

Non-operating earnings and firm risk¹

Abstract

We find that non-operating earnings reduce total earnings volatility, stock price volatility, idiosyncratic risk, and crash risk. The risk-reducing effects of non-operating earnings are higher than those of operating earnings for risk measures based on stock market data. Non-operating earnings serve to mitigate risks among firms with operating losses, high financial leverage, high growth uncertainty, and low-ability managers.

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Keywords: non-operating earnings, earnings volatility, stock price volatility, stock price crash risk

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1. Introduction

Reported earnings are composed of operating earnings and non-operating earnings. While investors, analysts, and academics closely follow operating earnings, non-operating earnings are growing in importance. Non-operating income and expenses are defined as income and expense items resulting from secondary business-related activities in COMPUSTAT². Firms establish non-core business units to diversify their business exposure and hence reduce their risk. According to the 2015 McKinsey Global Survey by McKinsey & Company³, most companies seek growth outside their core business and seventy-five percent of the respondents have pursued at least one non-core activity while an additional fifteen percent planned to do so between 2010 and 2015. A third of the respondents state that they generate more than 10% of their annual revenues from non-core operations. Participants in the survey report that they engage in non-core activities to diversify risk, increase profit pools, and strengthen their existing business. Our sample shows that operating earnings-to-asset ratio from 1990 to 2016 in the US averages 3.8%, while non-operating-earnings-to-asset ratio averages 0.8%, indicating that non-operating earnings are as significant as about one fifth of operating earnings. Given the growing use of non-operating activities, we examine the effects of non-operating earnings on the volatility of total earnings, stock price volatility, idiosyncratic risk, and stock price crash risk after controlling for the effects of operating earnings and other firm characteristics.

Treating a firm as a portfolio of revenue streams with operating revenue representing its core income, we propose that non-operating revenues from non-core undertakings benefit a firm

² For specific components of non-operating income and expenses, refer to the section of variable discussions (Section 3.2.1).

³ <http://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/growing-beyond-the-core-business>

to the extent that the revenues exceed the associated costs. Non-core revenues reduce a firm's susceptibility to downturns in its core business and, consequently, reduce its vulnerability to economic shocks (also see Eldenburg, Gunny, Hee, and Soderstrom, 2011; Singh and Song, 2013; Curtis, McVay, and Whipple, 2014). Besides, firms pursue non-operating activities to support rather than replace some of their core business by acquiring skills lacking in their core business, learning critical technology or research and development (R&D), seeking new avenues of short-term profit (2015 McKinsey Global Survey), among others. Decomposing a firm's non-operating activities from operating activities also improves firm transparency, reduces uncertainty and risk, and helps the firm stabilize its market value.

At the other end, engaging in non-operating activities is not all advantageous if it distracts the business from its core mission. Diverting resources to non-core businesses adversely affects the resource pool available to core operations. A lack of expertise in non-core operations may lead to projects that destroy shareholders' wealth. Consequently, there are both benefits and drawbacks in pursuing non-core activities. Empirical tests would assist corporations in understanding the impacts of non-operating earnings, and the current study considers the risk effects of non-operating earnings.

Based on a sample of 72,100 firm-year observations representing 9,659 U.S. publicly-traded non-financial and non-utility firms over the sample period 1990-2016, we document strong and consistent evidence that return on asset volatility, stock price volatility, idiosyncratic risk, and stock price crash risk are inversely related to the ratio of non-operating earnings-to-total assets. Our findings are robust to the effects of operating earnings, several firm characteristics, classification shifting, and model specifications.

Based on our empirical findings, the risk reducing effect of non-operating earnings on the volatility of return on assets (ROA) is half the effect of operating earnings. Specifically, a 1% increase in non-operating earnings reduces ROA volatility by 0.059%, while a 1% increase in operating earnings reduces ROA volatility by 0.119%. The impact of non-operating earnings on stock price volatility is of a greater magnitude than the impact of operating earnings. A 1% increase in non-operating earnings (operating earnings) is associated with a 0.376% (0.374%) decrease in stock price total volatility. Likewise, a 1% increase in non-operating earnings (operating earnings) reduces stock price idiosyncratic risk by 0.435% (0.355%). Lastly, a 1% increase in non-operating earnings (operating earnings) reduces stock price crash risk by 0.697% (0.197%). We find that the risk-reducing effects of non-operating income are more pronounced in firms with operating losses, growth uncertainty, high financial leverage, and/or low-ability managers.

We contribute to the emerging literature on non-operating earnings as well as the literature on equity volatility and crash risk. The empirical findings bear important implications for both investors and managers. Factoring non-operating earnings allows a comprehensive assessment of the overall riskiness of the portfolio of operations. Non-core operating units that complement existing business operations and provide the firm with an additional revenue stream to counter cyclical effects on the core operations are valuable. Finally, analyzing the effects of non-operating earnings distinct from operating earnings increases transparency in the firm operations.

The remainder of the paper is organized as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 describes the sample and methodology. Section 4 presents and discusses the empirical findings, and Section 5 concludes the paper.

2. Literature review and hypothesis development

2.1. Earnings components and firm valuation

Non-operating earnings are a function of exceptional activities as well as short- and long-term engagements in operations that fall outside the firms' core activities. Dissecting earnings into various components improves both managers' and investors' understanding of the value effects of earnings (Bowen, 1981; Sloan, 1996). Cheng and Cheung (1993) find that non-operating credits or charges contain incremental information, and decomposing earnings into operating and non-operating ones reduces specification errors in return-earnings equations. Fairfield, Sweeney, and Yohn (1996) illustrate how the disaggregation of earnings into operating earnings, non-operating earnings, and special items improves forecasts of return on equity.

Existing studies have documented consistent value-relevant evidence of non-operating earnings. Using a sample of electric utility firms from 1962 to 1975, Bowen (1981) finds that non-operating earnings contribute positively to firm value. Bao and Bao (2004) find that Taiwanese firms have a higher proportion of non-operating earnings than their U.S. and U.K. counterparts, which illustrates the importance of such income avenues in Taiwan. Managers and analysts provide estimates of both operating and non-operating earnings; their action underlines the informative and value-relevant aspects of non-operating earnings (Brown and Sivakumar, 2003). Taken together, the evidence suggests that non-operating earnings play a contributing role alongside operating earnings in determining value.

2.2. Non-operating earnings, total earnings volatility, and firm risk

Differentiating a firm's core operations from its non-core activities improves the accuracy of prediction models of its future earnings, hence the stock price. Cheng and Hollie (2008) find that disaggregating cash flows from operations into core and non-core cash flow components improves in-sample prediction. Similarly, Arthur, Cheng, and Czerkowski (2010) find that the cash flow component model is superior to an aggregate cash flow model in terms of explanatory

power and predictive ability of future earnings. The practice of reporting non-core earnings is more in line with the component model than the aggregate one and is, therefore, value relevant (Chen, Firth, and Gao, 2011); Such a practice enhances the accuracy of valuation tasks and lessens guesswork. Breaking down a firm's business activities and their associated revenues and expenses into core and non-core components further improves investors' visualization of the operations.

