEPS_{t+i}/B_{t+i-1}$. Subsequent *FROE* forecasts are a linear interpolation to industry median *ROE*, with industries defined using the 48 classifications in Fama and French (1997)

B_{t+i}= $B_{t+i-1} + FEPS_{t+i} \cdot (1+k)$. Forecasts of *B* are based on the clean surplus relation, I/B/E/S earnings forecasts, and the year t dividend payout rate.

Model 2 Claus and Thomas (2001)

$$P_t = B_t + \sum_{i=1}^{5} \frac{FEPS_{t+i} - r_{ct} B_{t+i-1}}{(1+r_{ct})^i} B_{t+i-1} + \frac{(FEPS_5 - r_{ct} B_4)(1+g)}{(r_{ct} - g)(1+r_{ct})^5},$$

where

r_{ct}= implied cost of equity

$FEPS_{t+i}$= I/B/E/S consensus for the first two years, for years three, four, five, consensus forecasts if available, otherwise,
$FEPS_{t+i} = FEPS_{t+i-1} \cdot (1+LTG)$

B_{t+i}= $B_{t+i-1} + 0.5 \cdot FEPS_{t+i}$

g= $r_{rf} - 0.03$.

Model 3 A model based on Ohlson and Jüettner-Narouth (2005) and implemented by Gode and Mohanram (2003)

$$r_{gm} = A + \sqrt{A^2 + \frac{FEPS_{t+1}}{P_t}(g_2 - (r_{rf} - 0.03))}$$

where

A= $0.5[(r_{rf} - 0.03) + (DPS_0/P_t)]$

g_2= $(FEPS_{t+2} - FEPS_{t+1})/FEPS_{t+1}$
$FEPS_{t+2} > 0$, and $FEPS_{t+1} > 0$.

Model 4 Easton's (2004) implementation of Ohlson and Jüettner-Narouth (2005)

$$P_t = \frac{FEPS_{t+2} + r_{peg} DPS_0 - FEPS_{t+1}}{r_{peg}^2},$$

where $FEPS_{t+2} \geq FEPS_{t+1} \geq 0$.

APPENDIX B: SUMMARY OF VARIABLE DEFINITIONS

Income Smoothing Measures

TA Smoothing= *Std(CFO)/Std(NIBE)* over the prior five years, where *CFO* is cash flow from operation and *NIBE* is net income before extraordinary items, both are scaled by total assets at the beginning of the year.

DA Smoothing= the negative correlation between the change in discretionary-accruals and the change in pre-discretionary income based on Kothari, Leone, and Wasley (2005) performance-adjusted accruals model,

$$Accruals_t = \beta_0(1/Assets_{t-1}) + \beta_1 \Delta Sales_t + \beta_2 PPE_t + \beta_3 ROA_t + \varepsilon_t,$$

where the total accruals (*Accrual*), change in sales (*ΔSales*), and net property, plant and equipment (*PPE*) are all scaled by the beginning-of-year total assets. Return on assets (*ROA*) is the performance-matching control variable.

The above equation is estimated cross sectionally each year within the same industry group (Fama-French 48 industries) to obtain the fitted value of *Accruals* and the estimation errors. The fitted value is the non-discretionary accruals, and the difference between observed value and the fitted value is the discretionary accruals. Pre-discretionary income is defined as net income minus discretionary accruals. Income smoothing measure is based on the negative correlation of a firms' change in discretionary accruals and its change in pre-managed income, with five-year rolling window.

Information Uncertainty Measures

Volatility= one year ahead annualized daily return volatility.

Forecast Dispersion= standard deviation of I/B/E/S analysts' one year ahead annual EPS forecasts scaled by consensus annual EPS forecast.

Forecast Errors= the absolute difference between one year ahead realized annual EPS and I/B/E/S analysts' EPS forecast.

Earnings Announcement Returns

$CumulativeReturns_{(-2, 2)}$= 5-day cumulative returns (-2, -1, 0, 1, 2) around quarterly earnings announcement dates.

$CAR_{(-2, 2)}$= abnormal 5-day cumulative returns (-2, -1, 0, 1, 2) around quarterly earnings announcement dates. Following Bernard and Thomas (1989), daily abnormal return is the difference between a firm's raw daily return and equally weighted mean daily return of the size decile where the firm belongs. Firm size is measured by the market value of common equity at the beginning of the year.

Implied Cost of Equity

r_{gls}= implied cost of equity based on Gebhardt, Lee, and Swaminathan (2001), see Appendix A for model specifications.

r_{ct}= implied cost of equity based on Claus and Thomas (2001), see Appendix A for model specifications.

r_{gm}= implied cost of equity based on Gode and Mohanram (2003), see Appendix A for model specifications.

r_{peg}= implied cost of equity based on Easton (2004), see Appendix A for model specifications.

r_{avg}= $(r_{gls}+ r_{ct}+ r_{gm}+r_{peg})/4$, the average of the four implied cost of equity measures.

Firm Characteristics

SUE= standardized unexpected earnings. Following Bernard and Thomas (1989), forecasted earnings are estimated based on the following univariate time-series model previously used by Foster (1977) and Foster, Olsen, and Shevlin (1984)**,** with rolling 20-quarter observations:

$$E(Q_{it}) = Q_{i,t-4} + \varphi_i(Q_{it-1} - Q_{i,t-5}) + \varsigma_i,$$

where Q_{it} is the quarterly earnings of the *i*th firm in period *t*. The difference between the actual and forecasted earnings is then scaled by the standard deviation of forecast errors over the estimation period to obtain standardized unexpected earnings (*SUE*).

ln(Size)= natural log of market value of common equity at fiscal year end.

ln(BM)= natural log of the book to market ratio, which is the ratio of common equity book value to market value at fiscal year end.

