Income Smoothing and Idiosyncratic Volatility

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Abstract

The idea that managers do prefer smoothed earnings is widely extended among practitioners and academics alike. Managers prefer a smooth earnings path, since lower firm risk as perceived by investors, is one of the most popular motivations for income smoothing. Given CEO career concerns and cost-benefit tradeoffs regarding the benefits of smoothing, we hypothesize that managers have incentives to smooth income in order to reduce idiosyncratic volatility. Our results are consistent with such a prediction. In a sample of about 88,577 observations for the period 1989-2006, we find that idiosyncratic risk is negatively and significantly correlated to income smoothing. Our results hold in a long-run changes specification, and also when the potential endogeneity in the association between income smoothing and idiosyncratic volatility is considered. Additionally, we show that the negative association between income smoothing and idiosyncratic volatility is strongest in firms with high operational risk, small firms, and loss firms. Our results are robust to governance characteristics, CEO equity holdings, firm-level information availability, liquidity, the use of various alternative measures of our risk and smoothing variables, and alternate statistical methods. Finally, we provide evidence that although income smoothing is also negatively correlated to systematic volatility, the idiosyncratic component of volatility dominates.

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1. Introduction

Income smoothing has received considerable attention in the academic literature in the past one-hundred years (Buckmaster, 2001). In an early discussion, Hepworth (1953) suggests that owners and creditors of an enterprise will feel more confident with corporate management that is able to report stable earnings, than if considerable fluctuation of reported earnings exists (Hepworth, 1953, p.34). Academics have basically investigated on: (1) whether firms do actually smooth income and which firms are more prompted to smooth (e.g.: DeFond and Park, 1997); (2) how income smoothing is implemented (e.g.: Beidleman, 1973), and (3) why managers are interested in smoothing income numbers (e.g.: Ronen and Sadan, 1981).

This paper focuses on the last issue previously mentioned, as it relates to the economic effects of income smoothing, which we define as the earnings management strategy that consists of managers' use of accounting discretion to artificially reduce reported earnings variability (Beidleman, 1973; Fundenberg and Tirole, 1995). Particularly, we study the association between income smoothing through accruals manipulation and the firm specific component of stock returns volatility, hypothesizing that CEOs smooth income in order to temper firm idiosyncratic risk.

Prior literature suggests that income smoothing should result into lower stock price volatility: there is a positive relationship between the extent of earnings variability and stock price variability (Lev and kunitzky, 1974); and investors can be misled by managers' use of accounting discretion (e.g.: Teoh et al., 1998a; Rangan, 1998; Louis, 2004). Still, since earnings management is costly for managers, incentives as to why they would incur such practices should be identified. In particular, based on previous literature that suggests CEOs dislike idiosyncratic risk, we conjecture that reducing such a type of risk underlies managers' use of financial reporting flexibility to smooth earnings.[1]

[1] Alternatively, managers may affect real operating performance to temper risk, which some studies claim to be more costly (e.g.: Cohen and Zarowin, 2008), although evidence is not always consistent with this prediction (e.g.: Chen et al., 2008). We do not address this issue, since we focus only on accounting based income smoothing.

Managers can be motivated to reduce idiosyncratic volatility to alleviate job security concerns. Gordon (1964) points out that a CEO's utility increases with job security, and Fundenberg and Tirole (1995) theoretically demonstrate that income smoothing can arise in equilibrium if managers are concerned about job security. Ahmed et al. (2008) find that income smoothing is higher in competitive industries, while recently Bushman et al. (2008) show that job security concerns increase with idiosyncratic volatility, in particular: (1) the probability of CEO turnover is increasing in the proportion of idiosyncratic risk, and (2), the sensitivity of CEO turnover to firm performance is higher as idiosyncratic volatility increases. Accordingly, we argue that CEOs would benefit from income smoothing in order to reduce idiosyncratic risk.

Additionally, standard finance theory indicates that idiosyncratic risk can be cancelled out by diversification. However, CEOs typically hold large portfolios in their own companies that make them unable to fully diversify their exposure to firm specific risk. Therefore, it can be argued that reducing idiosyncratic volatility through income smoothing would reduce the cost of loss diversification faced by the CEO.

From a signaling perspective, managers may smooth income to communicate private information to the market, reducing information asymmetries, and improving shareholder's ability to predict firm future performance (Ronen and Sadan, 1981). Given that firms with higher levels of idiosyncratic volatility have more information asymmetries (Ben-David and Roulstone, 2007), and income smoothing impounds more information about future earnings in current returns (Tucker and Zarowin, 2006), income smoothing could reduce the component of idiosyncratic volatility related to uncertainty about future profitability (see Pastor and Veronesi, 2003, for a related discussion).

The discussion so far argues that income smoothing in fact reduces investor perceptions of risk. This could be true if the underlying firm riskiness and cash flow risk is observable with error, and financial reporting succeeds in masking underlying perceptions of volatility, or if income smoothing succeeds in conveying information about future profitability, or income smoothing lowers operational risk, such as staving of bankruptcy and lowering the cost of debt (Trueman and Tirman, 1988). Since smoothing income entails costly action, firms that smooth are ones that have a positive cost/benefit tradeoff. From this perspective, firms that have higher ex-ante risk of CEO dismissal, or firms that have a higher underlying operational volatility, or smaller firms whose riskiness is less observable and future performance less predictable, are more likely to smooth. Finally, income smoothing can be more pervasive in loss making firms that are more likely to suffer from poor long-term performance. To our knowledge, no study has yet looked at income smoothing and its relationship to idiosyncratic volatility, which we predict, *a priori,* that these two are negatively related.

In accordance with prior research, we measure income smoothing in two alternative ways: the volatility of income with respect to the volatility of cash flows (*Dev*), and the correlation between changes in accruals and changes in cash flows (*Corr*). The more income smoothing, the less the variability of income with respect to variability in cash flows and the more negative will be the correlation between accruals and cash flows. Idiosyncratic volatility (*Volat*) is measured as in Rajgopal and Venkatachalam (2008), by calculating the average monthly variance of market adjusted returns.

In a sample of about 88,577 firm-year observations for the period 1989-2006, we provide empirical evidence that shows a strong negative relationship between current idiosyncratic volatility and income smoothing. In particular, OLS regressions confirm a negative and significant relationship between idiosyncratic risk and income smoothing, which is robust to controls for size, profitability, firm's investment opportunity set and growth opportunities, operating performance, volatility, leverage, institutional ownership, and industry and year effects. Since the results of income smoothing may take time to be observed, we use both current and past income smoothing data to match with current idiosyncratic volatility. Apart from a levels analysis, a changes analysis amongst the same set of variables shows similar results, where long term increases in income smoothing are related to decreases in idiosyncratic volatility. Our results also hold when considering the potential endogeneity in the relationship between income smoothing and idiosyncratic risk. Using a Three-Stage-Least-Squares estimation technique to estimate a system of equations, income smoothing is expressed as a function of lagged idiosyncratic volatility in a first stage equation, while in the second equation idiosyncratic volatility is regressed on income smoothing. Inferences remain unchanged.

In analyzing the motivations to smooth, we find evidence supporting the role of CEO career concerns. After replicating the Bushman et al. (2008) results which show that CEO turnover is increasing in idiosyncratic volatility, we show that income smoothing has a negative incremental effect in predicting CEO turnover: higher income smoothing predicts lower CEO turnover, after controlling for the effects of idiosyncratic volatility. Further analysis on the cost/benefit of smoothing, we find that firms with higher operational risk, small firms, firms with lower levels of institutional investors, and loss firms, have a higher propensity to smooth to reduce idiosyncratic volatility. These results are expected since firms that stand to gain most from the benefits of smoothing are firms that have high ex-ante risk, such as firms that have a high variation in operational cash flow, firms that perform R&D, and small firms. Finally, given the asymmetric response of share prices to loss vs. profitable firms, we find that the propensity to smooth in order to temper idiosyncratic volatility is higher in loss making firms.

A set of robustness tests enhances the validity of our initial results. First, we verify that our results are not a subset of the Rajgopal and Venkatachalam (2008) findings, which relate idiosyncratic risk with various earnings quality measures. Our results are robust controlling for the Dechow and Dichev (2002) measure of earnings quality, the absolute values of discretionary accruals calculated ala modified Jones (Dechow et al., 1995), and the dispersion in analyst forecasts. Second, our results are robust to controls for CEO equity holdings, and firm level corporate governance characteristics, which prior literature has shown to be related to both financial reporting and volatility. Third, controlling for firm-level information environment, liquidity, various permutations of our income smoothing and idiosyncratic volatility measures, results remain unchanged. Finally, we provide evidence that although income smoothing is also negatively related to systematic volatility, the idiosyncratic component of volatility dominates.

In all of our tests we find a strong, negative relationship between income smoothing and idiosyncratic volatility, where we have alluded that it is the smoothing that causes the reduction in volatility. Nonetheless, it could be that low idiosyncratic volatility firms are firms who undertake higher degrees of income smoothing. At *prima facie*, it is difficult to imagine why low volatility firms would smooth, the expectation is the contrary, as these firms do not benefit from costly smoothing actions. The alternate scenario, which we propose, that smoothing leads to lower volatility, is much more likely. Even if some low volatility firms undertook smoothing decisions, then this would bias our tests against finding results, weakening our documented relationships.

Our paper contributes to the literature on the economic effects of financial reporting, by relating income smoothing to share price volatility. To our knowledge, no previous research has addressed this issue, although several studies have hypothesized that companies smooth to reduce the actual or perceived riskiness of the firm. Lev and kunitzky (1974) show that the extent of earnings variability is positively related to stock market variability; and Michelson et al. (1995) suggest that systematic risk and income smoothing are negatively related, since smoothing firms have lower betas. However, Lev and kunitzky (1974) do not distinguish between real income smoothing (i.e the natural smoothness of income, or the smoothness of operations), and income smoothing associated to financial reporting decisions; and Michelson et al. (1995) focus only on the systematic component of risk. In our study income smoothing variables attempt to isolate accounting based income smoothing from the smoothness of earnings generated by other production, investment, and financing decisions.

Our study also contributes to portfolio theory, asset pricing, and option valuation models. We focus on the idiosyncratic component of risk, and our results relate to these research areas by showing how financial reporting decisions affect the non systematic component of share price volatility. Given that there is significant debate regarding the pricing of idiosyncratic volatility (Guo and Savickas, 2008; Goyal and Santa Clara, 2003), and investors care about idiosyncratic volatility only if it affects asset returns, our study provides for a relationship between financial reporting and returns, through the role of idiosyncratic volatility.