There is evidence on earnings' mitigating effects on business risk (see Francis, Hasan, and Li, 2016); however, the role of non-operating earnings in that process remains to be established. To the extent that managers make strategic use of non-operating earnings (for example, to meet analysts' forecasts), their use affects the firm's earnings distribution and stock price. Smith, Staikouras, and Wood (2003) find that various sources of income help stabilize banks' total income, implying that variability in earnings distribution is reduced with varied income sources. To show the stabilization process, we graph the distribution of the mean sample return on assets (ROA) over the sample period. ROA is defined in terms of its constituents, i.e., operating income-to-total assets and non-operating income-to-total assets. In Figure 1, the ratio of operating income-to-total assets is more volatile, while non-operating income-to-total assets ratio is more stable over time. Consequently, treating ROA as a portfolio of a volatile income stream (i.e., operating income) and a steady income stream (i.e., non-operating income) suggests that non-operating income helps reduce the volatility in ROA, and conceivably, the volatility of the stock price.

[INSERT FIGURE 1 ABOUT HERE]

The information ability of earnings in reducing uncertainties related to a firm's business operations is improved by decomposing them into core and non-core. In so doing, firms bring clarity to what constitutes their core operating performance, which is highly relevant in decreasing idiosyncratic risk. From a behavioral perspective, the decomposition of total earnings into

operating and non-operating provides managers with more clarity on what constitutes core and non-core activities, allowing them to focus on core activities to become more efficient and to explore non-core activities as a means to diversify their revenue base. Such transparency and renewed focus serve to reduce the volatility in total earnings and hence firm value. Under the premise that managers classify all secondary business-related activities accurately as non-operating items, then firms are apt to report non-operating income since managers now account for both non-operating revenues and losses as opposed to non-operating losses alone. We explain later how earnings manipulating firms attempt to lump non-operating earnings with core earnings while reporting non-operating losses separately from operating losses. For the time being, we hypothesize that uncertainty in pricing and valuations decreases with the reporting of non-operating income.

Pursuing non-operating activities, though, diverts firms' resources from their core activities. Emphasis on non-core activities will cost a firm valuable resources that could have been deployed on core operations. The firm may also be operating at the point where the incremental benefits of using resources toward non-core operations cost the firm more than what is brought in.⁴ To the extent that non-core activities are competing for resources with the core activities, this tension can translate into higher earnings volatility, which, in turn, leads to higher stock market volatility. Given that there are both advantages and disadvantages in pursuing non-core business operations, we rely on empirical evidence to settle the issue and test the following null hypotheses.

H_{1a}: There is no significant association between non-operating earnings and total earnings volatility.

⁴ For example, commitment in learning new skills in non-core business may jeopardize the firm's core business, such as developing new products and maintaining good relationships with their customers.

H_{1b}: There is no significant association between non-operating earnings and market-based risk metrics.

2.3. Non-operating earnings, classification shifting, and firm risk

There exists the risk that non-operating earnings are used opportunistically. It would pay to classify non-operating revenues as part of regular operations to inflate operating income, leaving investors an impression that the firm's regular activities yield high earnings (Kinney and Trezevant, 1997; and Weiss, 2001). Eldenburg et al. (2011) find that a few hospitals creatively manage non-operating revenues and expenses to improve reported earnings. Singh and Song (2013) document that hospitals rely on non-patient care activities to complement patient care revenues and to strengthen their financial performance. Curtis et al. (2014) show that managers intentionally include non-operating revenues in core profit, especially when their inclusion allows meeting core earnings' benchmark. Malikov, Manson, and Coakley (2018) document the practice of overstating core earnings by shifting non-operating revenues to operating ones. They explain how firms exploit the loopholes in financial reporting standards to engage in classification shifting of revenues. While non-operating revenues are included in core profit, yet non-operating losses are kept separate from operating losses to give the impression that they are one-off items and are not expected to recur (McVay, 2006; Fan, Barua, Cready, and Thomas, 2010; Athanasakou, Strong, and Walker, 2011; Zalata and Roberts, 2017; and Haw, Ho, and Li, 2011). As a result, the risk that managers opportunistically use classification shifting to misclassify some expenses as non-recurring ones and non-recurring revenues as recurring ones cannot be discounted.

Within the set of value-relevant information, misclassification of revenues and expenses (i.e., classification shifting) should matter little if it does not affect total earnings and bears no consequence on the firm's total cash flows. However, positive accounting theory suggests that

managers are not indifferent to classification shifting, and they intentionally shift items within the financial statements. Fan et al. (2010) find that managers are more likely to undertake classification shifting in the fourth quarter as opposed to the interim quarters.

To the extent that investors are fixated on core earnings as opposed to bottom-line GAAP earnings, managers may misclassify items of revenue and expenditure to give a boost to core earnings and to safeguard their own interests. Fan and Liu (2017) document that managers shift core expenses to special items to meet or beat zero core earnings, prior period core earnings, and analyst forecasts. Firms include transitory gains in core earnings to meet or beat zero core earnings (Hsu and Kross, 2011; and Curtis et al., 2014).

The need to sustain core earnings is understandable, given the considerable pressure faced by managers. The transitory nature of non-operating earnings suggests that they cannot be relied upon as a sustainable source of income. We argue, though, that irrespective of the pressure to sustain core earnings, the proper classification of earnings into core and non-core reduces uncertainty for all stakeholders, while classification shifting exacerbates the uncertainty. Dao, Xu, and Pham (2018) find that classification shifting is positively associated with audit fees, audit report lags, and the likelihood of a modified audit opinion, which is a testament of the uncertainty that classification shifting adds to company audits.

In so far as firms that manage earnings tend to report non-operating losses while they bundle non-operating income with other line items to raise operating earnings artificially, then it implies that firms reporting non-operating losses alone are more likely to misrepresent GAAP (generally accepted accounting principles) numbers. While it is inconceivable that all firms that report non-operating losses are deliberately concealing non-operating revenues, yet firms that engage in deceitful practices would be reporting more non-operating losses and less non-operating

income. It would suggest that firms reporting low non-operating income due to classification shifting would be subject to higher stock price uncertainty.

Correctly classifying accounting items as core or non-core improves firm transparency and reduces the uncertainty of investors, hence mitigating stock price volatility. Classification shifting, on the other hand, exacerbates the divergence between the perceived and real economic value of a firm's earnings and adds uncertainty. We test the following hypotheses in relation to classification shifting:

H_{2a}: Classification shifting does not affect the association between non-operating earnings and total earnings volatility.

H_{2b}: Classification shifting affects the association between non-operating earnings and market-based risk metrics.

3. Data, variable construction, and model specifications

3.1.Data

We construct the sample as follows. The sample period is 1990-2016, and the sample comprises of firms from the COMPUSTAT database. Firms with SIC codes 4900-4999 and 6000-6999 are excluded since they are highly regulated. To be included in the sample, data required to compute the return on assets must be available for at least five consecutive years. Firms must also have stock price data in the CRSP database. Imposing these conditions leads to a sample of 9,659 firms comprising of 72,100 firm-year observations.

We report the sample distribution by year and by the Fama-French 48-sector classification in Table 1. Business service (BUSSV) is the largest industry group, accounting for 13.36% of the sample firm-year observations, followed by electronic equipment (CHIPS, 7.82%), retail (RTAIL, 6.18%), and pharmaceutical products (DRUGS, 5.46%), respectively.