Leverage= the ratio of long-term debt to total assets.

Std(CFO)= *Std(CFO)* over the prior five years. *CFO* is cash flow from operations scaled by total assets at the beginning of the year.

Accruals= the difference between net income before extraordinary items and cash flow from operations, scaled by total assets at the beginning of the year.

ln(Volume=) natural log of average daily trading volume during the past year.

Turnover = average daily turn-over ratio during the past year. Daily turnover ratio is daily trading volume divided by shares outstanding.

$Volatility_{5yr}$= return volatility over the past five years.

LTG= I/B/E/S long term growth rate forecast.

Forecast EPS= I/B/E/S forecasted one year ahead EPS.

Forecast Revision= the revision to the consensus analyst forecast of year *t +1* earnings made just after year *t* earnings are announced. Specifically, it is the difference between the first mean I/B/E/S consensus one-year-ahead forecast of year *t + 1* earnings and the last mean consensus two-year-ahead forecast of year *t + 1* earnings, scaled by share price at the end of year *t*.

Quality= *1/Std(Discretionary Accruals)* over the prior five years. *Discretionary Accruals* is the estimation error of Kothari, Leone, and Wasley (2005) performance-adjusted accruals model,

$$Accruals_t = \beta_0(1/Assets_{t-1}) + \beta_1 \Delta Sales_t + \beta_2 PPE_t + \beta_3 ROA_t + \varepsilon_t,$$

where the total accruals (*Accrual*), change in sales (*ΔSales*), and net property, plant and equipment (*PPE*) are all scaled by the beginning-of-year total assets. Return on assets (*ROA*) is the performance-matching control variable. The accrual model is estimated cross sectionaly each year within the same Fama-French 48 industry groups.

Persistence= the slope coefficient of the following autoregressive model of annual earnings, $X_t=\varphi_0 + \varphi_1 X_{t-1}+\upsilon_t$, with 10-year rolling window.

Predictability= $-Std(\upsilon_t)$ over the prior ten years. υ_t is obtained from the above autoregressive model of annual earnings.

APPENDIX C: TABLES

Table 1
Summary Statistics: Income Smoothing and Information Uncertainty Variables

Panel A reports summary statistics of the income smoothing measures: TA Smoothing (Total Accrual Income Smoothing) and DA Smoothing (Discretionary Accrual Income Smoothing) and information uncertainty variables: Volatility, Forecast Dispersion, and Forecast Error. TA Smoothing is measured by Std(CFO)/Std(NIBE) over the past five years, where CFO is cash flow from operations and NIBE is net income before extraordinary items, both scaled by total assets at the beginning of the year. DA Smoothing is measured by the negative correlation between the change in discretionary-accruals and the change in pre-discretionary income based on Kothari, Leone, and Wasley (2005) performance-adjusted accruals model. The details are given in Section 3. Volatility is one year ahead annualized daily return volatility. Forecast Dispersion is the standard deviation of I/B/E/S analysts' one year ahead annual EPS forecasts scaled by consensus annual EPS forecast. Forecast Error is the absolute difference between one year ahead realized annual EPS and I/B/E/S analysts' EPS forecast. The table also reports summary statistics of firm characteristics used as control variables in the analysis. Details of variable definition can be found in Section 3 and Appendix B. All variables are winsorized at 99th percentile of their cross-sectional distribution each year. N denotes the number of firm-year observations. Panel B presents Pearson and Spearman correlation matrix of the variables for firm-year observations from 1993 through 2006.

Panel A. Summary Statistics

Measures	N	Mean	Std. dev.	10%	Median	90%
Income Smoothing						
TA Smoothing	55,499	1.511	2.285	0.385	1.012	2.954
DA Smoothing	46,761	0.604	0.495	-0.218	0.829	0.989
Information Uncertainty						
Volatility	42,301	0.653	0.436	0.265	0.530	1.189
Forecast Dispersion	17,571	9.941	22.165	0.806	2.941	21.951
Forecast Error	17,618	0.715	1.952	0.000	0.175	1.493
Firm Characteristics						
ln(Size)	47,597	4.938	2.399	1.921	4.831	8.153
ln(BM)	47,597	-0.731	0.945	-1.895	-0.678	0.372
Leverage	47,342	0.181	0.247	0.000	0.105	0.450
Std(CFO)	55,504	0.159	0.369	0.024	0.073	0.285
Accruals	47,445	-0.079	0.372	-0.204	-0.053	0.063
ln(Volume)	42,308	11.019	2.008	8.380	11.051	13.611
Turnover	42,308	6.020	7.006	0.855	3.729	13.812
Volatility5y	42,307	1.533	0.794	0.671	1.377	2.614
LTG	17,618	19.575	17.204	8.670	15.170	31.707
EPS_{t+2}	17,618	0.052	0.098	0.009	0.061	0.112
Forecast Revision	17,618	-0.361	1.559	-1.375	0.000	0.373