Additionally, we contribute to the literature that relates to the pricing of earnings quality. Francis et al. (2004) find a negative association between the smoothness of earnings and implied cost of capital estimates, while Core et al. (2008) claim that the Francis et al. (2004) results disappear when using asset pricing methodology to estimate cost of capital. Finally, Rountree et al. (2008) show that investors do place value to earnings smoothness, but only as it is related to cash flow volatility. Our results contribute to the studies above by showing a robust relationship between financial reporting and firm specific risk. Although our intention is not to test the pricing implications of financial reporting, our results indicate that it has a relationship to volatility. To the extent that such firm-specific volatility is priced, we provide for indirect evidence on the pricing of financial reporting decisions.

This study contributes to the signaling role of income smoothing, and relates to the literature on the determinants of idiosyncratic volatility. Turcker and Zarowin (2006), among others, argue that income smoothing impounds future information into contemporaneous returns. Given that volatility is increasing in uncertainty regarding future profitability (Pastor and Veronesi, 2003), by showing that income smoothing is negatively related to idiosyncratic volatility, we provide a link between financial reporting and asset pricing: income smoothing, by signaling information about future profitability, is contemporaneously related to volatility.

Our study also contributes to the survey evidence obtained by Graham et al. (2005), where managers overwhelmingly indicate that they are prepared to take costly action in order to reduce perceptions of risk. Our results are consistent with managers' statements, where smoothing income is negatively reduced to firm risk. Finally, our study complements the recent findings of Rajgopal and Venkatachalam (2008), who find a negative relationship between earnings quality and idiosyncratic volatility: time-series decreases in earnings quality is correlated to increases in volatility. We show that our results are incremental to theirs, and given that income smoothing is a special form of earnings management, we find that not all forms of earnings management result into lower earnings quality.

The rest of the paper is structured as follows. The next section discusses prior literature and presents the hypothesis development. Section 3 details the research design used to investigate the association between income smoothing and idiosyncratic volatility, the measurement of the variables, the sample selection and the sources of the data. Section four contains the descriptive statistics and the main results of our analysis. Section five contains additional analysis regarding the motivations to smooth, while robustness checks are presented in section six. Finally, section seven concludes and highlights the limitations of the paper.

2. Literature Review and Hypothesis Development

2.1 Income Smoothing and Idiosyncratic volatility

Income smoothing is the utilization of accounting discretion to reduce income stream variability (Fudenberg and Tirole, 1995). Smoothing moderates year-to-year fluctuations in income by shifting earnings from peak years to less successful ones, making earnings fluctuations less volatile (Copeland, 1968). *Idiosyncratic volatility* is the component of share price volatility that is independent of market wide fluctuations, and is related to firm-level characteristics. A large body of evidence, both from practitioners, and academics, supports that these two are related. In the field study carried out by Graham et al. (2005), more than 96% of respondents indicate that they prefer a smooth earnings path, since lower firm risk as perceived by investors, is one of the most popular motivations for income smoothing. Given that recent studies find that systematic volatility is a fraction of total firm volatility (Shin and Stulz, 2000; Ferreira and Laux, 2007), and that idiosyncratic volatility cannot be diversified away by a CEO through trading on their private account, incentives to temper idiosyncratic volatility, rather than systematic volatility, are expected to dominate.

Recent evidence from the capital markets, especially from practitioner outlets, indicates that the emphases on the importance of earnings volatility, and efforts to temper it, have increased. Beltratti and Corvino (2007) argue for the stability of short-term earnings, which improves the situation of investors. This is corroborated by a Fortune 500 CEO who states "The No. 1 job of management is to smooth out earnings" (Loomis, 1999). It is evident that over the past twenty years, the corporate community has given the issue of income smoothing a higher priority as a result of the expansive growth of financial markets and market risk as well as the adverse effects of share price volatility on shareholder value (RiskMetrics, 1999).

A large number of studies discuss incentives to reduce the volatility of both stock price and earnings. Stock price volatility has been associated with an increased cost of capital (Beaver et al., 1970; Gebhardt et al., 2001; Minton and Schrand, 1999), while earnings volatility has been linked to the valuation of firms (Barth et al., 1995; Beaver et al., 1970; Beidleman, 1973; Dye, 1988; Gebhardt et al., 2001; Gordon, 1964; Sadka, 2007; Wang and Williams, 1994). More recent evidence has argued that idiosyncratic volatility has been increasing (Campbell et al., 2001), with important implications for portfolio diversification, corporate incentive systems and CEO behavior.

2.2 Predictions

The first link between income smoothing and idiosyncratic volatility is related to the CEOs' job security concerns. Relating income smoothing to idiosyncratic volatility allows us to directly investigate the link between income smoothing and job security concerns suggested in prior literature. Gordon (1964) points out that a CEO's utility increases with job security, and that would create incentives to smooth income numbers. In the same vein, Fundenberg and Tirole (1995) theoretically demonstrate that income smoothing can arise in equilibrium if managers are concerned about job security. DeFond and Park (1997) provide indirect empirical evidence consistent with Fundenberg and Tirole's theory: they find that discretionary accruals are income increasing (income decreasing) in firms with poor (good) current performance and expected good (poor) future performance. Ahmed et al. (2008) investigate the link between job security and income smoothing in a more direct way by identifying corporate settings where job security concerns are more severe (high competitive industries, durable goods industries, and more uncertain operating environments), their results also confirm Fundenberg and Tirole's (1995) theory. Recently, Bushman et al. (2008) show that job security concerns increase with idiosyncratic volatility, in particular, they find that after controlling for realized firm performance: (1) the probability of CEO turnover is increasing in the proportion of idiosyncratic risk, and (2) the sensitivity of CEO turnover to firm performance is higher as idiosyncratic risk increases. These findings confirm the impact of idiosyncratic volatility on the information content of realized performance, also pointed out in Ferreira and Laux (2007). As idiosyncratic volatility is driven primarily by factors related to unobservable CEO talent, it will allow firm performance to be diagnostic about such talent, and so boards will discover and replace low talent incumbents (Bushman et al., 2008: 2).[2] Overall, Bushman et al. (2008) findings suggest that lowering idiosyncratic volatility would result into higher CEO's job security. Accordingly, we argue that CEOs would benefit from income smoothing in order to reduce idiosyncratic risk.

A second link between income smoothing and idiosyncratic volatility derives from the risk aversion of CEOs' due to their equity holdings. According to standard finance theory, idiosyncratic risk can be cancelled out by diversification. However, in addition to human capital risk, CEOs typically hold large portfolios in their own companies that make them unable to fully diversify their exposure to firm specific risk. Therefore, it can be argued that reducing idiosyncratic risk through income smoothing would reduce the cost of loss diversification faced by the CEO. Although the expected positive relationship between income smoothing and shareholdings could be entirely true for CEOs shareholdings, CEOs' preference for volatility is not clear when holding executive stock options. Since CEOs are risk averse, option compensation has been seen as an instrument for motivating managers to accept more risk (Jensen and Meckling, 1976; Lambert, 1986), where prior studies have shown controversial results as to how CEOs

[2] On the contrary, Bushman et al. (2008) state that systematic volatility, which is driven by factors unrelated to CEO talent, would limit board's ability to infer CEO talent from performance. Consistently, they find that CEO turnover is negatively related to systematic volatility.

respond to such risk taking incentives embedded in compensation contracts (Carpenter, 2000; Knopf et al., 2002; Rajgopal et al., 2004; Rogers, 2002; Tufano, 1996). Therefore, the role of equity holdings in relation to firm volatility and income smoothing, remains unclear.[3]

Smoothing income as a result of job security concerns, or because of equity incentives, is regarded as an opportunistic behavior by managers. The opportunistic view of income smoothing considers that managers' motivation underlying such behavior is to transfer wealth from the rest of stockholders to maximize their own wealth[4] (see Holthausen, 1990 for a detailed explanation of the alternative motivations that may be underlying income smoothing behavior).

However, not all motivations to smooth, and to temper idiosyncratic risk are opportunistic. A signaling perspective, as opposed to an opportunistic perspective, argues that managers may smooth income to communicate private information to the market, reducing information asymmetries between insiders and investors and subsequently improving shareholder's ability to predict firm future performance (Ronen and Sadan, 1981).[5] Additionally, several papers provide evidence suggesting that firms with higher levels of idiosyncratic volatility have more information asymmetries (Xu, 2006; Huson and Mackinnon, 2001; Ben-David and Roulstone, 2007). Consistent with this view, Turcker and Zarowin (2006) show that income smoothing results into more informative stock prices, where stock prices impound more information about future earnings when firms utilize flexibilities in financial reporting to smooth their reported income. Additionally, Subramanyam (1996) argues that flexibilities in financial

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[3] We have fully tested this avenue without any tangible results. Testing various permutations of CEO share and option holdings, across multiple research designs, as moderators of the relationship between income and idiosyncratic volatility yielded no tangible results. We leave for future research to examine this in a more detailed manner.

[4] The opportunistic view of earnings management has been largely tested. Examples of corporate settings where earnings are found to be managed opportunistically are: IPOs and SEOs (Teoh et al., 1998a, 1998b; Shivakumar, 2000); debt covenant violations (Sweeney, 1994; DeFond and Jiambalvo, 1994); Management Buy Outs (Perry and Williams, 1994); mergers and acquisitions (Erickson and Wang, 1999); or firms facing high political costs and public scrutiny (Key, 1997; Hang and Wang, 1999).

[5] Several prior studies suggest that managers use their reporting discretion to signal their private information (Watts and Zimmerman, 1986; Subramanyam, 1996; Guay et al., 1996; or Demski, 1998). However, fewer empirical studies identify corporate settings where managers might use accounting discretion to signal their private information. A recent example is Louis and Robinson (2005), who find that managers use accruals to reinforce the signal of favorable private information they make through stock splits.

reporting predict future profitability. Pastor and Veronesi (2003) argue that there is a positively relationship between stock return volatility and expectations about future profitability. Therefore, given that future performance uncertainties induce volatility, and given that income smoothing increases informativeness about future earnings and can possibly help predict future profitability, a negative relationship between smoothing and volatility can be expected.

Given the discussion above, we argue that managers favor lower levels of idiosyncratic volatility in order to ease job security concerns. Additionally, smoothing income from a signaling perspective can result into lower volatility. To our knowledge, no study has yet looked at income smoothing and its relationship to idiosyncratic volatility, which we predict, *a priori,* that these two are negatively related.