[INSERT TABLE 1 ABOUT HERE]

3.2. Variables definitions

3.2.1. Non-operating income and risk variables

The extent of non-operating earnings is measured using the ratio of non-operating earnings-to-total assets (*NONOPERINC*). Non-operating earnings equals the difference between non-operating income and non-operating expenses based on COMPUSTAT definition of each. Non-operating income includes discount on debt reacquired, dividend income, equity earnings in nonconsolidated subsidiaries, franchise income when corresponding expenses are not included in the income statement, interest charged to construction, interest capitalized, leased department income when corresponding expenses are not included in the income statement, other income, rental income, royalty income, and interest income. Non-operating expenses include amortization of deferred credit, amortization of negative intangibles, foreign exchange adjustments, idle plant expense, miscellaneous expense, moving expense, and other expenses.

We use a range of risk measures as follows. ROA volatility (*ROAVOL*) is the standard deviation of returns on assets (i.e. the ratio of income before extraordinary items-to-total assets) over a five-year period (i.e., from fiscal year -4 to fiscal year 0, year 0 is the current year). We compute two measures of stock price volatility, i.e., total risk and idiosyncratic risk. Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns and idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French Four-Factor model in Equation 1.

$$r_{j,t} = \alpha_j + \beta_{1,j}r_{m,t} + \beta_{2,j}SMB_t + \beta_{3,j}HML_t + \beta_{4,j}MOM_t + \varepsilon_{j,t} \quad (1)$$

where $r_{j,t}$ is the return on stock j on day t ; $r_{m,t}$ is the CRSP value-weighted market index return on day t ; SMB_t , HML_t and MOM_t are the size, book-to-market, and momentum risk premium factors on day t downloaded from Professor Kenneth French website.⁵ The equation is estimated for each firm in each year using daily stock returns.

Following Chen, Hong, and Stein (2001), Kim, Li, and Zhang (2011a, 2011b), and An and Zhang (2013), we construct three measures of firm-specific stock crash risk. First, we obtain weekly returns from the CRSP database, and estimate the following expanded market model regression:

$$r_{j,t} = \alpha_j + \beta_{1,j}r_{m,t-1} + \beta_{2,j}r_{i,t-1} + \beta_{3,j}r_{m,t} + \beta_{4,j}r_{i,t} + \beta_{5,j}r_{m,t+1} + \beta_{6,j}r_{i,t+1} + \varepsilon_{j,t} \quad (2)$$

where $r_{j,t}$ is the return on stock j in week t , $r_{m,t}$ is the return on the CRSP value-weighted market index in week t , and $r_{i,t}$ is the Fama-French value-weighted industry index return in week t . We include lead and lag terms for the market and industry indexes in Equation (2) as in Hutton, Marcus, and Tehranian (2009) to account for nonsynchronous trading. $t-1$ and $t+1$ indicate week $t-1$ and week $t+1$, respectively. The equation is estimated for each firm j using weekly observations per year. We use the residuals from the regression to calculate firm-specific weekly return as the log of one plus the residuals. The firm-specific weekly return is then used to construct three measures of firm-specific stock crash risk. As in Kim *et al.* (2011a, 2011b), *NCSKEW* is the negative conditional skewness of firm-specific weekly returns, calculated as the negative third central moment of the firm-specific weekly returns divided by their cubed standard deviation. Specifically, *NCSKEW* for firm j in fiscal year t is obtained as follows:

⁵ http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

$$NCSKEW_{j,t} = - \frac{\left[n(n-1)^{\frac{3}{2}} \sum_{\tau=1}^n (W_{j,\tau,t} - \overline{W}_{j,t})^3 \right]}{\left[(n-1)(n-2) \left(\sum_{\tau=1}^n (W_{j,\tau,t} - \overline{W}_{j,t})^2 \right)^{\frac{3}{2}} \right]} \quad (3)$$

where $W_{j,t}$ is the firm-specific weekly return and $\overline{W}_{j,t}$ is the average firm-specific weekly return in fiscal year t , and n is the number of observations in fiscal year t . The negative value of the skewness simplifies the interpretation of $NCSKEW$, i.e., a larger $NCSKEW$ corresponds to more crash risk or a more negative-skewed stock return distribution.

Next, we follow Chen *et al.* (2001) and An and Zhang (2013) to compute $DUVOL$, which is the down-to-up volatility. For each firm-year, we calculate the standard deviation of firm-specific weekly returns during the up (down) weeks when the firm-specific weekly returns are above (below) the annual mean. $DUVOL$ is the log of the ratio of the standard deviation during down weeks to the standard deviation during up weeks. A higher value of $DUVOL$ suggests a more left-skewed distribution and, thus, a higher crash risk.

Third, we define a crash (jump) as an event that takes place when the firm-specific weekly return is 3.09 standard deviations below (above) the mean in fiscal year t similar to Hutton *et al.* (2009). $COUNT$ is the number of crashes *minus* the number of jumps in a fiscal year as in Jin and Myers (2006). A positive $COUNT$ value indicates more crashes than jumps in a year.

3.2.2. Control variables

We control for a host of variables that affect firm risk. Since operating earnings are the major sources of a firm's earnings and serves as a barometer of the stock price movement most of the time, we control for operating earnings, constructed as the ratio of operating income to assets ($OPERINC$). Next, larger firms have more resources and possess stronger market power, and thus

are more capable of absorbing losses from production disruption and/or drop in sales (Moyer and Chatfield, 1983). Large firms are also less likely to experience earnings and stock price volatility. We measure firm size with the natural log of a firm's total assets (*LNAT*). A high leveraged firm tends to have large interest payments, which are paid out of operating earnings and consequently increases earnings volatility⁶. We measure financial leverage with the ratio of long-term debt-to-total assets (*DEBT*) and proxy operating leverage with the ratio of net property, plant, and equipment-to-total assets (*OPERLEV*). R&D expenditure (*XRD*) and advertising expenditure (*XAD*) affect a firm's earnings, earnings volatility (Kothari, Laguerre, and Leone, 2002), comparative advantage (Erickson and Jacobson, 1992), as well as value (Chauvin and Hirschey, 1993). It is to be noted that R&D expenditure and advertising expenditure do not necessarily contribute to earnings instantaneously or in the short-term. Investors, though, recognize the potential of such spending to add to long-term earnings and may reward firms incurring it.⁷ We control for the ratios of R&D expenditure to total assets and advertising expenditure to total assets (i.e., *XRD* and *XAD*, respectively) in the multivariate analyses.

Pressures from short-term oriented investors may contribute to earnings volatility. Chichernea, Petkevich, and Zykaj (2015) show that short-term (long-term) institutional ownership is associated with higher (lower) idiosyncratic risk. To discriminate between short- and long-term oriented shareholders, we use Bushee (2001) classification. Each institutional investor is classified into one of the three types based on their investment horizon, i.e., transient, quasi-index, and dedicated institutional owners. *INSTOWN_TRAN*, *INSTOWN_QIX*, and *INSTOWN_DED*

⁶ Hamada (1972) documents a positive relation between a firm's financial leverage and its stock price risk. Mandelker and Rhee (1984) show that both financial leverage and operating leverage contribute to firm risk.

⁷ This was kindly pointed to us by an anonymous reviewer.

represent the percentage of the firm shares held by transient, quasi-index, and dedicated institutional owners, respectively.