Table 1. Panel B: Pearson (Spearman) correlations below (above) the diagonal

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) TA Smoothing	1.000	0.690	-0.233	-0.204	-0.141	0.130	0.093	0.095	0.022	0.136	-0.119	-0.127	-0.288	-0.105	0.205	0.057
(2) DA Smoothing	0.283	1.000	-0.295	-0.239	-0.160	0.187	0.079	0.093	-0.155	0.109	-0.079	-0.121	-0.331	-0.160	0.159	0.058
(3) Volatility	-0.136	-0.228	1.000	0.227	0.251	-0.620	0.106	-0.175	0.488	-0.100	-0.182	0.061	0.766	0.437	-0.163	-0.104
(4) Forecast Dispersion	-0.087	-0.130	0.174	1.000	0.460	-0.236	0.206	0.016	0.165	-0.090	-0.101	0.018	0.228	0.062	-0.121	-0.136
(5)Forecast Error	-0.068	-0.120	0.290	0.287	1.000	-0.352	0.282	0.049	0.161	-0.056	-0.215	-0.035	0.208	-0.011	0.030	-0.061
(6) ln(Size)	0.072	0.154	-0.580	-0.180	-0.254	1.000	-0.391	0.208	-0.374	0.031	0.700	0.369	-0.626	-0.238	-0.095	0.140
(7) ln(BM)	0.079	0.086	0.108	0.116	0.181	-0.362	1.000	0.046	-0.148	0.040	-0.410	-0.317	0.041	-0.198	0.361	-0.143
(8) Leverage	0.042	0.011	-0.084	0.011	0.035	0.113	-0.022	1.000	-0.293	-0.008	0.048	-0.070	-0.257	-0.222	0.253	-0.027
(9) Std(CFO)	-0.044	-0.109	0.245	0.051	0.084	-0.169	-0.201	-0.017	1.000	-0.073	0.004	0.213	0.562	0.385	-0.217	-0.037
(10) Accruals	0.061	0.102	-0.136	-0.059	-0.063	0.040	0.099	-0.098	-0.296	1.000	-0.068	-0.034	-0.089	-0.005	0.143	0.060
(11) ln(Volume)	-0.107	-0.077	-0.175	-0.085	-0.108	0.688	-0.377	0.044	0.055	-0.055	1.000	0.753	-0.132	0.022	-0.259	0.043
(12) Turnover	-0.084	-0.094	0.047	-0.006	-0.017	0.236	-0.232	-0.030	0.140	-0.053	0.562	1.000	0.138	0.308	-0.231	0.046
(13) Volatility$_{5yr}$	-0.174	-0.276	0.691	0.149	0.196	-0.606	0.018	-0.129	0.333	-0.109	-0.135	0.152	1.000	0.491	-0.310	-0.064
(14) LTG	-0.071	-0.144	0.306	0.167	0.134	-0.232	-0.088	-0.059	0.211	-0.034	-0.043	0.125	0.341	1.000	-0.265	0.007
(15) EPS$_{t+2}$	0.107	0.140	-0.261	-0.065	-0.196	0.066	0.133	0.091	-0.209	0.120	-0.113	-0.098	-0.294	-0.063	1.000	0.125
(16) Forecast Revision	0.057	0.058	-0.223	-0.111	-0.275	0.164	-0.140	0.000	-0.069	0.061	0.012	-0.023	-0.162	-0.091	0.202	1.000

Table 2
Income Smoothing and Information Uncertainty

Panel A reports the average information uncertainty variables of firms in each income smoothing quintile based on *TA Smoothing*. Each year, firms are sorted into quintiles according to *TA Smoothing,* as measured by *Std(CFO)/Std(NIBE)* over the prior five years. The time series averages of the mean information uncertainty variables are calculated for each income smoothing quintile. Panel B reports the results based on sequential sorting, first on *Std(CFO)* and then on *TA Smoothing*. The differences between top and bottom *TA Smoothing* quintiles, as well as the *Newey-West t-statistics* with one year lag, are also reported.

Panel A. Average Information Uncertainty Measures of Income Smoothing Quintiles

	Level of *TA Smoothing*$_t$						
	Q1	Q2	Q3	Q4	Q5	Q5-Q1	*t*-Stat
Volatility$_{t+1}$	0.730	0.673	0.617	0.552	0.487	-0.243	(-9.45)
Forecast Dispersion$_{t+1}$	13.099	12.157	10.009	7.969	5.337	-7.762	(-9.31)
Forecast Error $_{t+1}$	1.069	1.010	0.699	0.722	0.522	-0.547	(-8.22)

Panel B. Average Information Uncertainty Measures of Income Smoothing Quintiles Presorted on *Std(CFO)*

		Level of *TA Smoothing*$_t$						
	Level of *Std(CFO)*	Q1	Q2	Q3	Q4	Q5	Q5-Q1	*t*-Stat
Volatility$_{t+1}$								
	Q1	0.611	0.462	0.408	0.376	0.356	-0.235	(-7.90)
	Q2	0.770	0.610	0.517	0.444	0.421	-0.349	(-10.04)
	Q3	0.865	0.700	0.610	0.547	0.479	-0.387	(-8.36)
	Q4	0.951	0.822	0.747	0.685	0.577	-0.374	(-7.72)
	Q5	1.030	0.985	0.936	0.899	0.781	-0.249	(-7.22)
	Average	0.846	0.716	0.644	0.590	0.523	-0.319	(-8.93)
Forecast Dispersion$_{t+1}$								
	Q1	12.287	8.981	7.175	4.464	4.151	-8.136	(-7.01)
	Q2	16.540	13.547	9.025	7.189	5.474	-11.066	(-11.29)
	Q3	16.882	12.624	10.209	7.854	4.372	-12.511	(-12.51)
	Q4	15.268	12.655	12.403	11.836	5.809	-9.459	(-3.79)
	Q5	17.155	19.359	13.470	12.346	8.515	-8.640	(-2.18)
	Average	15.626	13.433	10.457	8.738	5.664	-9.962	(-8.38)
Forecast Error $_{t+1}$								
	Q1	0.877	0.503	0.536	0.295	0.264	-0.613	(-4.55)
	Q2	1.116	1.010	0.516	0.440	0.383	-0.733	(-4.34)
	Q3	1.316	1.016	0.657	0.511	0.367	-0.948	(-7.05)
	Q4	1.274	1.034	0.893	0.708	0.522	-0.753	(-3.61)
	Q5	1.774	1.725	1.571	0.975	0.757	-1.016	(-3.07)
	Average	1.271	1.058	0.834	0.586	0.459	-0.813	(-6.06)