The discussion so far argues that income smoothing in fact reduces investors' perception of risk. This could be true if (1) underlying firm riskiness and cash flow risk is observable with error, and financial reporting succeeds in masking underlying perceptions of volatility (see Leuz et al., 2003, for general assumptions regarding the effects of earnings management), or (2) income smoothing, although not masking true underlying firm fundamentals, succeeds in successfully conveying information about future profitability, or (3) income smoothing lowers operational risk, such as staving of bankruptcy and lowering the cost of debt (Trueman and Tirman, 1988). Given that income smoothing necessitates costly action that might not be advantageous from a cost/benefit perspective, firms that smooth income in order to temper volatility, expect tangible benefits from such actions. Under the simplifying assumptions of uniform costs of smoothing across publicly held corporations, firms that have higher ex-ante risk of CEO dismissal, or firms that have higher underlying operational volatilities, or smaller firms whose riskiness is less observable or future performance is less predictable are more likely to smooth. Finally, income smoothing can be more pervasive in loss making firms that are more likely to suffer from poor long-term performance. Given the above discussion regarding motivations to smooth income to temper idiosyncratic volatility, the next sections empirically examine the role of job security concerns, and various firm level characteristics, in testing our predicted relationship between income smoothing and idiosyncratic volatility.

3. Research design, variable measurement and sample selection

3.1 Research Design

Our study examines the relationship between income smoothing and firm level idiosyncratic risk. We argue that at any point in time, because of incentives associated to job security concerns and lack of diversification, the CEO utilizes flexibility in financial reporting to report a smoothed income stream, consequently tempering firm-level idiosyncratic risk. From this perspective we assume that idiosyncratic volatility can be presented in the following form:

$$\text{Idiosyncratic Volatility} = f\,(\text{Income Smoothing, Control variables}) \qquad (1)$$

One potential issue regarding the measurement of our theoretical constructs is time-consistent matching of our research variables. Given that income smoothing is performed over multiple time periods, and it manifests over a long cycle, then the effects on the market should be observed after a time lag. From this perspective, reductions in idiosyncratic volatility follow observable income streams. Therefore in our research design, we measure income smoothing using current and past data, and match it to contemporaneous idiosyncratic volatility. Our primary estimation method is by Ordinary Least Squares (OLS).

It can be argued that income smoothing is itself an endogenous function of firm-level risk. A manager observes a high level of idiosyncratic volatility, hence, smoothes income. From this perspective, methodologically the formulation can also be constructed as a system of equations, where:

$$\text{Income Smoothing} = f\,(\text{lagged Idiosyncratic Volatility, Control variables}) \qquad (2)$$

&

Idiosyncratic Volatility = f (Income Smoothing, Control variables) (3)

As a consequence, in our tests we also perform a Three-Staged Least-Squares estimation methodology. In this system of equations, the first equation measures the amount of income smoothing carried out, given a level of past idiosyncratic volatility. The second equation, in turn, measures the subsequent effect of smoothing on idiosyncratic volatility.

3.2. Variable Measurement

3.2.1. Measuring Idiosyncratic Volatility

Our main research variable is calculated following Rajgopal and Venkatachalam (2008). We measure firm level idiosyncratic volatility, *Volat*, by calculating the average monthly variance of market adjusted returns. This is calculated by taking the excess of daily stock returns over the daily return on the value weighted market portfolio, consistent with the market adjustment procedure of Campbell et al. (2001). In subsequent robustness tests, we also calculate *Volat2* as residuals from market model regressions, and *Volat3* using the Fama and French (1992) three-factor model, and *Volat4* from industry level regression residuals.

3.2.2 Measuring Income Smoothing

Consistent with prior studies, we use two measures for income smoothing: the volatility of income with respect to the volatility of cash flows, and the correlation between changes in accruals and changes in cash flows. Our first income smoothing measure is the ratio of the variability of income to the variability of cash flows, σ_{NI}/σ_{CFO}- (hereafter *Dev*). This has been used in Leuz et al. (2003) and Myers and Skinner (1999). The more income smoothing, the less the variability of income with respect to variability in cash flows, hence a lower value of *Dev* would signify a smoother income stream. We obtain financial statement data from Compustat, and we require data to be present for three consecutive years for the annual calculations. We use income before extraordinary items as the earnings measure, and cash flow from operations as the cash flow measure. We calculate *Dev* over a period of three year, since a longer time period would result in fewer observations and a noisier matching process with the volatility data. Therefore, we match contemporaneous and lagged income smoothing data, with current idiosyncratic volatility data. In alternate tests, we match current idiosyncratic volatility with lagged income smoothing, to maintain the hypothesized causality of the constructs, so to speak.

The second measure of income smoothing used is the correlation between changes in accruals[6] and cash flows from operations, ρ[*ΔAcc*, *ΔCFO*] (hereafter *Corr*). This has also been used in Myers and Skinner (1999) and Leuz et al. (2003). The underlying intuition is that the variability of cash flow is smoothed through the usage of accruals. Therefore, a more negative correlation would signify a smoother income stream in relationship to the underlying fundamentals. We again calculate this variable over a three year period, and match it with idiosyncratic volatility in a similar way as *Dev* above.

Since lower numbers of *Dev* and *Corr* indicate higher levels of income smoothing, in our tests we use the inverted sign of *Corr* (*iCorr*) and the reciprocal of *Dev* (*iDev*), to ease the interpretation of the results.[7] This way, higher values of our income smoothing variables indicate more income smoothing.

3.2.3 Control Variables

We employ a number of control variables in our statistical tests, based on variables identified in prior literature to be related either to the income smoothing measure or to stock price volatility. *LogMktVal* denotes the logarithm of the market value of equity, used as a control for visibility and information asymmetry. Return on assets, *ROA,* is used as a control for profitability, calculated as net income before extraordinary items divided by total assets. We control for a firm's investment opportunity set and growth opportunities by calculating *MB*, which is the market value of equity divided by the book value of equity.

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[6] We calculate accruals as the difference between net income before extraordinary items and cash flows from operations.

[7] Apart from the descriptive statistics, where we maintain the classical representation to facilitate comparisons with other studies

To control for firm operating performance volatility, we calculate *DevCFO* and *DevNI*, as the standard deviation of cash flow from operations and net income, respectively, calculated over a period of 12 quarters. *Leverage*, which is calculated as long term debt over total assets, controls for adverse selection and equity risk. *PercInst* is the percentage of shares held by institutional investors. We also employ control variables for industry, classified into 23 industries according to Core and Guay (1999), since managers with similar risk preferences and utility functions self-select into similar industries (Lambert et al, 1991), and risk varies across industries. Finally, we also control for year effects using year dummies. Other variables used in the robustness tests and other analyses are discussed in the respective sections. The main variables are summarized in Table 1.

(Insert Table 1 about here)

3.3 Sample Selection

We utilize CRSP daily data in order to calculate idiosyncratic volatility. We merge the CRSP database with the Compustat data to calculate our income smoothing variables and control variables. Additionally, we collect data from CDA Spectrum for the institutional data. The cross-section of those gives us about 66,262 observations for the base level analysis, over the period 1989-2006. Details about the sample selection are provided in Table 2.

(Insert Table 2 about here)

The sample varies given the choice of tests and controls employed, where the introduction of governance, compensation, and firm-level information data dents the sample size. For the robustness analyses, we also employ data from I/B/E/S to calculate dispersion in earnings forecasts, we use data provided in Andrew Metrick's website to calculate the Gompers et al. (2003) governance variables. Additionally, we utilize data from Institutional Shareholder Services in order to calculate variables related to board structure and independence. We utilize the Execucomp database to calculate executive compensation variables. Finally, to control for price informativeness, we obtain probability of informed trade (*PIN*) values from Easley et al. (2002), and we estimate a measure of informed private trading (*Private*), according to Llorente et al. (2002).

4. Statistical Model, Descriptives, and Results

In our research design we argue that idiosyncratic volatility is a function of managerial income smoothing decisions and other control variables. Therefore we represent our main statistical model as follows (for simplicity, coefficients and firm and time subscripts are suppressed):

$$\begin{aligned} &Volat = iCorr \text{ (or } iDev) + ROA + MB + PercInst + LogMktval + Leverage + \\ &DevCFO + DevNI + Industry\ Controls + Year\ Controls \end{aligned} \quad (4)$$

As discussed before, *ROA* and *MB* control for the past and future performance-related effects on volatility. *LogMktval*, and *Leverage* control for firm-level characteristics that affect share volatility, and *PercInst* controls for shareholder preferences regarding observed firm risk, while *DevCFO* and *DevNI* represent firm and operational risk's effect on idiosyncratic volatility.

4.1 Descriptives and Main Results

Table 3 presents the descriptive statistics. All variables are winsorised at 1% and 99%. *Volat* has a mean of 0.045 and a median of 0.022, similar to Rajgopal and Venkatachalam (2008) whose estimation methodology we copy. They report a mean of 0.041 and a median of 0.016, slightly lower than ours, but this could be explained by differences in sample size and period, since their sample selection is from an earlier period characterized by lower idiosyncratic volatility. Mean *Corr* is -0.54 (median = -0.89) indicating that the negative correlation between change in accruals and change in cash flows is high. *Dev* has a mean of 1.51 indicating that on average there is larger variability in net income as compared to operating cash flows; however, the median is 0.82, which is evidence that this variable is skewed right. Both the mean and medians of our income smoothing variables compare well with Zarowin (2002).

MktVal has a mean of about $1.85 billion with a median of about $200 million, this figure is right skewed because of the very large valuations of the largest firms. Institutional holding is about 37.9%, which is typical of the larger firms. In unreported analysis, we see that firm size and institutional ownership greatly increases throughout the sample period, mirroring changes in US capital market characteristics.

(Insert Table 3 about here)

As a first indication, we plot the relationship between idiosyncratic volatility and income smoothing. Figure 1 displays the mean level of idiosyncratic volatility by deciles of our two income smoothing measures. A monotonic negative relationship between income smoothing and idiosyncratic risk is observed. The mean idiosyncratic volatility (*Volat*) in the lowest and highest deciles of *iDev* is 0.071 and 0.024 respectively, being the difference statistically significant at the 1% level (*t*-statistic equals 39.02). Similarly, the mean of *Volat* in the lowest and highest deciles of *iCorr* is 0.072 and 0.030 respectively, again being the difference statistically significant at 1% level (*t*-statistic equals 34.53).

(Insert Figure 1 about here)

Additionally, unreported correlations (both Pearson and Spearman) analysis indicates a preliminary and univariate evidence regarding our predicted relationships. *Volat* is negatively related to both *iDev* and *iCorr*, higher levels of income smoothing are related to less idiosyncratic volatility. Nevertheless, it is difficult to obtain any meaningful inferences at the univariate level since there are high correlations among the variables: all of *LogMktVal*, *ROA*, *DevCFO*, and *DevNI* are highly correlated with *Volat*, *iDev*, and *iCorr*. To go beyond the statistical limitations of the univariate analysis, we employ further statistical techniques as discussed below.

We turn our attention to our multivariate analysis. Table 4 presents our main findings, where *Volat* is regressed on income smoothing and control variables. Model (1) presents our base OLS regression model with *iCorr* as the income smoothing variable, while Model (2) repeats the same regression with *iDev*.