Managerial ability affects firm profitability over time and, consequently, earnings volatility. Yung and Chen (2018) posit that managerial ability affects firm risk-taking behavior and document that high-ability managers are more likely to take on risky investments. These investments can increase earnings volatility, cash flow volatility, and, consequently, stock price volatility. Likewise, Habiba and Hassan (2017) find that more able managers tend to overinvest as well as invest in risky projects, resulting in a higher stock price crash risk. Following Bui, Chen, Hasan, and Lin (2018), we use *SKILL* to measure managerial ability. *SKILL* is an indicator variable which equals 1 for firms with managerial ability scores higher than the median industry scores in the past three years, and 0 otherwise. Data on managerial ability scores are provided by Demerjian, Lev, and McVay (2012). Using data envelopment analysis, Demerjian *et al.* (2012) compare the combination of revenues (as the output) and revenue-generating sources (as the inputs) among firms in the same industry and derive a total firm efficiency score, which captures how efficient a firm is in generating outputs given a set of inputs. They then regress the total firm efficiency score on a set of firm characteristics. The residuals from the regression capture firm efficiency that cannot be explained by firm characteristics and thus are attributed to managerial ability.

Raith (2003) shows that product market competition and the threat of product substitutability induce managers to reduce costs, leading to increased earnings volatility and stock price volatility. We control for the impact of product market competition on earnings volatility by including *MKTCON*, constructed as the Herfindahl sales-based industry concentration (i.e., the sum of the squared firm sales-to-industry sales ratio).

High turnover can affect stock return volatility (Karpoff, 1987). We use *TURNOVER* to proxy for liquidity. *TURNOVER* is computed as the natural log of the ratio of the number of shares traded-to-the number of shares outstanding. Abdoh and Varela (2017) argue that market-to-book ratios can either magnify or reduce stock price volatility. We include market-to-book ratio (*MKBK*) to proxy for firm growth opportunities.

Large, stable, and value-oriented companies with little volatility in their stock price tend to be dividend-payers (Venkatesh, 1989; Lee and Mauck, 2016). We include dividend yield (*DIVYIELD*) as a control variable. *DIVYIELD* is measured as the regular cash dividends on common stock scaled by the market value of equity at the fiscal year end (Fenn and Liang, 2001; Kulchania, 2016). *RET* and *SIGMA* represent the average and the standard deviation of the firm-specific weekly returns over the preceding fiscal year, respectively. Detrended turnover (*DTURN*) is the difference of the average monthly turnover between fiscal years t-1 and t-2.

Hutton et al. (2009) and Zhu (2016) suggest that managers use income-increasing accruals to hoard bad news. This practice holds up to a certain point beyond which a stock price crash risk becomes unavoidable. We estimate abnormal discretionary accrual ($DISACC_{i,t-1}$) as the residual from the following modified Jones model (Jones, 1991):

$$\frac{ACC_n}{AT_{n-1}} = a1 + a1 \left(\frac{1}{AT_{n-1}} \right) + a2 \left(\frac{\Delta S_n}{AT_{n-1}} \right) + a3 \left(\frac{PPE_n}{AT_{n-1}} \right) + \varepsilon_n \quad (4)$$

where, *ACC* is earnings before extraordinary items and discontinued operations minus operating cash flows reported in the statement of cash flows in year *n*. *AT* is total assets. ΔS is the change in sales from year n-1 to year n, and *PPE* is gross property, plant, and equipment.

Managers can also hoard bad news using real earnings management activities. Francis *et al.* (2016) document that real earnings management is positively associated with future stock crash

risk. Accordingly, we control for a composite measure of real earnings manipulation (*REALEM*) in analyzing the relation between non-operating income and stock price volatility. *REALEM* is the sum of abnormal discretionary expenditures (*ABDISEXP*), abnormal production costs (*ABPROD*), and abnormal operating cash flows (*ABCFO*).

Following Roychowdhury (2006), *ABDISEXP* is the product of -1 and the residual from the following regression:

$$\frac{DISEXP_n}{A_{n-1}} = a_0 + a_1 \left(\frac{1}{AT_{n-1}} \right) + a_2 \left(\frac{S_{n-1}}{AT_{n-1}} \right) + \varepsilon_n \quad (5)$$

where *DISEXP* is the sum of selling, general, administrative expenses, research and development expenses, and advertising expenses in year *n*, *AT* is total assets, and *S* is total sales.

ABPROD is the residual from the following regression:

$$\frac{PROD_n}{A_{n-1}} = a_0 + a_1 \left(\frac{1}{AT_{n-1}} \right) + a_2 \left(\frac{S_{n-1}}{AT_{n-1}} \right) + a_3 \left(\frac{\Delta S_n}{AT_{n-1}} \right) + \varepsilon_n \quad (6)$$

where, *PROD* is the sum of cost of goods sold and the change in inventory; the remaining variables are as previously defined.

ABCFO is the product of -1 and the residual from the following regression:

$$\frac{CFO_{i,t}}{Assets_{i,t-1}} = k_0 + k_1 \frac{1}{Assets_{i,t-1}} + k_2 \frac{SALES_{i,t}}{Assets_{i,t-1}} + k_3 \frac{\Delta SALES_{i,t}}{Assets_{i,t-1}} + \epsilon_{i,t} \quad (7)$$

where *CFO_{i,t}* is the difference between net cash flow from operating activities and extraordinary items and discontinued operations scaled by assets during the year for firm *i*. Equations (4) to (7) are estimated cross-sectionally for industry-years with at least 15 observations.

3.3. Multivariate regressions

We use the following equations to examine the associations between non-operating earnings ($NONOPERINC_{i,t}$) and various firm risk measures, including ROA volatility ($ROAVOL_{i,t}$), stock price volatility ($STOCKVOL_{i,t}$), and crash risk (either $NCSKEW$, $DUVOL$ or $COUNT$) while controlling for other firm characteristics.

$$\begin{aligned}
ROAVOL_{i,t} = & \alpha_i + \beta_{1,i}NONOPERINC_{i,t} + \beta_{2,i}OPERINC_{i,t} + \beta_{3,i}LNAT_{i,t} + \beta_{4,i}DEBT_{i,t} \\
& + \beta_{5,i}XRD_{i,t} + \beta_{6,i}XAD_{i,t} + \beta_{7,i}INSTOWN_TRAN_{i,t} + \beta_{8,i}INSTOWN_QIX_{i,t} \\
& + \beta_{9,i}INSTOWN_DED_{i,t} + \beta_{10,i}SKILL_{i,t} + \beta_{11,i}MKTCON_{i,t} + \varepsilon_{i,t} \quad (8)
\end{aligned}$$

$$\begin{aligned}
STOCKVOL_{i,t} = & \alpha_i + \beta_{1,i}NONOPERINC_{i,t} + \beta_{2,i}OPERINC_{i,t} + \beta_{3,i}LNAT_{i,t} \\
& + \beta_{4,i}TURNOVER_{i,t} + \beta_{5,i}MKBK_{i,t} + \beta_{6,i}DEBT_{i,t} + \beta_{7,i}OPERLEV_{i,t} \\
& + \beta_{8,i}DIVYIELD_{i,t} + \beta_{9,i}INSTOWN_TRAN_{i,t} + \beta_{10,i}INSTOWN_QIX_{i,t} \\
& + \beta_{11,i}INSTOWN_DED_{i,t} + \beta_{12,t}SKILL_{i,t} + \beta_{13,i}MKTCON_{i,t} + \varepsilon_{i,t} \quad (9)
\end{aligned}$$