Table 3
Regressions of Information Uncertainty on Total Accrual Smoothing

This table reports the *Fama-MacBeth* regression results of information uncertainty on *TA Smoothing*. Each year, cross-sectional regressions of information uncertainty variables on *TA Smoothing* are performed with and without control variables. The time series averages of the coefficients, and the *Newey-West t-statistics* with one year lag, are reported.

	Predicted Sign	*Information Uncertainty Variables* $Volatility_{t+1}$		*Forecast Dispersion*$_{t+1}$		*Forecast Error* $_{t+1}$	
Intercept		69.08	20.72	10.84	5.44	0.80	0.95
		(13.56)	(4.41)	(14.77)	(2.03)	(10.98)	(4.99)
TA Smoothing$_t$	-	-3.30	-0.41	-1.01	-0.74	-0.07	-0.01
		(-10.05)	(-2.84)	(-19.32)	(-12.35)	(-9.68)	(-2.52)
ln(Size)$_t$	-		-7.48		-0.52		-0.07
			(-11.07)		(-1.53)		(-4.73)
ln(BM)$_t$			-0.10		3.36		0.26
			(-0.22)		(5.10)		(7.00)
Leverage$_t$			-2.89		4.34		0.26
			(-1.98)		(2.10)		(4.07)
Std(CFO)$_t$	+		8.08		6.31		-0.04
			(3.39)		(1.95)		(-0.15)
Accruals$_t$			-17.12		-10.13		-0.59
			(-5.61)		(-4.10)		(-2.35)
ln(Volume)$_t$	+		4.17		0.25		
			(5.84)		(0.58)		
TurnOver$_t$			-0.24		-0.19		
			(-2.32)		(-3.80)		
Volatility$_{5yr}$	+		0.24		0.07		0.18
			(12.76)		(7.84)		(2.03)
LTG_t							0.01
							(4.03)
EPS_{t+2}							-3.11
							(-6.33)
Forecast Revision$_t$							-0.22
							(-4.86)
Forecast Error $_{t-1}$	+						0.27
							(10.91)
N		42,301	42,301	17,571	17,571	17,618	17,618
Adj. R^2		0.0247	0.5913	0.0091	0.0647	0.0057	0.2170

Table 4
Regressions of Information Uncertainty on Discretionary Accrual Income Smoothing

This table reports the *Fama-MacBeth* regression results of information uncertainty on *DA Smoothing*. Each year, cross-sectional regressions of information uncertainty variables on *DA Smoothing* are performed with and without control variables. The time series averages of the coefficients, and the *Newey-West t-statistics* with one year lag, are reported.

	Predicted Sign	*Return Volatility$_{t+1}$*		*Analysts Forecast Dispersion$_{t+1}$*		*Analysts Forecast Error$_{t+1}$*	
Intercept		74.14	18.89	13.28	7.85	1.02	1.11
		(12.53)	(3.78)	(10.90)	(3.42)	(9.69)	(8.27)
DA Smoothing$_t$	-	-18.69	-1.46	-6.71	-4.62	-0.53	-0.10
		(-9.06)	(-2.67)	(-6.48)	(-3.90)	(-7.62)	(-3.01)
ln(Size)$_t$	-		-7.01		-0.50		-0.08
			(-12.95)		(-1.58)		(-6.09)
ln(BM)$_t$			.01		3.02		0.25
			(0.02)		(4.65)		(5.54)
Leverage$_t$			-3.02		2.70		0.22
			(-2.05)		(2.33)		(3.07)
Std(CFO)$_t$	+		9.72		11.49		-0.31
			(3.87)		(1.90)		(-1.63)
Accruals$_t$			-17.433		-11.21		-0.48
			(-5.69)		(-3.98)		(-3.48)
ln(Volume)$_t$	+		4.12		0.18		
			(5.60)		(0.54)		
TurnOver$_t$			-0.239		-0.17		
			(-2.08)		(-4.21)		
Volatility$_{5yr}$	+		0.24		6.41		0.16
			(11.80)		(6.58)		(2.16)
LTG$_t$							0.00
							(2.42)
EPS$_{t+2}$							-3.34
							(-5.12)
Forecast Revision$_t$							-0.21
							(-4.12)
Forecast Error $_{t-1}$	+						0.28
							(8.60)
N		42,301	42,301	17,571	17,571	17,618	17,618
Adj. R^2		0.0500	0.5935	0.0200	0.0714	0.0168	0.2121

Table 5
Summary Statistics: Earnings Announcement Returns and Unexpected Earnings

This table reports summary statistics of cumulative earnings announcement returns and cumulative abnormal returns (*CAR*) around earnings announcements, as well as standardized unexpected earnings *(SUE)*. *Cumulative Returns*$_{(-2,\ 2)}$ (in percentage) is 5-day cumulative returns (-2, -1, 0, 1, 2) around quarterly earnings announcement dates where "0" denotes earnings announcement date. Following Bernard and Thomas (1989), *CAR*$_{(-2,\ 2)}$ (in percentage) is the 5-day cumulative returns adjusted for the mean return of the firm's size decile. *SUE* is standardized unexpected earnings computed following Foster (1977), Foster, Olsen, and Shevlin (1984), and Bernard and Thomas (1989). N denotes the number of firm-year observations. Panel B reports the Pearson and Spearman correlation matrix of variables (including control variables in the analysis) for firm-year observations from 1993 through 2006.