This base model is employed with firm size, industry dummies, and year dummies as controls. As expected, the coefficient on *iCorr* and *iDev* is negative (*t*-statistics are -23.9 and -20.7, respectively).

(Insert Table 4 about here)

In models (3) and (4) we repeat our regressions adding *ROA*, *MB*, *PercInst*, *Leverage*, *DevCFO*, and *DevNI* as additional control variables. Our results are qualitatively similar since our income smoothing variables are negatively related to idiosyncratic volatility. Results for control variables are also as predicted and consistent with prior literature: *LogMktVal* is negatively related to *Volat*, which indicates that larger firms have lower levels of idiosyncratic risk; the same can be said about firm profitability (*ROA*), which is again as expected. Pastor and Veronesi (2003) have already shown that profitability[8] is negatively related to idiosyncratic risk. Our results complement their findings by showing that not only profitable but also smoothing income patterns contribute to temper idiosyncratic risk. Interestingly enough, untabulated results show that the effect of profitability on idiosyncratic risk becomes stronger as income smoothing increases: the negative coefficient of *ROA* on *Volat* in the lowest quartiles of our income smoothing measures is one third of the same coefficient in the highest quartiles, being the differences statistically significant at 1% level; *PercInst* is negatively related to *Volat*, which accurately describes the risk appetite of institutional investors on average; *MB*, *Leverage*, and *DevNI* are positively related to *Volat*, indicating that firms with more growth opportunities, and a more volatile operational structure, exhibit higher levels of idiosyncratic volatility. Except for the lack of results on *DevCFO* (positive in model 4) our research and control variables exhibit coefficients that are as ex-ante predicted. As for *DevCFO*, once we re-run our regressions without *DevNI DevCFO* becomes positive and significant. It seems that the effect of cash flow volatility is subsumed by earnings volatility. In Models (5) and (6) we re-run our analysis while employing *LagiCorr* and *LagiDev* (these variables are calculated by taking prior year values). Since we previously had ran our regressions employing contemporaneous

[8] Pastor and Veronesi use return on equity (*ROE*) to measure profitability.

and past income smoothing against *Volat*, now using a lagged form of our statistical model, we completely isolate the measurement periods of idiosyncratic risk and income smoothing: now, only lagged income smoothing is tested against contemporaneous idiosyncratic risk. The estimation in models (5) and (6) confirm our previous findings: income smoothing is negatively related to firm idiosyncratic volatility. For all estimations, R-squared is above 40%, indicating good fit for our model.

We next do a number of untabulated tests to further understand the efficacy of our results. First, in our regressions we employ both *DevCFO* and *DevNI*, which potentially creates problems as both those variables are highly correlated to each other, and are also correlated to our income smoothing variables. Re-running our regressions with *DevCFO* and *DevNI* separately yields qualitatively similar results. Second, our descriptives indicate that both *iCorr* and *iDev* are skewed, which could be potentially problematic in terms of the efficiency of our estimation. Therefore, we also employ ranks of these variables, by splitting them into 10 groups adjusted for industry and year effects: results remain the same. This method of ranking by industry and year is also advantageous as it potentially provides for a stronger control in filtering out systematic factors in income streams. Third, and most importantly, we check for the robustness of our results given various alternate specifications of our firm size variable. Firm size is an important regressor, with t-statistics exceeding 40 in most estimations. Given that firm size is jointly related to idiosyncratic volatility, firm operational risk, and incentives to smooth income, we further check whether our results are not due to model misspecification (the underlying assumption being that perhaps *Volat* is not related to firm size in a logarithmic specification). We first re-run our regressions using the non-logarithmic form of our size variable (*MktVal*), results remain the same. Next, we employ firm assets in lieu of the market value of equity, results are qualitatively similar. Finally, instead of *LogMktVal* we employ 10 (and 40) dummies for the various size deciles, results are again unchanged. On aggregate, these tests confirm our predictions indicating that income smoothing has incremental explanatory power for firm level idiosyncratic volatility that is robust to the inclusion of a large number of covariates.

4.2 Three-Stage Least Squares, and Changes, Analysis

To control for a potential endogeneity problem in the association between income smoothing and idiosyncratic risk, we next use a Three-Stage Least-Squares estimation methodology. Since we previously argued that managers undertake costly income smoothing actions in order to temper idiosyncratic volatility, then it must be the case that managers observe past high levels of *Volat*, and attempt to moderate it using accounting techniques. Hence, a system of equations could be more appropriate from an estimation perspective. Therefore, we employ the following statistical model:

Volat = *iCorr* (or *iDev*) + *ROA* + *MB* + *PercInst* + *LogMktVal* + *Leverage* + *DevCFO* + *DevNI* + *Industry Controls* + *Year Controls* (5)

Simultaneously, we also estimate:

*iCorr (*or *iDev)* = lagged *Volat* + lagged *MB* + lagged *LogMktVal* + *Industry Controls* + *Year Controls* (6)

Results are tabulated in Table 5. Both *iDev* and *iCorr* are negatively related to *Volat*, confirming our previous findings: Controlling for the endogenous relationship between income smoothing and idiosyncratic volatility, we find that they are negatively related.

(Insert Table 5 about here)

However, one statistical relationship deserves further explanation. In the second stage equation, we regress *iCorr* (or *iDev*) on lagged *Volat*. Contrary to our expectations, results indicate that past *Volat* is negatively and significantly related to income smoothing (models 2 and 4), where in fact we were expecting higher past values of volatility to result into more income smoothing. One possible explanation could be as follows: we are using *LagVolat* which just precedes the income smoothing estimation period, however, this could be mis-specified because managers potentially observe volatility at a point further back in time. In other words, given idiosyncratic volatility, managers smooth income, a continuous process that possibly cannot be measured by the lagged volatility specification. It might as well be that a manager knows the underlying volatility structure of the firm, as far as 10 years back, and is continuously smoothing: a possibility that cannot be tested/verified using our present methodology. We go a bit further in investigating this by testing whether positive (negative) shocks in idiosyncratic volatility are followed by increases (decreases) in income smoothing. Untabulated results show that in an OLS regression, where industry and year controls are also included, the average of past annual changes in idiosyncratic volatility (calculated over a six year period, from *t-5* to *t*) is positively and significantly related to the future change in income smoothing, using both *iCorr* and *iDev*, (i.e.: change from year *t+1* to year *t+4*, which covers the firm's income smoothing behavior in the period *t+1* to *t+6*). This finding provides direct evidence on idiosyncratic volatility being an incentive to incur in income smoothing: positive (negative) shocks in idiosyncratic volatility are followed by increases (decreases) in the firm's income smoothing level.

Next, we examine a changes analysis among our variables. If income smoothing has a negative effect on idiosyncratic volatility, we should also observe a link between changes in income smoothing patterns and ensuing volatility. To this effect, we examine the association between long-term changes in idiosyncratic volatility and income smoothing. We calculate long-term changes in both the dependent and independent variables. If CEO income smoothing decisions have a significant influence on idiosyncratic volatility as our results have implied so far, then as income smoothing changes over time, we would expect to see a corresponding change in volatility. That is, we would expect to see increases in income smoothing to be associated with decreases in idiosyncratic volatility in our sample period.

In this methodology, given the construction of our income smoothing measures -over a period of three years-, for all variables in model (4), included both the dependent variable and the regressors, we calculate changes by taking the difference with three-year lagged values. In other words, changes in variable X in year t (Ch_X_t) are calculated as the difference between the variable in year t and the variable in year $t-3$ (X_t - X_{t-3}). Results presented in Table 6 indicate that our income smoothing variables are still negatively and significantly related to income smoothing.

(Insert Table 6 about here)

Next, we take advantage of the time dimension in our panel data set and include the lagged dependent variable as an additional right-hand-side variable (results untabulated). Therefore, we analyze only the explanatory power of the independent variable above and beyond the explanatory power included in lagged values of the dependent variable itself. This would be a test in the spirit of Granger (1969), which attempts to investigate the effect of income smoothing on volatility, beyond the time series dependencies of *Volat/iCorr/iDev*. We utilize both *LagVolat* (the three-year lagged value of *Volat*) and *iCorr* (or *iDev*) in the same regression specification. Results show that our income smoothing measures are still negative and significant.

Cumulatively, the results in this section support our hypothesis that risk-related incentives influence income-smoothing decisions. Using a three-staged least squares analysis to control for the endogeneity of the relationships between income smoothing and volatility, results indicate that these two are negatively related. Additionally, changes in idiosyncratic volatility are negatively related to changes in income smoothing. Finally, Granger (1969) type tests confirm our prior obtained results.

5. Additional Analyses

As discussed before, CEOs smooth income to temper idiosyncratic volatility in order to alleviate career concerns. These motivations differ given situations when the cost/benefit tradeoff of smoothing is high. In the following section we present results on possible CEO motivations to utilize discretions in financial reporting in order to reduce idiosyncratic volatility, by examining the role of CEO career concerns, the effect of operational risk, firm size, and firms that exhibit losses.

5.1 The Role of CEO Career Concerns

Since we discuss the role of CEO career concerns as possible motivators to smooth income, given the arguments in Bushman et al. (2008) and DeFond and Park (1997), we first examine whether income smoothing alleviates CEO career concerns given idiosyncratic volatility. To this effect, we first replicate the methodology and findings of Bushman et al. (2008) by carrying out a probit analysis where CEO turnover is expressed as a function of idiosyncratic volatility and control variables. Similar to Bushman et al. (2008), in Model (1) of Table 7 we show that *Volat* is positively related to CEO turnover (t = 4.80), with a marginal effect of 0.4572, indicating that a 100% increase in idiosyncratic volatility increases the probability of CEO turnover by 46%. In Models (2) and (3) we replicate the Bushman et al. (2008) analysis while introducing both *iCorr* and *iDev* as additional regressors. Results indicate that *iDev*, but not *iCorr*, significantly explains CEO turnover (t-statistic on *iDev* is -4.3), where firms with higher income smoothing have lower CEO turnover, however, the marginal effect is small (less than 1%). The analysis so far examines CEO turnover without distinguishing between forced and voluntary turnover. In untabulated results we also examine forced turnovers (defined as CEOs who leave their positions before the age of 64), and routine turnovers (turnovers at 64 years and above). Results hold only for forced turnovers, and not routine turnovers. This indicates that both volatility and income smoothing are unrelated to normal successions changes.

(Insert Table 7 about here)

Although the marginal effect of smoothing on turnover is small, this could be a result of our research design. Smoothing could exist in all situations where the probability of CEO dismissal is high, however, in our tests we only measure instances were turnover is recorded, adding noise to our estimation methodology. Given that we cannot predict, *ex-ante*, situations where the CEO is more likely to be dismissed, we lack powerful tests to measure our predicted relationships.