$$\begin{aligned}
CRASH_{i,t} = & \alpha_i + \beta_{1,i}NONOPERINC_{i,t-1} + \beta_{2,i}OPERINC_{i,t-1} + \beta_{3,i}LNAT_{i,t-1} + \beta_{4,i}RET_{i,t-1} \\
& + \beta_{5,i}SIGMA_{i,t-1} + \beta_{6,i}DTURN_{i,t-1} + \beta_{7,i}MKBK_{i,t-1} + \beta_{8,i}DEBT_{i,t-1} \\
& + \beta_{9,i}DISACC_{i,t-1} + \beta_{10,i}REALEM_{i,t-1} + \beta_{11,i}INSTOWN_TRAN_{i,t} \\
& + \beta_{12,i}INSTOWN_QIX_{i,t} + \beta_{13,i}INSTOWN_DED_{i,t} + \beta_{14,t}SKILL_{i,t} \\
& + \beta_{15,i}MKTCON_{i,t} + \varepsilon_{i,t} \quad (10)
\end{aligned}$$

In Equations (8) to (10), the subscript i stands for firm i , and t stands for the year. The independent variables are explained in Section 3.2. (also see Chen et al., 2001; Jin and Myers, 2006; and An and Zhang, 2013).

For robustness checks, the regression equations are estimated using three techniques, alternately. First, we use pooled ordinary least squares regression (OLS) with clustered standard

errors by firms while also controlling for year fixed effects and industry fixed effects. Second, we use panel-data fixed effect regression (FE). We perform the Hausman test to see whether the fixed effects model or the random effects model is appropriate. The Hausman test statistics are significant at the 1% level in favor of the fixed effects model. Third, because ROA volatility is measured using data for five consecutive years, autocorrelation among observations for the same firm may exist. As such, we estimate the equations using feasible generalized least squares regression (FGLS) to correct for both heteroskedasticity and autocorrelation.

3.4.Descriptive Statistics

Table 2 reports the summary statistics of the variables. Non-operating income-to-assets ratio (*NONOPERINC*) averages 0.008 while operating income-to-assets ratio (*OPERINC*) averages 0.038. The standard deviation of *NONOPERINC* (0.017) is smaller than that of *OPERINC* (0.176). Non-operating earnings are smaller than operating earnings, but tend to be more stable.

[INSERT TABLE 2 ABOUT HERE]

As mentioned earlier, Figure 1 displays the time series of operating earnings and non-operating earnings as a proportion of total assets for our sample firms during 1990-2016. The operating-earnings-to-asset ratio fluctuates considerably over time, but the non-operating-earnings-to-asset ratio stays relatively stable.

4. Results

4.1.Non-operating income and ROA volatility.

To estimate the impact of non-operating earnings on earnings volatility (i.e., ROA volatility), we run three regressions based on Equation (8). Table 3 displays the results from (i)

pooled ordinary least squares regression (Panel A) with year fixed effect and industry fixed effect, (ii) panel-data fixed effect approach (Panel B) with year fixed effect, and (iii) feasible generalized least squared approach (Panel C) with year fixed effect. The dependent variable is ROA volatility over the past five years (*ROAVOL*). All reported coefficients are standardized coefficients. The coefficient on *NONOPERINC* is negative and significant in all three models, suggesting that higher non-operating earnings are associated with lower ROA volatility and, consequently, lower total earnings volatility.

[INSERT TABLE 3 ABOUT HERE]

In Panel C, where the impact of *NONOPERINC* on ROA volatility is the smallest, an increase of one standard deviation in *NONOPERINC* is associated with a decrease of $0.008 \times$ standard deviation in *ROAVOL*. Specifically, a 1.7% increase in *NONOPERINC* leads to a 0.101% decrease (0.008×0.126) in *ROAVOL*, yielding an impact ratio of 0.059 (0.101% divided by 1.7%). At the same time, an increase of one standard deviation in *OPERINC* leads to a decrease of $0.166 \times$ standard deviation in *ROAVOL*; i.e., a 17.6% increase in *OPERINC* leads to a 2.09% decrease (0.166×0.126) in ROA volatility, yielding an impact ratio of 0.119 (2.09% divided by 17.6%). Thus, the impact of *OPERINC* on *ROAVOL* is approximately double that of *NONOPERINC* (0.119 vs. 0.059). Likewise, the impact ratios of *NONOPERINC* are 0.126^8 under OLS regression (in Panel A) and 0.074^9 under the panel-data fixed effect regression (in Panel B); the impact ratios of

⁸ One standard deviation increase in *NONOPERINC* is associated with $0.017 \times$ standard deviation-decrease in *ROAVOL* (Panel A of Table 3). Specifically, 1.7% increase in *NONOPERINC* is associated with 0.214% (0.017×0.126) decrease in *ROAVOL*. The impact ratio is equal to 0.214% divided by 1.7% or 0.126.

⁹ One standard deviation increase in *NONOPERINC* is associated with $0.010 \times$ standard deviation-decrease in *ROAVOL* (Panel B of Table 3). Specifically, 1.7% increase in *NONOPERINC* is associated with 0.126% (0.010×0.126) decrease in *ROAVOL*. The impact ratio is equal to 0.126% divided by 1.7% or 0.074.

OPERINC are 0.258¹⁰ and 0.120¹¹, respectively. We reject null hypothesis H1a in favor of an inverse association between non-operating earnings and earnings volatility.

Consistent with prior studies, we document that large firms experience lower income volatility, but firms with high financial leverage (*DEBT*) face high income volatility. In line with Kothari *et al.* (2002), we find that firms with higher R&D (*XRD*) and advertising (*XAD*) expenditures experience more volatile income. We also find that quasi-index and dedicated institutional ownership (*INSTOWN_QIX* and *INSTOWN_DED*) are negatively associated with earnings volatility while transient institutional ownership (*INSTOWN_TRAN*) is positively related to earnings volatility. Firms in less competitive industries (higher *MKTCON* value) experience less volatile income as in Raith (2003). The results in Table 3 suggest that non-operating earnings reduce total earnings volatility, and that the impact of non-operating earnings on earnings volatility is not trivial.

4.2. Non-operating income and stock price volatility.

Table 4 displays the estimation results from regressions of stock price volatility on non-operating earnings (i.e., Equation (9)) using panel-data fixed effect estimation approach.¹² The dependent variable is annualized total risk (*TOTRISK*) in Panel A and annualized idiosyncratic risk (*IDIORISK*) in Panel B, respectively. All reported coefficients are standardized coefficients.

[INSERT TABLE 4 ABOUT HERE]

¹⁰ One standard deviation increase in *OPERINC* is associated with $0.360 \times$ standard deviation-decrease in *ROAVOL* (Panel A of Table 3). Specifically, 17.6% increase in *OPERINC* is associated with 4.536% (0.360×0.126) decrease in *ROAVOL*. The impact ratio is equal to 4.536% divided by 17.6% or 0.258.

¹¹ One standard deviation increase in *OPERINC* is associated with $0.167 \times$ standard deviation-decrease in *ROAVOL* (Panel B of Table 3). Specifically, 17.6% increase in *OPERINC* is associated with 2.104% (0.167×0.126) decrease in *ROAVOL*. The impact ratio is equal to 2.104% divided by 17.6% or 0.120.