Panel A. Summary Statistics

Measures	N	Mean	Std.dev.	10%	Median	90%
Cumulative Returns$_{(-2,\ 2)}$	139,280	0.775	10.417	-10.873	0.327	12.728
CAR$_{(-2,\ 2)}$	139,280	0.320	10.086	-11.027	0.004	11.833
SUE	139,280	-0.016	1.033	-1.202	0.017	1.152

Panel B: Pearson (Spearman) correlations below (above) the diagonal

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
(1) Cumulative Returns$_{(-2,2)}$	1.000	0.956	0.039	0.023	0.154	0.039	-0.044	0.015	-0.038	0.033
(2) CAR$_{(-2,\ 2)}$	0.975	1.000	0.037	0.023	0.161	0.081	-0.060	0.027	-0.050	0.031
(3) TA Smoothing	0.021	0.020	1.000	0.690	0.010	0.130	0.093	0.095	0.022	0.136
(4) DA Smoothing	0.004	0.004	0.283	1.000	0.014	0.187	0.079	0.093	-0.155	0.109
(5) SUE	0.134	0.139	0.002	-0.008	1.000	0.030	-0.033	0.005	-0.029	0.042
(6) ln(Size)	0.010	0.046	0.072	0.154	0.017	1.000	-0.391	0.113	-0.374	0.031
(7) ln(BM)	-0.031	-0.043	0.079	0.086	-0.025	-0.362	1.000	-0.022	-0.148	0.040
(8) Leverage	0.003	0.013	0.042	0.011	-0.006	0.208	0.046	1.000	-0.293	-0.008
(9) Std(CFO)	-0.028	-0.033	-0.044	-0.109	-0.011	-0.169	-0.201	-0.017	1.000	-0.073
(10) Accruals	0.022	0.022	0.061	0.102	0.059	0.040	0.099	-0.098	-0.296	1.000

Table 6
Income Smoothing and Earnings Announcements Returns

Panel A reports the average cumulative earnings announcement returns and cumulative abnormal returns of firms in each *TA Smoothing* quintile. Each quarter, firms are sorted into quintiles according to *TA Smoothing,* as measured by *Std(CFO)/Std(NIBE).* The time series averages of mean returns are calculated for each *TA Smoothing* quintile. All returns are calculated over a 5-day window around earnings announcement date. Panel B reports the results based on sequential sorting, first on *SUE* and then on *TA Smoothing*. The differences between top and bottom *TA Smoothing* quintiles, as well as the *Newey-West t-statistics* with one quarter lag, are also reported.

Panel A. Average Stock Returns of Income Smoothing Quintiles

	Level of *TA Smoothing*						
	Q1	Q2	Q3	Q4	Q5	Q5-Q1	*t*-Stat
Cumulative Returns$_{(-2,2)}$	0.543	0.579	0.856	0.930	1.094	0.551	(4.154)
CAR$_{(-2, 2)}$	0.042	0.065	0.357	0.478	0.648	0.606	(4.851)

Panel B. Average Stock Returns of Income Smoothing Quintiles Presorted on *SUE*

		Level of *TA Smoothing*						
	SUE	Q1	Q2	Q3	Q4	Q5	Q5-Q1	*t*-Stat
Cumulative Returns$_{(-2,2)}$								
	Q1	-1.631	-1.653	-1.273	-1.199	-0.894	0.737	(3.05)
	Q2	-0.749	-0.518	-0.394	-0.261	-0.109	0.640	(3.03)
	Q3	0.781	0.735	0.808	0.886	0.848	0.067	(0.37)
	Q4	1.732	1.908	2.013	2.088	1.838	0.106	(0.47)
	Q5	2.449	2.782	3.087	3.356	3.368	0.918	(4.00)
	Average	0.516	0.651	0.848	0.974	1.010	0.494	(3.70)
CAR$_{(-2, 2)}$								
	Q1	-2.144	-2.173	-1.763	-1.666	-1.363	0.781	(3.17)
	Q2	-1.204	-1.081	-0.909	-0.701	-0.570	0.634	(3.07)
	Q3	0.267	0.240	0.276	0.458	0.363	0.096	(0.57)
	Q4	1.245	1.476	1.515	1.667	1.451	0.206	(0.95)
	Q5	1.895	2.283	2.561	2.855	2.952	1.057	(4.94)
	Average	0.012	0.149	0.336	0.523	0.566	0.554	(4.42)

Table 7
Regressions of Earnings Announcement Returns on Total Accrual Income Smoothing

This table reports the Fama-BacBeth regression results of earnings announcement returns on the *TA Smoothing*. Each quarter, cross-sectional regressions of earnings announcement returns on *TA Smoothing* are performed with various sets of control variables. The time series averages of the coefficients, and the *Newey-West t-statistics* with one quarter lag, are reported.