5.2 Smoothing and firm-Level Characteristics

Given that CEOs smooth to temper the effects of risk, then these effects should be most pronounced in firms that have a high cost/benefit relationship regarding the outcomes of smoothing. From this perspective, firms that have high operational risk, small firms where smoothing is less observable, and firms with losses, are expected to have a higher propensity to smooth in order to temper idiosyncratic volatility.

Prior research indicates that firms with more variability of cash flows have higher idiosyncratic risk (Xu and Malkiel, 2003), therefore, we expect firms that have higher variability of operational cash flows to undertake smoothing for the specific purpose of reducing idiosyncratic volatility. To test this, we re-run our regressions in Table 4 in the highest and lowest quartiles of *DevCFO* subsamples.[9] [10]

(Insert Table 8 about here)

Panel A of Table 8 presents the results of our sub-sample analysis. We see that the coefficient on *iCorr* is about four times higher in the quartile with the highest operational risk, as compared to the lowest quartile. The Wald Test coefficient is 28.7 and this difference is statistically significant at the 1% level. Inferences are the same regarding *iDev*. *Prima facie* results are as predicted, in firms with higher operational risk, the negative relationship between smoothing and idiosyncratic volatility is stronger. This could be a result of two possibilities, either that smoothing in high operational risk environments is primarily directed toward reducing idiosyncratic volatility (while for low risk firms it could be for tax, bonus, or leverage related reasons), or, smoothing in high risk environments is more effective in tempering idiosyncratic risk. This last possibility is entirely possible if the market fixates on the earnings number vis-à-vis that of cash. As a robustness analysis for the influence of ex-ante risk on smoothing decisions, we split our sample firms into the high/low levels of R&D expenditures[11]. Untabulated results

[9] Running our regressions in the subsamples above and below the median of *DevCFO* shows qualitatively similar results.
[10] Another approach is to run regressions by utilizing a dummy variable to indicate high/low operational risk (without splitting the sample). This approach is not taken as Chow tests indicate the superior efficiency of our adopted statistical methodology.
[11] Since R&D takes a lot of zero values, the partition of low versus high levels of R&D is done considering the median as the breaking point.

indicate that results are qualitatively similar: income smoothing is more related to idiosyncratic volatility in firms where R&D expenditures are higher.

Next, we turn our attention to firm size, and institutional ownership. Our primary interest in utilizing those variables is to examine whether CEOs smooth to reduce the perception of risk (i.e. in small firms), and to attract institutional investors. It is well known that small firms are riskier from an investment perspective (Fama and French, 1992), and institutional investors shun risky stocks (Badrinath et al. 1989). We examine our predictions in Panels B and C of Table 8. In Panel B we split our firms according to the highest and lowest quartiles of firm size (*LogMktval*)[12]: the relationship between smoothing and idiosyncratic volatility is stronger for small firms, the coefficient in the lowest quartile of size is more than six times larger (more negative) than in the highest quartile, and the difference is statistically significant at the 1% level. The same can be observed in Panel C, where firms that have lower institutional ownership, have stronger incentives to smooth in relation to idiosyncratic volatility.

Our findings in Panels B and C open possibilities for alternate explanations. Since institutional ownership is correlated with firm size, we could altogether be examining the two sides of the same coin. Additionally, it could be that we observe our relationships because in smaller firms, smoothing is less observable by the market, and more effectively affects the perceptions of investors regarding operational risk. To exclude this possibility, we split our sample firms by two measures of information: *PIN* and *Private* (we obtain the probability of informed trade (*PIN*) values from Easley et al. (2002), and we estimate a measure of informed private trading (*Private*), according to Llorente et al. (2002)). Comparing results across the two subsamples (high/low information) does not yield any differential results. It seems that the relationship between income smoothing and idiosyncratic volatility is not different in high versus low information environments. Therefore, we conclude that our results in Panels B and C are not driven

[12] Using the log of total assets to proxy for firm size we get qualitatively similar results.

because of market participants not being able to observe the riskiness of cash flows, in fact, it seems that smoother income streams by risky firms is viewed positively by the market.

In Panel D of Table 8 we split our sample firms according to whether the firm had profits or losses in the sample period. This approach is motivated by Berrada and Hugonnier (2008), who develop a model that predicts that the market reaction to news should be stronger among high idiosyncratic volatility firms.[13] Given that returns are not symmetric with respect to performance, managers in poorly performing firms have higher incentives to smooth in order to temper idiosyncratic volatility, to minimize losses. Comparing the coefficient of our income smoothing measures when estimating our regressions in the profits and losses firms subsamples, we see that loss firms have a statistically stronger relationship between smoothing and idiosyncratic volatility. This confirms our expectations.

6. Robustness Tests

In this section we employ a number of statistical tests to indicate the robustness of our results, these include controls for firm level governance characteristics, equity ownership, controls for earnings quality, and the information environment of the firm. Additionally, we utilize alternate measures of our income smoothing and idiosyncratic volatility variables.

6.1 Controls for Firm Level Governance Structures

We start our robustness tests by including controls for the governance structure of firms. Governance structures have been linked to CEO turnover, where stronger monitoring and shareholder control have been related to CEO turnover during periods of poor financial performance (DeFond and Hung, 2004). Apart from the role of corporate governance as a possible alternate test for CEO career concerns, it has also been widely linked to the financial reporting characteristics of host firms (see Klein, 2002, for a

[13] Zang (2006) findings are consistent with the predictions derived from Berrada and Hugonnier (2008) model. This paper provides evidence that firms with high volatility produce relatively lower returns following bad news and relatively higher returns following good news.

seminal study), at the same time, governance is also related to volatility (Ferreira and Laux, 2007; Philippon, 2003), hence corporate governance could be a correlated omitted variable driving our observed results. We calculate *B.Indep*, which measures the percentage of independent directors on the board. Model 1 in Table 9 presents the results,[14] where we see that *B.Indep* is negatively related to *Volat*, indicating that firms with better governance structures are less volatile. The significance and direction of our income smoothing variables remains unchanged.

(Insert Table 9 about here)

In untabulated results, we examine two additional governance measures. We calculate the *GIM* index, which represents an aggregation of firm-level governance characteristics as developed by Gompers et al. (2003), and *InstConc*, which measures the percentage of shares held by the top 5 institutional investors (see Hartzell and Starks, 2003), representing a form of monitoring. Consistent with findings in prior studies, both *GIM* and *InstConc* are negatively and significantly related to idiosyncratic volatility. Again, in these tests our income smoothing measures remain negatively and significantly related to *Volat*.

6.2 Controls for CEO Equity Holdings

We next test for the robustness of our results, given equity holdings by the CEO. Previous research indicates that shareholdings and stock options are affected by the level of firm risk (Abdel-Khalik, 2007; Carpenter, 2000; Knopf et al., 2002); hence equity holdings provide incentives to influence risk. Additionally, equity incentives are simultaneously related to financial reporting decisions (Bergstresser and Philippon, 2006; Cheng and Warfield, 2005; Kadan and Yang, 2004), and to firm risk. Undiversified managers who hold shares in a firm are risk averse and prefer lower volatility (Grossman and Hart, 1983), while options whose values are increasing in volatility give the incentives to increase risk (Lambert, 1986; Smith and Stulz, 1985). In other words, it might be that the equity incentives of CEOs are both driving the

[14] This table only reports results for *iDev*, but they are qualitatively similar for *iCorr*.

operational decisions of the firm (and ensuing risk), and financial reporting decisions. To control for this possibility, we introduce *Shares* as a control variable measuring the percentage of firm shares held by the CEO, while *Options* calculates the logarithmic form of the dollar value of all options held by the CEO. Results of Models (2) and (3) in Table 9 indicate that neither shareholdings nor option holdings affect the relationship between income smoothing and idiosyncratic volatility. *Shares* is negatively related to volatility, indicating that managers who have high stakes in a firm prefer less volatility, while *Options* is positive, indicating that riskier firms award options more intensely, or managers increase volatility to benefit from options' convex payoffs (Core and Guay, 1998). In untabulated results we examine a number of other measures of equity holdings: the dollar value of shares, options held divided by total shares outstanding, the logarithmic form of the dollar value of equity holdings (shares plus options). Results are qualitatively similar. We find no evidence that the inclusion of equity incentives as statistical covariates eliminates the relationship between income smoothing and idiosyncratic volatility, indicating that our results are robust to a potentially correlated omitted variables problem.

6.3 Controls for earnings quality

This set of tests aim to distinguish our results from those of Rajgopal and Venkatachalam (2008), who find that idiosyncratic volatility has been increasing through time and attribute this to a decline in earnings quality.[15] If income smoothing is construed as lower earnings quality, then our findings may be a subset of the findings in Rajgopal and Venkatachalam (2008). However, income smoothing has both an opportunistic and signaling component, and its relationship to earnings quality is unclear. To confirm the uniqueness of our findings and contribution, we re-run our tests controlling for the three earnings quality variables used in Rajgopal and Venkatachalam (2008): the Dechow and Dichev (2002) measure of earnings quality (*DD* in Table 9); the absolute value of discretionary accruals (*AbsAcc*) calculated *ala*

[15] Rajgopal and Venkatachalam (2008) try to explain the intriguing results in studies that show an increasing trend in idiosyncratic volatility in the US market over last 40 years (Campbel et al., 2001). However, Bekaert et al. (2008) state that efforts made to explain the increasing trend in idiosyncratic volatility are premature since there is no such trend.

modified Jones (Dechow et al., 1995); and the dispersion in analyst forecasts regarding upcoming earnings (*Disp*). Consistent with Rajgopal and Venkatachalam (2008) results, we find that both *DD* and *AbsAcc* are positively and significantly related to *Volat* when using *iDev* as the income smoothing measure (Models 4 and 5 in Table 9).[16] Similarly, untabulated tests show that *Disp* is positively and significantly related to *Volat*. These results, cumulatively, indicate that lower earnings quality is related to higher idiosyncratic volatility. More importantly, our measures of income smoothing, *iCorr* and *iDev*, are still negative and significant. Collectively, results can be interpreted as follows: lower earnings quality results into higher volatility, however, discretionary managerial actions to smooth income works in the other direction. The effects are incremental to each other, raising a number of possibilities: the possibility that managers smooth income to counter the effects of poor earnings quality, or on average some firms smooth to reduce volatility and others have higher volatilities due to poor earnings. Finally, it could also be the case that the signaling embedded in income smoothing renders higher quality earnings (as such, our measures of earnings smoothing would be an alternate measure of earnings quality orthogonal to those of Rajgopal and Venkatachalam, 2008).

6.4 Controls for the Information Environment of the Firm

Finally, we examine the role of firm-specific information in the relationship between income smoothing and idiosyncratic volatility. Tucker and Zarowin (2006) argue that income smoothing makes stock prices more informative, by showing that smoothed income streams map better into future stock prices. Simultaneously, price informativeness, as proxied by information asymmetry, has been shown to affect the volatility of firms (see Xu, 2006, and Huson and Mackinnon, 2001). Therefore, not controlling for the effect of information could be the driver of a spurious relationship between income smoothing and *Volat*.