¹² To conserve space, we only report the regression results from the panel-data fixed effect estimation approach. Using pooled ordinary least squares and feasible generalized least squared estimation approaches, we find similar results. The results are not tabulated, but are available upon request.

In Panel A, an increase of one standard deviation in non-operating earnings *NONOPERINC* is associated with a decrease of $0.019 \times$ standard deviation in total risk (*TOTRISK*). Specifically, a 1.7% increase in *NONOPERINC* leads to a 0.638% decrease (0.019×0.336) in *TOTRISK*, yielding an impact ratio of 0.376 (0.638% divided by 1.7%). An increase of one standard deviation in *OPERINC* leads to a decrease of $0.196 \times$ standard deviation in *TOTRISK*, i.e., a 17.6% increase in operating earnings leads to a 6.590% decrease (0.196×0.336) in total risk, yielding an impact ratio of 0.374 (6.590% divided by 17.6%). Thus, the magnitude of the impact of *NONOPERINC* on *TOTRISK* is similar to, but a little bit higher than that of *OPERINC* (0.376 vs. 0.374).

In Panel B, a 1.7% increase in *NONOPERINC* leads to a 0.737%¹³ decrease in *IDIORISK*, yielding an impact ratio of 0.434¹⁴; while, a 17.6% increase in *OPERINC* leads to a 6.231%¹⁵ decrease in idiosyncratic risk, yielding an impact ratio of 0.354¹⁶. Thus, the impact of *NONOPERINC* is larger than that of *OPERINC* on *IDIORISK* (i.e., 0.434 vs. 0.354).

The results in Table 4 provide empirical evidence that stock price volatility decreases with non-operating earnings. The estimated coefficients on the control variables suggest that stock price volatility is higher for more liquid stocks (*TURNOVER*) and stocks of high-leverage firms (both financial leverage (*DEBT*) and operating leverage (*OPERLEV*)). Consistent with Abdoh and Varela (2017), we document firm size (*LNAT*) and market-to-book ratios (*MKBK*) are negatively related to stock price volatility. The volatility is also lower for firms with higher dividend yield, higher quasi-index and dedicated institutional ownerships, and high-skilled managers.

¹³ $0.737\% = 0.022 \times 0.335$, where 0.022 is the coefficient on *NONOPERINC* in Panel B of Table 4 and 0.335 is the standard deviation of *IDIORISK* in Table 2.

¹⁴ $0.434 = 0.737\% \text{ divided by } 1.7\%$.

¹⁵ $6.231\% = 0.186 \times 0.335$, where 0.186 is the coefficient on *OPERINC* in Panel B of Table 4 and 0.335 is the standard deviation of *IDIORISK* in Table 2.

¹⁶ $0.354 = 6.231\% \text{ divided by } 17.6\%$

4.3. Non-operating income and stock price crash risk

Table 5 displays the results from the estimation of the relation between non-operating earnings and stock price crash risk (Equation (10)) using panel-data fixed effect estimation approach. The dependent variable, stock price crash risk, is *NCSKEW* in Panel A, *DUVOL* in Panel B, and *COUNT* in Panel C. All reported coefficients are standardized coefficients.

[INSERT TABLE 5 ABOUT HERE]

Panel A shows an increase of one standard deviation in non-operating earnings (*NONOPERINC*) is associated with a decrease of $0.014 \times$ standard deviation in negative conditional skewness of firm-specific weekly return (*NCSKEW*). Specifically, a 1.7% increase in *NONOPERINC* leads to a 1.184% decrease (0.014×0.846) in *NCSKEW*, yielding an impact ratio of 0.697 (1.184% divided by 1.7%). Meanwhile, an increase of one standard deviation in operating earnings (*OPERINC*) leads to a decrease of $0.041 \times$ standard deviation in *NCSKEW*. A 17.6% increase in *OPERINC* leads to a 3.469% decrease (0.041×0.846) in *NCSKEW*, yielding an impact ratio of 0.197 (3.469% divided by 17.6%). The impact of *NONOPERINC* on *NCSKEW* is almost 3.5 times larger than that of *OPERINC* (0.697 vs 0.197).

Panel B shows a 1.7% increase in non-operating earnings (*NONOPERINC*) leads to a 0.718%¹⁷ decrease in the down-to-up volatility ratio (*DUVOL*), yielding an impact ratio of 0.422¹⁸. A 17.6% increase in *OPERINC* leads to a 2.719%¹⁹ decrease in *DUVOL*, yielding an impact ratio

¹⁷ $0.718\% = 0.014 \times 0.513$, where 0.014 is the coefficient on *NONOPERINC* in Panel B of Table 5 and 0.513 is the standard deviation of *DUVOL* in Table 2.

¹⁸ $0.422 = 0.718\%$ divided by 1.7%

¹⁹ $2.719\% = 0.053 \times 0.513$, where 0.053 is the coefficient on *OPERINC* in Panel B of Table 5 and 0.513 is the standard deviation of *DUVOL* in Table 2.

of 0.154²⁰. Once more, the impact of *NONOPERINC* on *DUVOL* is larger than that of *OPERINC* (0.422 vs. 0.154).

Panel C shows a 1.7% increase in non-operating earnings (*NONOPERINC*) leads to a 0.452%²¹ decrease in the number of crashes minus the number of jumps (*COUNT*), yielding an impact ratio of 0.266²². A 17.6% increase in *OPERINC* leads to a 1.355%²³ decrease in *COUNT*, yielding an impact ratio of 0.077²⁴. The impact of *OPERINC* on *COUNT* is about 3.5 times smaller than that of *NONOPERINC* (0.077 vs. 0.266).

Consistent with the findings of Chen *et al.* (2001), firm size (*LNAT*), detrended turnover (*DTURN*), and market-to-book ratio (*MKBK*) are positively related to firm crash risk. Firms hoarding bad news, proxied by discretionary accruals and real earnings management (*DISACC* and *REALEM*), are associated with higher stock price crash risk as in Hutton *et al.* (2009), Zhu (2016), and Francis *et al.* (2016). Stock price crash risk is also higher among firms with more transient institutional ownership (*INSTOWN_TRAN*) similar to the findings of An and Zhang (2013). Like Habiba and Hassan (2017), we document a positive association between stock price crash risk and managerial skills. Next, the average and the standard deviation of the firm-specific weekly return over the preceding fiscal year (*RET* and *SIGMA*) are negatively related to future stock price crash risk. Financial leverage (*DEBT*) is associated with lower stock price crash risk (also see Hutton *et al.* (2009), i.e., more stable firms have the ability to carry more debt).

²⁰ $0.154 = 2.719\%$ divided by 17.6%

²¹ $0.452\% = 0.007 \times 0.645$, where 0.007 is the coefficient on *NONOPERINC* in Panel C of Table 5 and 0.645 is the standard deviation of *COUNT* in Table 2.

²² $0.266 = 0.452\%$ divided by 1.7%

²³ $1.355\% = 0.021 \times 0.645$, where 0.021 is the coefficient on *OPERINC* in Panel C of Table 5 and 0.645 is the standard deviation of *COUNT* in Table 2.