	Predicted Signs	Cumulative Returns (%) (-2, 2) (1)	(2)	(3)	(4)	CAR (%) (-2, 2) (1)	(2)	(3)	(4)
Intercept		0.40	0.51	0.40	0.42	-0.06	0.06	-0.06	-0.25
		(3.06)	(4.38)	(3.03)	(1.46)	(-0.71)	(0.73)	(-0.75)	(-2.01)
TA Smoothing	+	0.08		0.07	0.07	0.08		0.08	0.07
		(3.05)		(3.13)	(3.31)	(3.53)		(3.63)	(3.79)
SUE	+		1.48	1.48	1.46		1.48	1.48	1.47
			(25.16)	(25.19)	(25.88)		(24.99)	(25.02)	(25.75)
ln(Size)					-0.03				
					(-1.01)				
ln(BM)					-0.41				-0.48
					(-4.70)				(-5.47)
Leverage					0.14				0.30
					(1.07)				(2.29)
Std(CFO)	-				-1.57				-1.80
					(-3.83)				(-4.98)
Accruals	+				0.70				0.67
					(2.11)				(1.94)
N		139,280	139,280	139,280	139,280	139,280	139,280	139,280	139,280
Adj. R^2		0.0010	0.0217	0.0222	0.0299	0.0009	0.0228	0.0232	0.0309

Table 8
Regressions of Earnings Announcement Returns on Discretionary Accrual Income Smoothing

This table reports the Fama-MacBeth regression results of earnings announcement returns on the *Discretionary Accrual Smoothing (DA Smoothing)*. Each quarter, cross-sectional regressions of earnings announcement returns on *DA Smoothing* are performed with various sets of control variables. The time series averages of the coefficients, and the *Newey-West t-statistics* with one quarter lag, are reported.

		Cumulative Returns (%) (-2, 2)				*CAR (%)* (-2, 2)			
	Predicted Signs	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Intercept		0.22	0.51	0.21	0.38	-0.26	0.06	-0.27	-0.35
		(1.26)	(4.38)	(1.21)	(1.27)	(-2.42)	(0.73)	(-2.57)	(-2.57)
DA Smoothing	+	0.53		0.54	0.50	0.62		0.62	0.54
		(3.76)		(4.03)	(4.38)	(4.95)		(5.30)	(5.20)
SUE	+		1.48	1.48	1.46		1.48	1.49	1.46
			(25.16)	(25.45)	(25.98)		(24.99)	(25.53)	(26.02)
ln(Size)					-0.05				
					(-1.34)				
ln(BM)					-0.38				-0.41
					(-4.74)				(-5.11)
Leverage					0.11				0.24
					(0.80)				(1.71)
Std(CFO)	-				-1.86				-1.89
					(-4.48)				(-4.46)
Accruals	+				1.04				1.06
					(3.84)				(4.21)
N		139,280	139,280	139,280	139,280	139,280	139,280	139,280	139,280
Adj. R^2		0.0010	0.0217	0.0223	0.0288	0.0009	0.0228	0.0234	0.029

Table 9
Summary Statistics: Implied Cost of Equity

Panel A reports summary statistics of four implied cost of equity measures (r_{gls}, r_{ct}, r_{gm} and r_{peg}) and their average (r_{avg}). The table also reports summary statistics of firm characteristics used as control variables in the analysis. Details of variable definition can be found in Section 5. All variables are winsorized at 99th percentile of their cross-sectional distributions each year. N denotes the number of firm-year observations. Panel B presents Pearson and Spearman correlation matrix of the variables for firm-year observations from 1993 through 2006.

Panel A. Summary Statistics

Measures	N	MEAN	Std. dev.	10%	Median	90%
$r_{gls}(\%)$	14,572	12.870	14.103	6.762	10.186	15.523
$r_{ct}(\%)$	13,281	11.633	11.526	6.806	9.931	14.325
$r_{gm}(\%)$	14,825	11.176	4.745	6.854	9.945	17.224
$r_{peg}(\%)$	14,929	11.870	9.066	6.694	10.103	17.484
$r_{avg}(\%)$	12,086	10.684	3.308	7.512	10.069	14.434
Quality	15,988	22.873	19.743	7.495	17.983	42.482
Persistence	16,098	0.942	37.596	-0.390	0.165	0.817
Predictability	16,048	-4.588	6.102	-9.231	-2.861	-0.973
β_{mkt}	16,148	1.001	0.623	0.294	0.952	1.779
β_{smb}	16,148	0.726	0.898	-0.258	0.606	1.829
β_{hml}	16,148	0.230	0.882	-0.812	0.273	1.163