[16] When using *iCorr* to measure income smoothing *AbsAcc* is positively and significantly related to *Volat* while *DD* is not significant. Although excluding *iCorr* from the regression *DD* becomes significant.

Model 6 of Table 9 reports regression results utilizing *PIN* as a control for the firm-level information environment. Our income smoothing measure is significant in the expected direction, confirming our results. *PIN* is negative to *Volat*, indicating that firms with richer information environments have lower idiosyncratic volatility. In untabulated results, we substitute *Private* with *PIN* with similar qualitative results on *iDev* (*Private* is not significant).

6.5 Other Robustness Checks

Having established a robust relationship between income smoothing and idiosyncratic volatility, we do additional checks on the validity of our results. First, we use alternate estimation methods for our idiosyncratic volatility variable. Second, we use alternate measures of our income smoothing variable. Third, we do a sub-sample analysis for thinly traded firms. Finally, we indicate that although managers also have incentives to reduce systematic volatility, the idiosyncratic component of volatility dominates.

We re-run the regressions in Table 4 using alternate estimation methods of idiosyncratic volatility: *Volat2* is calculated using the Fama and French (1992) three-factor model, and *Volat3* using residuals from market model regressions, both are calculated using daily data aggregated over a calendar year, while *Volat4* utilizes residuals from industry level regressions. Untabulated results indicate that our income smoothing measures, *iCorr* and *iDev*, are still significantly and negatively related to *Volat2*, *Volat3,* and *Volat4.* Therefore, our results so far are not sensitive to alternate specifications of our idiosyncratic risk variable.

Next, we replicate our Table 4 analysis with a different income smoothing measure, *CorrZ*, calculated according to Tucker and Zarowin (2006) as the correlation between changes in "managed earnings" and changes in "unmanaged earnings". In other words, it is the correlation of the change in discretionary accruals with the change in pre-discretionary income. We measure discretionary accounting decisions through the modified Jones model (Dechow et al., 1995),[17] adjusted for future earnings growth as per Phillips et al. (2003), and also adjusted for change in cash holdings as per Chan et al. (2006).[18] Since we cannot observe managerial income smoothing actions, this measure has the advantage that it partitions income into a discretionary and non-discretionary component, and assumes discretionary accounting choices proxy for active managerial decisions to smooth underlying "unsmooth" earnings. Untabulated results remain our main finding unchanged: income smoothing is negatively related to idiosyncratic volatility (t = -8.71).

Additionally, we examine the effect of illiquid firms. The presence of illiquid firms can distort our results because of their unique trading patterns, which could be correlated with their earnings characteristics. Ashbaugh-Skaife et al. (2006) find that 20% of US firms do not trade on any given day. To test for the possibility these illiquid firms are driving our results, we do two alternate tests. First, we do our tests on the subsample of firms with above-median share turnover (shares traded during the year divided by total shares outstanding) for the year. Second, we introduce share turnover (*Turnover*) as a control variable in our main regressions in Table 4. In both cases, our results are qualitatively unchanged. Income smoothing is negatively related to idiosyncratic volatility.

Finally, in our last set of tests, we try to examine whether income smoothing is related to systematic volatility as it is with idiosyncratic risk. Lev and Kunitzky (1972) show that the extent of earnings smoothness is positively associated to systematic risk, interpreting this as evidence of stockholders preferring smoothed income series. This risk aversion perspective can itself be used as a motivation for income smoothing. Furthermore, Jin's (2002) results suggest that under specific circumstances, like facing binding short-selling constrains, incentives of performance based compensation contracts are

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[17] Basically, discretionary accruals are calculated to be total accruals minus non-discretionary accruals (accruals that are related to sales growth, receivables, and PPE). The calculation is done for each firm on a yearly basis, adjusting for industry membership.

[18] Measuring discretionary accruals is controversial, and prone to error. A number of different authors claim the supremacy of their developed models, and it is not our intention to suggest a preferred measure. Nevertheless, the original modified Jones model as developed by Dechow et al. (1995) provides us with the same results.

negatively related to systematic risk. To explore these possibilities further, we examine whether the incentives to reduce idiosyncratic volatility are above and beyond incentives to reduce systematic volatility, and if not, whether the incentives to reduce both types of risk exist independently. To do so, we run separate regressions with each type of risk as the dependent variable, and then compare the strengths of the effects of our income smoothing measures on the systematic/idiosyncratic risk specifications. We estimate the statistical significance of the differences between the coefficients of the income smoothing measure across models as θ_1-θ_2 divided by $\sqrt{\sigma_1^2+\sigma_2^2}$ where θ_1 and θ_2 are the estimated coefficients of the income smoothing variable when respectively using idiosyncratic risk and systematic risk as dependent variables, and σ_1 and σ_2 are the corresponding standard errors. This statistic follows a *t* distribution.

(Insert Table 10 about here)

Table 10 presents the results of our tests. Comparing Model 1 to Model 2 (and Model 3 to Model 4), we see that the coefficient on income smoothing is larger (more negative), and statistically different, in idiosyncratic volatility, as compared to systematic volatility. Additionally, in the *iDev* specification (Models 3 and 4), income smoothing is not significant when tested against systematic volatility. The differences across coefficients are statistically significant (t-statistics are -3.01 and -5.73, both significant at $p<0.01$), indicating that there are consistent incentives to reduce idiosyncratic volatility, and such incentives are stronger as compared to incentives in reducing systematic volatility. These results are compatible with the Jin (2002) and Bushman et al. (2008) findings. Jin (2002) shows that idiosyncratic and systematic risks react differently to incentives in performance based compensation contracts: while incentives are always negatively related to idiosyncratic volatility, only under specific circumstances this is the case for systematic risk. Similarly, Bushman et al. (2008) show that the probability of CEO turnover is increasing in idiosyncratic volatility while decreasing in systematic volatility.

7. Conclusion and limitations

Given CEO career concerns and the cost/benefits associated with income smoothing, we hypothesize that managers have incentives to smooth income in order to reduce idiosyncratic volatility through the use of financial reporting flexibility. By relating income smoothing to stock returns volatility we add to the still scarce literature on the economic effects of income smoothing. Also, our study helps to better understand the determinants of idiosyncratic risk, which in turn benefits finance literature related to portfolio theory, asset pricing models and option valuation.

As the market effects of income smoothing take time to be observed, we empirically test the association between income smoothing and idiosyncratic volatility by regressing current idiosyncratic risk on current and past income smoothing data, controlling for a robust set of covariates. OLS regression results reveal a robust negative association between both current and past income smoothing and idiosyncratic risk, which we interpret as evidence that income smoothing practices are implemented in order to reduce returns idiosyncratic volatility. In further analyses, we find evidence supporting the role of CEO career concerns, high operational risk, small firms, institutional investors, and loss firms, as potential motivations to reduce idiosyncratic volatility. Further robustness analysis indicates that results remain unchanged when controlling for firm level governance characteristics, equity holdings, firm level information environment, and controls for earnings quality. Our main result also holds when the endogeneity in the association between income smoothing and idiosyncratic volatility is considered by using a Three Stage Least Squares estimation technique to estimate a system of equations where current idiosyncratic risk depends on current and past income smoothing and at the same time income smoothing is a function of past idiosyncratic volatility. Finally, a changes analysis indicates that increases in income smoothing are negatively related to idiosyncratic volatility.

The study has a number of limitations. We need further analysis on the role of CEO career concerns, given that we do a simple research design. We have so far investigated simple CEO turnover, however, a potentially stronger test is to examine situations where the ex-ante CEO turnover probability is high. Other limitations include the lack of expected relationships in our tests. Most importantly, contrary to our expectations, 3SLS results indicate that income smoothing is negatively and significantly related to past idiosyncratic risk. This counter intuitive result highlights a potential limitation of our study: we observe the result of a continuous smoothing process where managers observe volatility and then decide to smooth income; the consequence being that in the cross-section high income smoothing is related to lower current idiosyncratic volatility. Although preliminary tests indicate that past changes in idiosyncratic volatility are positively and significantly related to future changes in income smoothing, further investigation is needed in this respect.

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Figure 1: Income Smoothing and Idiosyncratic Volatility

This figure shows the mean values of idiosyncratic volatility (*Volat*) by deciles of our two income smoothing measures: *iCorr* is the inverted sign of *Corr* (the correlation between change in accruals and change in cash flows from operations, calculated over a three year period); and *iDev* is the inverse of *Dev* (the standard deviation of net income before extraordinary items, divided by the standard deviation of cash flows from operations, both calculated over a three year period)

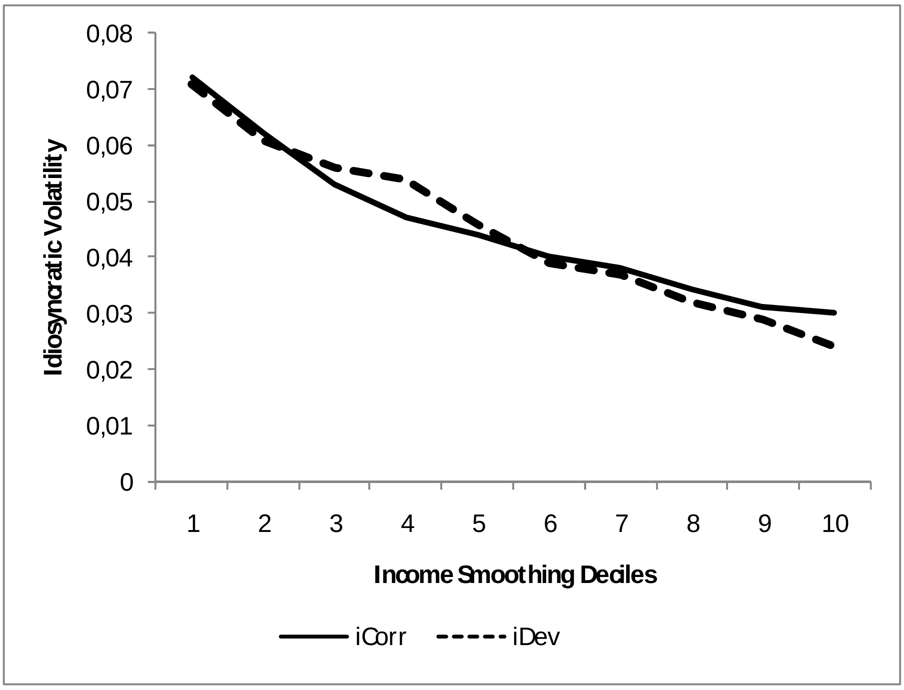

Table 1: Variable Definitions

Research Variables:

Volat = Idiosyncratic volatility for each firm, estimated as the average monthly variance of market adjusted returns, and subsequently aggregated on a calendar year basis. Daily market-adjusted returns are the excess of daily stock return for the corresponding firm over the daily return on the value weighted market portfolio.