²⁴ $0.077 = 1.355\%$ divided by 17.6%

The results in Table 5 corroborate our earlier findings, i.e., non-operating earnings and risk (in this case, stock price crash risk) are inversely related. The magnitude of the risk-reducing impact of non-operating earnings exceeds that of operating income when it comes to stock price crash risk. Based on the results in Tables 4 and 5, we reject the null hypothesis H1b and conclude that there is an inverse association between non-operating earnings and risk measures derived from stock market prices.

4.4. Tests of endogeneity

The overall results in Tables 3 to 5 provide strong and consistent evidence that non-operating earnings help reduce earnings volatility and stock price risk. However, certain firm characteristics may simultaneously affect a firm's non-operating earnings, earnings volatility, and stock price risk. Firm fixed effects are included in the regressions in Tables 3 to 5 to minimize issues with omitted variables and control for time-invariant firm characteristics.

To the extent that firm characteristics vary over time, it is essential to control for time-variant omitted variable bias, which we attempt with “change” regressions and two-stage least squared regressions. In the “change” regressions, the first differences of earnings volatility and stock price risk are regressed separately on the first differences of non-operating income and the control variables. For brevity, we only report the coefficients on *NONOPERINC* and *OPERINC* and the model fitness statistics in Table 6. The coefficients on *NONOPERINC* and *OPERINC* are negative and statistically significant across all models, i.e., increases in both *NONOPERINC* and *OPERINC* are associated with decreases in the risk measures.

[INSERT TABLE 6 ABOUT HERE]

In the two-stage least squared analysis, we use the median non-operating earnings of firms in the same Fama-French 48 sector classification as an instrument for a firm's non-operating earnings. This instrument variable meets both conditions of a valid instrument, i.e., relevance and exclusion. While the industry median non-operating earnings are correlated with a firm's non-operating earnings, there is no a priori expectation that the industry median non-operating earnings are associated with the dependent variables, i.e., a firm's ROA volatility, stock price risk, and crash risk.

In the first stage, we regress firms' non-operating earnings on the instrument variable and other firm characteristics with firm fixed effects. In the second stage, we replace the actual non-operating earnings with the predicted values from the first stage regression. We report the results in Table 7. The first stage result in Panel A shows the instrument variable (i.e., the industry median non-operating earnings (*IND_NONOPERINC*)) is positively associated with firms' non-operating earnings (*NONOPERINC*). In addition, the Hansen test indicates that the instrument passes the validity test. For brevity, we only report the coefficients on *NONOPERINC* and *OPERINC* and the model fitness statistics for the second stage regressions in Panel B. The second stage results are consistent with the earlier findings, i.e. non-operating earnings reduce earnings volatility, stock price volatility, idiosyncratic risk, and stock price crash risk. The evidence further supports the risk-reducing benefits of non-operating earnings and, therefore, rejects the null hypotheses H_{1a} and H_{1b} .

[INSERT TABLE 7 ABOUT HERE]

4.5. Components of non-operating income and firm risk

We are able to collect data on a few constituent items comprising non-operating income as follows: equity earnings in unconsolidated subsidiaries (*ESUB*); rental income (*IRENT*); total interest and related income (*IDIT*); capitalized interest (*INTC*), amortization of intangibles (*AM*); and foreign exchange income or loss (*FCA*). We replace non-operating income with these variables (each expressed as a percentage of current year's total assets) and rerun Equations (8), (9), and (10). We present our findings in Table 8. The primary driver of the inverse associations between non-operating income and the various risk measures appears to be equity earnings in unconsolidated subsidiaries (*ESUB*), and these subsidiaries can cover a vast array of activities. Equity earnings tend to be long-term non-core investments, which constitutes a source of stable non-operating earnings for a firm, hence assisting the firm to achieve earnings stability.

[INSERT TABLE 8 ABOUT HERE]

4.6. Classification shifting and risk measures

Studies show that firms commonly use non-operating earnings to artificially inflate revenue to meet core profit expectations (Curtis *et al.*, 2014) and to manage their reported earnings using classification shifting (Malikov *et al.* 2018). Were managers to engage in earnings management and misclassify non-operating revenues as operating ones or operating expenses as non-operating ones, *OPERINC* would be inflated while *NONOPERINC* would be underreported. It follows that, the risk reducing effect of non-operating earnings could be biased downward, which suggests that the documented results thus far are conservative.

To depict a more accurate picture of the relation between non-operating earnings and firm risks, we account for the extent of misclassification of accounting items and other forms of earnings management below. Abnormally high unexpected operating profit and unexpected non-

operating expenses may indicate classification shifting and can induce higher uncertainty on the true value of the earnings. To test H₂, we decompose operating and non-operating earnings into expected and unexpected portions.

4.6.1. Unexpected operating income and risk measures

We follow Fan *et al.* (2010) to estimate unexpected core earnings using the following equation:

$$\begin{aligned}
 OPERINC_t = & \beta_0 + \beta_1 OPERINC_{t-1} + \beta_2 ATO_t + \beta_3 ACCRUALS_t + \beta_4 ACCRUALS_{t-1} \\
 & + \beta_5 SALECHG_t + \beta_6 NEGSALECHG_t + \beta_7 MKTADJRET_{t-1} \\
 & + \beta_8 MKTADJREAT_t + \epsilon_t
 \end{aligned} \tag{11}$$

where,

$$\begin{aligned}
 OPERINC & = \text{Sales minus cost of goods sold minus selling, general, and} \\
 & \text{administrative expenses and the end result scaled by total assets} \\
 ATO & = \text{Asset turnover ratio, defined as} \\
 ATO_t & = \frac{SALES_t}{\left(\frac{NOA_t + NOA_{t-1}}{2}\right)}
 \end{aligned} \tag{12}$$

$$\begin{aligned}
 ACCRUALS & = \text{Income before extraordinary items minus cash from operations} \\
 NOA & = \text{Operating assets minus operating liabilities} \\
 \text{Operating Assets} & = \text{Total Assets minus cash and short-term investments} \\
 \text{Operating Liabilities} & = \text{Total Assets minus Total Debt minus Book Value of Common and} \\
 & \text{Preferred Equity minus Non-controlling Interest}
 \end{aligned}$$

$$SALECHG_t = \frac{SALES_t - SALES_{t-1}}{SALES_{t-1}} \tag{13}$$

$$NEGSALECHG_t = 1 \text{ if sales decrease, and 0 otherwise.}$$

$$MKTADJREAT_t = \text{Buy-and-hold returns of the firm in year } t \text{ minus the buy-and-hold} \\
 \text{returns of the CRSP value-weighted (VW) index in year } t$$

We estimate Equation (11) using all the observations in a particular industry-year except firm *i*. Expected operating income for firm *i* is measured using the coefficients obtained from

Equation (11) multiplied by the actual values of the variables in the model for the firm. Unexpected operating income is computed as the difference between reported and expected operating income as in Equation (14). We use the unexpected values of operating earnings to proxy for potentially misclassified non-operating earnings.

$$\text{Unexpected } (OPERINC_t) = OPERINC_t - \text{Expected } (OPERINC_t) \quad (14)$$

We present the results of Equation (11) on estimating the expected operating earnings in Appendix Table A1, Panel A. The adjusted R-squared for this regression is 83.7%. There is a highly significant autocorrelation between the ratio of operating income-to-total assets (*OPERINC*) and its one-year lagged value. Consistent with McVay (2006), we document a significant and positive association between accruals and *OPERINC*. *OPERINC* is also positively related to the change in sales from the previous year and the firm's market-adjusted stock return.