Table 9
Panel B: Pearson (spearman) Correlations below (above) the Diagonal

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*	*(15)*	*(16)*	*(17)*	*(18)*
(1) r_{gls}	1.000	0.664	0.311	0.352	0.692	0.025	0.005	-0.079	-0.011	-0.055	-0.283	0.286	0.182	0.014	-0.047	0.042	0.191	0.147
(2) r_{ct}	0.198	1.000	0.441	0.477	0.730	0.043	-0.029	-0.048	-0.004	-0.039	-0.389	0.289	0.136	0.047	0.053	0.132	0.276	0.101
(3) r_{gm}	0.130	0.357	1.000	0.945	0.855	-0.123	-0.185	-0.138	-0.012	-0.289	-0.436	0.382	0.101	0.350	0.193	0.183	0.354	0.147
(4) r_{peg}	0.059	0.172	0.589	1.000	0.909	-0.103	-0.178	-0.152	-0.011	-0.290	-0.464	0.382	0.094	0.325	0.246	0.201	0.394	0.124
(5) r_{avg}	0.606	0.650	0.816	0.812	1.000	-0.049	-0.121	-0.137	-0.010	-0.218	-0.480	0.448	0.161	0.260	0.117	0.191	0.381	0.154
(6) TA Smoothing	-0.034	-0.036	-0.093	-0.046	-0.029	1.000	0.640	-0.098	0.007	0.505	-0.009	0.067	0.029	-0.167	-0.039	-0.113	-0.060	-0.002
(7) DA Smoothing	-0.064	-0.093	-0.129	-0.061	-0.075	0.308	1.000	-0.205	0.010	0.566	0.100	0.025	0.032	-0.220	-0.112	-0.150	-0.143	0.025
(8) Quality	-0.023	-0.048	-0.091	-0.046	-0.095	-0.109	-0.205	1.000	0.002	0.350	0.173	0.020	0.137	-0.032	-0.205	-0.069	-0.206	0.045
(9) Persistence	-0.032	-0.016	-0.022	-0.011	-0.011	-0.004	0.010	-0.003	1.000	-0.001	0.022	0.005	0.008	-0.002	-0.029	0.000	-0.012	0.018
(10) Predictability	-0.001	0.000	-0.001	-0.002	0.001	0.370	0.566	0.035	0.000	1.000	0.228	0.029	0.139	-0.229	-0.233	-0.167	-0.287	-0.003
(11) ln(Size)	-0.079	-0.204	-0.393	-0.193	-0.412	-0.009	0.100	0.156	0.005	0.168	1.000	-0.499	0.064	-0.200	-0.204	-0.004	-0.517	-0.105
(12) ln(BM)	-0.001	0.140	0.334	0.173	0.381	0.053	0.025	0.023	-0.002	-0.009	-0.486	1.000	0.104	0.275	-0.192	0.053	0.242	0.250
(13) Leverage	0.251	0.069	0.106	0.067	0.151	0.015	0.032	0.077	-0.003	0.034	0.007	0.034	1.000	0.088	-0.169	-0.031	-0.062	0.194
(14) ln(Dispersion)	0.050	0.100	0.281	0.142	0.195	-0.078	-0.220	-0.035	-0.008	-0.101	-0.166	0.152	0.049	1.000	-0.004	0.119	0.170	0.073
(15) LTG	0.009	0.026	0.217	0.088	0.110	-0.047	-0.112	-0.106	-0.032	-0.115	-0.198	-0.063	-0.039	0.162	1.000	0.156	0.297	-0.195
(16) β_{mkt}	0.025	0.050	0.148	0.066	0.151	-0.074	-0.150	-0.077	-0.003	0.010	-0.008	0.050	-0.039	0.035	0.064	1.000	0.197	0.185
(17) β_{smb}	0.080	0.161	0.286	0.135	0.289	-0.037	-0.143	-0.157	-0.006	0.010	-0.478	0.202	-0.014	0.109	0.207	0.198	1.000	0.188
(18) β_{hml}	0.073	0.023	0.121	0.066	0.122	-0.001	0.025	0.041	0.000	0.022	-0.101	0.226	0.150	0.030	-0.093	0.188	0.229	1.000

Table 10
Income Smoothing and Implied Cost of Equity

This table reports the average implied cost of equity measures (r_{gls}, r_{ct}, $r_{gm,}$ r_{peg} and r_{avg}) of firms in each *TA Smoothing* quintile. Each year, firms are sorted into quintiles according to *TA Smoothing* as measured by *Std(CFO)/Std(NIBE).* The time series averages of the mean implied cost of equity measures are calculated for each *TA Smoothing* quintile. The differences between top and bottom *TA Smoothing* quintiles, as well as the *Newey-West t-statistics* with one year lag, are also reported.

Average Implied Cost of Equity Measures of Income Smoothing Quintiles

	Level of *TA Smoothing*						
	Q1	Q2	Q3	Q4	Q5	Q5-Q1	*t*-Stat
R_{avg}(%)	11.108	10.845	10.821	10.511	10.388	-0.720	(-2.67)
R_{gls}(%)	14.962	13.007	12.762	12.1	12.258	-2.704	(-3.77)
R_{ct}(%)	13.349	12.864	11.808	11.232	10.57	-2.779	(-3.35)
R_{gm}(%)	12.389	11.913	11.442	11.005	10.424	-1.965	(-4.66)
R_{peg}(%)	13.171	12.726	12.38	11.676	11.11	-2.061	(-4.29)

Table 11
Regressions of Cost of Equity on Total Accrual Income Smoothing

This table reports the Fama-MacBeth regression results of the implied cost of equity measures on *TA Smoothing*. Each year, cross-sectional regressions of cost of equity variables on *TA Smoothing* are performed with and without various control variables and industry (Fama French 48 industry) dummies. The time series averages of the coefficients, and the *Newey-West t-statistics* with one year lag, are reported. The coefficients for industry dummies are not reported for brevity.