Dev = Standard deviation of net income before extraordinary items, divided by the standard deviation of cash flows from operations, both calculated over a three year period. The inverse of this (*iDev*) is used in most specifications.

Corr = The correlation between change in accruals and change in cash flows from operations, calculated over a three year period. The inverted sign of this (*iCorr*) is used in most specifications.

Control Variables:

LogMktval = logarithm of the market value of equity.

ROA = net income before extraordinary items divided by total assets.

MB = market value of equity divided by the book value.

Leverage = long term debt over total assets.

Perctinst = percentage of shares held by institutional investors.

DevCFO = standard deviation of cash flow from operations, calculated quarterly over a period of 12 quarters.

DevNI = standard deviation of net income before extraordinary items, calculated quarterly over a period of 12 quarters.

Table 2: Sample Selection

CRSP daily data to calculate *Volat*	128,963
Intersection with	
Compustat data to calculate income smoothing:	113,903
Base sample	88,577
Subsamples for various analyses:	
Sample with robust set of controls	
(Including data from CDA Spectrum)	66,262
Sample with CEO turnover	21,246
Sample with *governance* data	12,951
Sample with compensation data	17,963
Sample with *PIN* and *Private*	11,193

Table 3: Descriptive Statistics of Select Variables (1990-2006)

This table reports descriptive statistics of the main variables for the common sample of observations we can calculate our income smoothing measures and all the control variables included in model (4). The sample comprises more than 66,000 observations and 10,000 unique firms. The number of firms per year ranges from a minimum of 550 in 1990 to a maximum of 5,085 in 2001. *Volat* is the idiosyncratic volatility, estimated as the average monthly variance of daily market adjusted returns, subsequently aggregated on a calendar year basis. *Corr* is the correlation between change in accruals and change in cash flows from operations, calculated over a three year period. *Dev* is the standard deviation of net income before extraordinary items, divided by the standard deviation of cash flows from operations, both calculated over a three year period. *Mktval* is the market value of equity. *ROA* is the net income before extraordinary items divided by total assets. *MB* is the market value of equity divided by the book value of equity. *Percinst* is the percentage of shares held by institutional investors. *Leverage* is the long term debt over total assets. *DevCFO* is the standard deviation of cash flow from operations, calculated quarterly over a period of 12 quarters. *DevNI* is the standard deviation of net income before extraordinary items, calculated quarterly over a period of 12 quarters.

Variable	N	Mean	p50	St.Dev.	p5	p25	p75	p95
Volat	66,262	0.045	0.022	0.066	0.003	0.009	0.051	0.168
Corr	66,262	-0.544	-0.889	0.632	-1.000	-0.987	-0.303	0.922
Dev	66,262	1.508	0.822	2.324	0.108	0.389	1.586	5.178
MktVal	66,262	1,851.2	198.9	5,276.2	7.1	43.3	964.7	9,771.7
ROA	66,262	-0.048	0.029	0.317	-0.524	-0.031	0.069	0.151
MB	66,262	2.851	1.874	4.683	0.302	1.110	3.311	9.314
Percinst	66,262	37.9	34.4	28.6	0.6	11.4	61.2	87.8
Leverage	66,262	0.238	0.195	0.237	0.000	0.032	0.370	0.660
DevCFO	66,262	0.075	0.042	0.124	0.006	0.021	0.083	0.237
DevNI	66,262	0.093	0.031	0.232	0.003	0.012	0.085	0.356

Table 4: OLS Regressions Examining the Relationship between Various Income Smoothing Measures and Idiosyncratic Volatility

This table shows the coefficients from an OLS regression of firm idiosyncratic volatility on explanatory variables including income smoothing (*iCorr* or *iDev*). Year and industry controls are included but not reported. The time period is 1990-2006 and 1989-2006 for the *iCorr* and *iDev* regressions respectively. All variables are winsorised at 1% and 99%. In parenthesis we report t-statistics that are robust to heteroskedasticity, autocorrelation, and firm-level clustering. Statistical levels are indicated by *** for p<0.01, ** for p<0.05, and * for p<0.1. The dependent variable is idiosyncratic volatility (*Volat*), estimated as the average monthly variance of daily market adjusted returns, and subsequently aggregated on a calendar year basis. Column (1) reports results for *iCorr*, while column (2) reports results for *iDev*. Columns (3) and (4) repeat the same regressions with a robust set of controls. Columns (5) and (6) utilized lagged values of *iDev* and *iCorr*. *iCorr* is the inverted sign of *Corr* (the correlation between change in accruals and change in cash flows from operations, calculated over a three year period). *iDev* is the inverse of *Dev* (the standard deviation of net income before extraordinary items, divided by the standard deviation of cash flows from operations, both calculated over a three year period). *LogMktval* is the natural logarithm of the market value of equity. *ROA* is the net income before extraordinary items divided by total assets. *MB* is the market value of equity divided by the book value. *Percinst* is the percentage of shares held by institutional investors. *Leverage* is the long term debt over total assets. *DevCFO* is the standard deviation of cash flow from operations, calculated quarterly over a period of 12 quarters. *DevNI* is the standard deviation of net income before extraordinary items, calculated quarterly over a period of 12 quarters.

	1	2	3	4	5	6
Constant	0.1447***	0.1511***	0.0983***	0.1033***	0.1141***	0.0968***
	[17.7]	[20.1]	[20.6]	[18.3]	[16.4]	[20.2]
iCorr	-0.0126***		-0.0054***			
	[-23.9]		[-10.9]			
iDev		-0.0014***		-0.0009***		
		[-20.7]		[-15.0]		
LagiCorr					-0.0046***	
					[-9.1]	
LagiDev						-0.0009***
						[-14.3]
LogMktval	-0.0172***	-0.0175***	-0.0124***	-0.0125***	-0.0119***	-0.0123***
	[-70.8]	[-75.5]	[-48.2]	[-50.2]	[-44.6]	[-47.9]
ROA			-0.0360***	-0.0380***	-0.0346***	-0.0369***
			[-19.8]	[-23.0]	[-17.2]	[-20.1]
MB			0.0005***	0.0004***	0.0005***	0.0005***
			[7.8]	[7.04]	[7.2]	[7.7]
Percinst			-0.0177***	-0.0177***	-0.0177***	-0.0181***
			[-16.7]	[-17.2]	[-16.2]	[-17.0]
Leverage			0.0104***	0.0109***	0.0096***	0.0105***
			[5.9]	[6.43]	[5.2]	[6.0]
DevCFO			0.0088	0.0099**	0.0096	0.0089
			[1.6]	[2.1]	[1.5]	[1.6]
DevNI			0.0168***	0.0135***	0.0204***	0.0185***
			[4.5]	[4.4]	[4.8]	[5.0]
Observations	78,156	88,577	66,262	73,779	58,067	66,271
R-squared	36.3	35.3	40.6	40.6	40.5	40.6

Table 5: Three Stage Least Squares Regressions Examining the Relationship between Various Income Smoothing Measures and Idiosyncratic Volatility

This table shows the coefficients from a Three-Stage Least-Squares regression where the first equation is *Volat* = *iCorr* (or *iDev*) + *Controls*, and the second equation is *iCorr (*or *iDev)* = lagged *Volat* + *Controls*. In the second stage equation all variables including control variables are lagged by 3 years to precede the time period related to income smoothing. Year and industry controls are included but not reported. All variables are winsorised at 1% and 99%. Columns (1) and (2) report results on *iCorr*, column (1) on the first stage regression and column (2) on the second stage equation. Columns (3) and (4) report the same results using *iDev* as the income smoothing measure. Statistical levels are indicated by *** for p<0.01, ** for p<0.05, and * for p<0.1. *Volat* is the idiosyncratic volatility, estimated as the average monthly variance of daily market adjusted returns, and subsequently aggregated on a calendar year basis. *iCorr* is the inverted sign of *Corr* (the correlation between change in accruals and change in cash flows from operations, calculated over a three year period). *iDev* is the inverse of *Dev* (the standard deviation of net income before extraordinary items, divided by the standard deviation of cash flows from operations, both calculated over a three year period). *LogMktval* is the natural logarithm of the market value of equity. *ROA* is the net income before extraordinary items divided by total assets. *MB* is the market value of equity divided by the book value. *Percinst* is the percentage of shares held by institutional investors. *Leverage* is the long term debt over total assets. *DevCFO* is the standard deviation of cash flow from operations, calculated quarterly over a period of 12 quarters. *DevNI* is the standard deviation of net income before extraordinary items, calculated quarterly over a period of 12 quarters.

	1	**2**	**3**	**4**
	Volat	***iCorr***	***Volat***	***iDev***
Constant	0.2647**	0.781***	0.3785***	2.8477***
	[11.3]	[15.0]	[13.7]	[10.3]
iCorr	-0.2361***			
	[-16.6]			
iDev			-0.0828***	
			[-39.0]	
LagVolat		-1.1575***		-2.882***
		[-23.6]		[-13.9]
LogMktVal	-0.0136***	-0.0195***	-0.0063***	-0.0224***
	[-38.6]	[-15.4]	[-10.9]	[-2.5]
ROA	-0.0326***		-0.0086***	
	[-11.5]		[-4.5]	
MB	0.0005	-0.0014***	-0.0007***	0.0097***
	[5.7]	[-4.7]	[-7.2]	[6.0]
Percinst	-0.0115		-0.0074***	
	[-7.0]		[-5.4]	
Leverage	0.0129**		0.0084***	
	[7.8]		[6.2]	
DevCFO	-0.0099		0.0406***	
	[-0.6]		[17.6]	
DevNI	0.0312**		-0.1877***	
	[2.1]		[-15.7]	
Observations	53,371		55,479	

Table 6: OLS Regressions Examining the Relationship between Changes in Various Income Smoothing Measures and Changes in Idiosyncratic Volatility

This table shows the coefficients from an OLS regression of changes in firm idiosyncratic volatility on changes in explanatory variables, including income smoothing (*iCorr* or *iDev*). Year and industry controls are included but not reported. All variables are winsorised at 1% and 99%. In parenthesis we report t-statistics that are robust to heteroskedasticity, autocorrelation, and firm-level clustering. Statistical levels are indicated by *** for p<0.01, ** for p<0.05, and * for p<0.1. Changes of all variables are calculated from t-3 to t to precede the time period related to income smoothing. The dependent variable is change in idiosyncratic volatility (*Ch_Volat*), calculated as $Volat_t - Volat_{t-3}$. Changes in all the explanatory variables (*Ch_X*) are calculated as $X_t - X_{t-3}$. The time period is 1990-2006 and 1989-2006 for the *Ch_iCorr* and *Ch_iDev* regressions respectively. Column (1) reports results for *Ch_iCorr*, while column (2) reports results for *Ch_iDev*. *iCorr* is the inverted sign of *Corr* (the correlation between change in accruals and change in cash flows from operations, calculated over a three year period). *iDev* is the inverse of *Dev* (the standard deviation of net income before extraordinary items, divided by the standard deviation of cash flows from operations, both calculated over a three year period). *LogMktval* is the natural logarithm of the market value of equity. *ROA* is the net income before extraordinary items divided by total assets. *MB* is the market value of equity divided by the book value. *Percinst* is the percentage of shares held by institutional investors. *Leverage* is the long term debt over total assets. *DevCFO* is the standard deviation of cash flow from operations, calculated quarterly over a period of 12 quarters. *DevNI* is the standard deviation of net income before extraordinary items, calculated quarterly over a period of 12 quarters.