		Implied Cost of Equity Measures									
	Predicted Signs	r_{avg}		r_{gm}		r_{peq}		r_{gls}		r_{ct}	
Intercept		10.81	12.12	11.44	11.05	12.15	12.58	13.71	11.62	12.86	15.67
		(46.85)	(17.57)	(35.21)	(18.96)	(31.18)	(10.29)	(33.60)	(6.62)	(15.10	(12.56)
TA Smoothing	-	-0.08	-0.03	-0.27	-0.11	-0.21	-0.14	-0.21	-0.07	-0.25	-0.02
		(-2.04)	(-2.24)	(-4.85)	(-3.87)	(-4.34)	(-2.94)	(-6.46)	(-1.21)	(-4.43)	(-0.67)
ln(Size)	-		-0.39		-0.38		-0.41		-0.87		-0.68
			(-6.47)		(-7.20)		(-2.41)		(-4.08)		(-4.81)
ln(BM)	+		0.92		1.09		0.97		-1.34		1.01
			(6.25)		(6.92)		(3.14)		(-2.74)		(1.83)
Quality	-		-0.006		-0.001		-0.009		0.014		-0.005
			(-2.71)		(-0.24)		(-1.91)		(1.22)		(-0.97)
Persistence	-		0.001		0.01		0.001		0.08		0.001
			(0.50)		(0.38)		(0.27)		(1.13)		(-0.01)
Predictability	-		-0.06		-0.08		-0.07		-0.05		-0.25
			(-2.79)		(-2.43)		(-1.63)		(-1.87)		(-3.72)
Leverage	+		2.34		2.41		2.58		14.90		4.08
			(11.67)		(6.44)		(7.18)		(6.95)		(4.37)
ln(Dispersion)	+		0.36		0.94		1.21		-0.17		0.28
			(7.33)		(16.77)		(6.44)		(-1.55)		(1.59)
LTG	-		0.02		0.04		0.01		0.02		-0.05
			(1.73)		(3.16)		(0.95)		(0.75)		(-2.38)
β_{MKT}	+		0.77		1.02		0.97		1.06		0.23
			(7.07)		(5.59)		(3.25)		(3.91)		(0.63)
β_{SMB}	+		0.17		0.28		-0.13		0.60		1.03
			(0.94)		(2.24)		(-0.37)		(2.54)		(3.10)
β_{HML}	+		0.07		0.20		0.02		0.30		-0.44
			(0.61)		(1.23)		(0.12)		(1.00)		(-1.81)
N		12,086	12,086	14,825	14,825	14,929	14,929	14,572	14,572	13,281	13,281
Adj.R^2		0.0067	0.3050	0.0145	0.3319	0.0034	0.1097	-0.0004	0.0842	0.0028	0.0848

Table 12
Regressions of Cost of Equity on Discretionary Accrual Income Smoothing

This table reports the Fama-MacBeth regression results of the implied cost of equity measures on *DA Smoothing*. Each year, cross-sectional regressions of cost of equity variables on *DA Smoothing* are performed with and without various control variables and industry (Fama French 48 industry) dummies. The time series averages of the coefficients, and the *Newey-West t-statistics* with one year lag, are reported. The coefficients for industry dummies are not reported for brevity.

	Predicted Signs	*Implied Cost of Equity Measures*									
		r_{avg}		r_{gm}		r_{peg}		r_{gls}		r_{ct}	
Intercept		10.91	12.13	12.05	11.22	12.31	12.35	15.24	11.45	13.85	16.19
		(101.61)	(16.77)	(50.80)	(25.00)	(65.09)	(12.24)	(18.41)	(5.86)	(18.03)	(11.08)
TA Smoothing	-	-0.62	-0.04	-1.64	-0.40	-1.39	-0.17	-2.56	-0.13	-2.57	-0.53
		(-5.63)	(-0.45)	(-7.71)	(-3.18)	(-6.88)	(-0.75)	(-4.88)	(-0.21)	(-7.41)	(-0.67)
ln(Size)	-		-0.40		-0.38		-0.41		-0.81		-0.70
			(-6.58)		(-9.14)		(-2.27)		(-3.47)		(-4.89)
ln(BM)	+		0.89		1.07		0.94		-1.69		1.05
			(6.70)		(7.09)		(2.80)		(-3.06)		(2.05)
Quality	-		-0.006		-0.002		-0.009		0.008		-0.005
			(-2.38)		(-0.44)		(-1.63)		(0.79)		(-0.63)
Persistence	-		0.003		0.004		0.004		0.008		0.005
			(0.60)		(0.28)		(0.20)		(1.19)		(0.40)
Predictability	-		-0.06		-0.06		-0.05		-0.05		-0.24
			(-3.21)		(-2.49)		(-2.04)		(-1.47)		(-2.64)
Leverage	+		2.39		2.35		2.74		15.18		3.14
			(8.87)		(6.23)		(5.74)		(6.20)		(3.43)
ln(Dispersion)	+		0.33		0.92		1.19		-0.09		0.29
			(6.94)		(17.93)		(5.49)		(-0.76)		(1.78)
LTG	-		0.02		0.04		0.02		-0.01		-0.04
			(1.42)		(2.99)		(0.98)		(-0.26)		(-1.85)
β_{MKT}	+		0.81		1.07		1.06		0.99		0.28
			(6.19)		(5.45)		(3.08)		(3.02)		(0.81)
β_{SMB}	+		0.14		0.26		-0.14		0.62		0.80
			(0.80)		(2.27)		(-0.40)		(2.31)		(2.41)
β_{HML}	+		0.10		0.22		-0.01		0.45		-0.34
			(0.80)		(1.28)		(-0.03)		(1.57)		(-1.69)
N		12,086	12,086	14,825	14,825	14,929	14,929	14,572	14,572	13,281	13,281
Adj.R^2		0.0088	0.3076	0.0186	0.3343	0.0052	0.1069	0.0020	0.0827	0.0062	0.0878

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