	1	**2**
Constant	0.0164***	0.0332***
	[3.4]	[6.3]
Ch_iCorr	-0.0012**	
	[-2.4]	
Ch_iDev		-0.0002***
		[-3.8]
Ch_LogMktVal	-0.0192***	-0.0195***
	[-26.6]	[-29.2]
Ch_ROA	-0.0137***	-0.0167***
	[-5.4]	[-7.2]
Ch_MB	0.0005***	0.0005***
	[5.9]	[6.7]
Ch_Percinst	0.0003	0.0008
	[0.1]	[0.4]
Ch_Leverage	0.0105***	0.0107***
	[3.8]	[4.0]
Ch_DevCFO	0.0083	0.0058
	[1.3]	[1.0]
Ch_DevNI	0.0172***	0.0128***
	[4.1]	[3.5]
Observations	38,568	43,668
R-squared	20.6	20.7

Table 7: Probit Analysis Examining the Effect of Income Smoothing on the Probability of CEO Turnover

This table shows the coefficients and marginal effects (expressed in percentage) from a probit regression of firm CEO turnover on idiosyncratic volatility, income smoothing and other explanatory variables. Year controls are included in all specifications but not reported. The time period is 1992-2006. All the right hand side variables are winsorised at 1% and 99%. Z-value is below each estimated coefficient, calculated using robust standard errors controlling for firm level clustering. Column (1) does not include income smoothing, while columns (2) and (3) include income smoothing measured using *iCorr* and *iDev* respectively. Marginal effects are calculated as product of three terms: variable estimate, its one standard deviation and the mean turnover density. Statistical levels are indicated by *** for p<0.01, ** for p<0.05, and * for p<0.1. The dependent variable is CEO turnover (*Turnover*) which is defined as one if there is turnover, zero otherwise. *Volat* is the idiosyncratic volatility, estimated as the average monthly variance of daily market adjusted returns, and subsequently aggregated on a calendar year basis. *iCorr* is the inverted sign of *Corr* (the correlation between change in accruals and change in cash flows from operations, calculated over a three year period). *iDev* is the inverse of *Dev* (the standard deviation of net income before extraordinary items, divided by the standard deviation of cash flows from operations, both calculated over a three year period). *Size* is the natural logarithm of the total assets. *ROA* is the net income before extraordinary items divided by total assets. *DevNI* is the standard deviation of net income before extraordinary items, calculated quarterly over a period of 12 quarters.

	1		2		3	
	Estimate	**Marginal**	**Estimate**	**Marginal**	**Estimate**	**Marginal**
Volat	2.4529***	0.4572	2.4475***	0.4573	2.3111***	0.430
	[4.8]		[4.7]		[4.5]	
iCorr			0.0020	0.0004		
			[0.1]			
iDev					-0.0130***	-0.0024
					[-4.3]	
Size	0.0418***	0.0078	0.0409***	0.0076	0.0428***	0.0080
	[5.9]		[5.8]		[6.1]	
ROA	-0.5563***	-0.1037	-0.5401***	-0.1009	-0.5737***	-0.1067
	[-6.2]		[-5.9]		[-6.2]	
DevNI	-0.2126*	-0.0396	-0.1694	-0.0316	-0.2843**	-0.0529
	[-1.9]		[-1.5]		[-2.4]	
Constant	-1.5812***		-1.7117***		-1.5485***	
	[-20.4]		[-14.8]		[-19.8]	
Observations	21,246		20,985		21,246	
***Turnover* = 1**	2,518		2,518		2,518	

Table 8: OLS Regression Examining the Firm-Level characteristics of Companies that Temper Idiosyncratic Volatility through Income Smoothing

This table shows the coefficients from OLS regressions of firm idiosyncratic volatility (*Volat*) on explanatory variables including our income smoothing variable (*iCorr* or *iDev*), examining partitions of our sample based on select firm-level characteristics. Control variables and year and industry controls are included but not reported. The time period is 1990-2006 for the regressions using *iCorr* and 1989-2006 for the regressions using *iDev*. All variables are winsorised at 1% and 99%. In parenthesis we report t-statistics that are robust to heteroskedasticity, autocorrelation, and firm-level clustering. Statistical levels are indicated by *** for p<0.01, ** for p<0.05, and * for p<0.1. Panels A, B and C split our sample firms according to the lowest/highest quartiles of *Devcfo*, *Lnmktval* and *Percinst*. Panel D splits the sample into losses and profits firms.

Panel A: Sample partition by DevCFO					
	Lowest quartile		**Highest quartile**		**Wald test Diff coeff**
iCorr	-0.0019*** [-3.0]		-0.0087*** [-8.2]		32.4***
iDev		-0.0005*** [-5.7]		-0.0016*** [-11.5]	35.18***
Observations	16,566	16,566	16,565	16,565	
Panel B: Sample partition by LogMktval					
	Lowest quartile		**Highest quartile**		**Wald test Diff coeff**
iCorr	-0.0106*** [-8.4]		-0.0022*** [-7.4]		50.5***
iDev		-0.0023** [-10.9]		-0.00022*** [-5.8]	102.4***
Observations	16,566	16,565	16,565	16,565	
Panel C: Sample partition by Institutional Investors Ownership					
	Lowest quartile		**Highest quartile**		**Wald test Diff coeff**
iCorr	-0.0075*** [-6.2]		-0.0019*** [-5.9]		20.5***
iDev		-0.0018*** [-8.1]		-0.00030*** [-7.7]	51.2***
Observations	16,566	16,565	16,565	16,565	
Panel D: Sample partition by losses versus profit firms					
	Losses subsample		**Profits subsample**		**Wald test Diff coeff**
iCorr	-0.0049*** [-5.9]		-0.0027*** [-5.7]		7.3***
iDev		-0.00092*** [-2.8]		-0.00044*** [-8.6]	3.4*
Observations	21,050	23,776	45,204	49,994	

Table 9: OLS Regressions Examining the Relationship between Various Income Smoothing Measures and Idiosyncratic Volatility, Including Additional Controls

This table shows the coefficients from an OLS regression of firm idiosyncratic volatility on explanatory variables including income smoothing, and additional controls for various measures of corporate governance, executive compensation and shareholding, private information, and earnings quality. Results are reported only using *iDev* as the income smoothing measure. Using *iCorr* results remain unchanged. Control variables and year and industry controls are included but not reported. All variables are winsorised at 1% and 99%. In parenthesis we report t-statistics that are robust to heteroskedasticity, autocorrelation, and firm-level clustering. Statistical levels are indicated by *** for $p<0.01$, ** for $p<0.05$, and * for $p<0.1$. Column (1) shows the results including in our model board independence (*B.Indep*) as a control variable, being the sample period in this case 1996-2005. Column (2) controls for the percentage of shares owned by the CEO (*Shares*). Column (3) reports the results including the dollar value of all outstanding stock options owned by the CEO (*Options*). The sample period in these two models is 1992-2006. Column (4) controls for the Dechow and Dichev (2002) measure of earnings quality (*DD*). Column (5) controls for the absolute value of the modified Jones (Dechow et al. 1995) measure of abnormal accruals (*AbsAcc*). The sample period for the last two analyses is 1989-2006. Finally, column (6) shows the results including as an additional regressor in our models a measure of firm private information (*PIN*): the probability of informed trade as per Easley et al. (2002). The sample period with available data for *PIN* is 1989-2001. The dependent variable is *Volat*, the idiosyncratic volatility, estimated as the average monthly variance of daily market adjusted returns, and subsequently aggregated on a calendar year basis. *iDev* is defined as in table 4.

	1	2	3	4	5	6
iDev	-0.0006***	-0.0004***	-0.0004***	-0.0010***	-0.0010***	-0.0002**
	[-9.9]	[-8.4]	[-8.1]	[-13.5]	[-15.1]	[-2.5]
B.Indep	-0.0057***					
	[-4.2]					
Shares		-0.0078**				
		[-2.3]				
Options			0.0010***			
			[9.1]			
DD				0.0037*		
				[1.69]		
AbsAcc					0.0118***	
					[10.4]	
PIN						-0.0051***
						[-4.3]
Observations	12,951	18,309	15,757	41,144	59,785	11,193
R-squared	48.2	48.0	46.8	38.0	40.0	37.3

Table 10: OLS Regressions Examining the Differential Impact of Income Smoothing on Idiosyncratic and Systematic Volatility

This table shows the coefficients from an OLS regression of firm idiosyncratic volatility, calculated using the market model and daily data, and firm systematic volatility (*Systematic*), on explanatory variables including income smoothing (*iCorr* or *iDev*). Control variables and year and industry controls are included but not reported. The time period is 1990-2006 for the regressions using *iCorr* and 1989-2006 for the regressions using *iDev*. All variables are winsorised at 1% and 99%. In parenthesis we report t-statistics that are robust to heteroskedasticity, autocorrelation, and firm-level clustering. Statistical levels are indicated by *** for p<0.01, ** for p<0.05, and * for p<0.1. Column (1) reports results on idiosyncratic volatility and *iCorr*, while Column (2) reports results on systematic volatility and *iCorr*. Models (3) and (4) repeat the analysis for *iDev*. Column (5) reports the t-statistic on the difference between the coefficient strength across both models. *iCorr* is the inverted sign of *Corr* (the correlation between change in accruals and change in cash flows from operations, calculated over a three year period). *iDev* is the inverse of *Dev* (the standard deviation of net income before extraordinary items, divided by the standard deviation of cash flows from operations, both calculated over a three year period).

	1	2	3	4	5
	Volat	***Systematic***	***Volat***	***Systematic***	**Diff test**
iCorr	-0.023 ***	-0.00247***			-8,93***
	[-10.2]	[-13.9]			
iDev			-0.00413***	-0.000227***	-13,8***
			[-14.6]	[-12.2]	
Observations	61,424	61,424	68,999	68,999	
R-squared	40.7	28.7	40.7	29.5	