In Table 9, we show the results of Equations (8), (9) and (10), whereby we replace the actual values of *OPERINC* by its constituent parts, i.e., expected and unexpected *OPERINC*, to account for classification shifting. The coefficient of the variable representing expected operating income (i.e., *OPERINC_PREDICTED*) is negative and statistically significant in all the regressions, signifying that operating income reduces risk. The coefficients of *NONOPERINC_t* and the unexpected operating earnings, i.e., *OPERINC_UNEXPECTED*, (i.e., our estimate of the misclassified portion of non-operating earnings) are both negative and highly significant in the regressions of the stock market-based measures of volatility. Thus, after accounting for potential classification shifting and earnings management, non-operating income continues to be adversely associated to stock price volatility. Taken together, the evidence does not support H_{2b}.

[INSERT TABLE 9 ABOUT HERE]

4.6.2. *Unexpected non-operating income and risk measures*

We follow the same procedure as that in Section 4.6.1 to obtain expected and unexpected non-operating income. We present the regression results for the expected levels of the ratio of non-operating income-to-total assets in Panel B of Table A1. The adjusted R-squared is 44.7%. The coefficient of the lagged value of non-operating income-to-total assets is negative, which suggests that firms reporting a large value of non-operating income this year are likely to report a smaller non-operating income next year.

In Table 10, we replace the actual values of *NONOPERINC* and *OPERINC* by their corresponding expected and unexpected values to account for classification shifting of earnings. The coefficients of operating income (i.e., both *OPERINC_PREDICTED* and *OPERINC_UNEXPECTED*) are negative and statistically significant, consistent with the adverse association between operating income and the risk measures documented earlier. Crucially, the coefficients related to non-operating income (i.e., both *NONOPERINC_PREDICTED* and *NONOPERINC_UNEXPECTED*) are also negative and statistically significant in the regressions of two stock market-based risk measures, i.e., *TOTRISK* and *IDIORISK*. The coefficient of *NONOPERINC_PREDICTED* is negative and statistically significant, though the coefficient of *NONOPERINC_UNEXPECTED* is not significant in the regression of *ROAVOL*.

[INSERT TABLE 10 ABOUT HERE]

The results from Tables 9 and 10 suggest that classification shifting and earnings management do not displace the inverse associations between non-operating income and the various risk measures. The risk-reducing characteristic of non-operating earnings could be the results of diversification and transparency.

4.6.3. Non-operating earnings and the risk measures: controlling for invested and non-operating assets

In this section, we account for the effects of non-operating capital since it is the combination of non-operating earnings and non-operating capital that yields ROA. Separating invested capital from non-operating assets could yield further insights into the role of non-operating activities. It would also uncover how non-operating income relates to non-operating assets.

We calculate operating asset ratio and non-operating asset ratio and control for both ratios in the regressions of the risk measures. We follow Shu and Thomas (2019) to calculate operating asset ratio as the sum of cash, total receivables, inventories, prepaid expenses, deferred taxes, net plant, property and equipment, goodwill and intangibles scaled by total assets. This measure of the operating asset includes invested capital, i.e., operating working capital plus net plant, property, and equipment. We follow Anabila (2012) to calculate the non-operating asset ratio as the sum of short-term investment and total investment and advances scaled by total assets. We present the findings in Table 11. The coefficients of non-operating income, i.e., *NONOPERINC*, is negative and statistically significant in all the regressions of the risk measures, suggesting non-operating earnings reduce ROA volatility and firm risk after controlling for non-operating asset ratio and operating asset ratio.

[INSERT TABLE 11 ABOUT HERE]

4.6.4. Non-operating earnings and the components of ROA volatility

ROA is a function of profit margin and asset turnover. As such, the inverse association between non-operating income and ROA volatility could be due to the effect of non-operating

earnings on profit margin volatility or the effect on asset turnover volatility or both. We calculate the volatility of profit margin and asset turnover in the 5-year window and regress these two variables on non-operating earnings. We present our findings in Table 12. The coefficient of *NONOPERINC* is negative and statistically significant in both models, indicating that non-operating earnings are inversely related to both profit margin and asset turnover volatility. Thus, the beneficial effect of non-operating earnings on ROA volatility is driven by decreases in the volatility of both profit margin and asset turnover.

[INSERT TABLE 12 ABOUT HERE]

4.7. Additional robustness tests

We perform further robustness checks. To save space, we present the results in the Appendix and report only the coefficients on *NONOPERINC* and *OPERINC* and the model fitness statistics.

4.7.1. Operating performance and risk measures

Firms with strong operating performance may not need to rely heavily on non-operating activities. Therefore, the impact of non-operating income on ROA volatility, stock price risk, and stock price crash risk are more germane to firms with weaker operating performance. We test this possibility with two subsamples: firms with negative *OPERINC* and those with positive *OPERINC*. The results are presented in Table A2. Panel A shows that the coefficient on *NONOPERINC* is statistically significant only for the subsample of firms with operating losses, confirming our prediction that the stabilizing effect of *NONOPERINC* on earnings volatility is more potent in firms with weaker operating performance. In Panels B, C, and D, the coefficient

on *NONOPERINC* is negative and significant for both subsamples. However, the risk-reducing impact of non-operating earnings is larger for the subsample of firms with operating losses.

4.7.2. Debt and risk measures

Debt induces earnings volatility, and the stabilizing effects of non-operating income may be contingent on debt usage. We repeat the primary analysis with two subsamples dissected with the sample median debt-to-asset ratio: firms with above the sample median debt-to-asset ratio and those with below the sample median debt-to-asset ratio. We report the results in Table A3. The coefficient on *NONOPERINC* is negative and significant for both subsamples in Panels A, B, and C, implying that non-operating earnings alleviate earnings volatility and stock price risk regardless of the level of debt, but the risk-reducing impact is larger in firms with high debt usage.

4.7.3. Growth uncertainty and risk measures

Growth uncertainty entails more volatility in operating cash flows and, consequently, higher stock price risk. Malikov *et al.* (2018) document that firms with low growth use a higher degree of classification shifting of revenues, which implies that non-operating activities are especially important to stabilize earnings in firms with high growth uncertainty. We use R&D expenditure to proxy for growth uncertainty. We examine how the effect of non-operating earnings vary between firms with R&D expenditure (high growth and high uncertainty firms) and those without such expenditure. Table A4 Panel A shows that non-operating earnings are negatively associated with earnings volatility among firms with R&D expenditure, i.e., our proxy for high growth uncertainty. The results in Panels B, C, and D suggest that non-operating earnings and stock price volatility or crash risk are inversely related regardless of the level of growth and uncertainty.

4.7.4. *Financial crisis and risk measures*

Financial crises escalate risk and volatility. The extreme volatility of the 2007-2009 financial crisis would overshadow the real effects of non-operating earnings on the various risk measures and confound our results. To account for this possibility, we analyze three subsamples separately: 1990-2006 (pre-crisis), 2007-2009 (during-crisis), and 2010-2016 (post-crisis), and present our findings in Table A5. The inverse association between non-operating earnings and the various risk measures is most significant during the pre-crisis period. Thus, during normal times, the inverse association between non-operating earnings and the risk measures holds.

4.7.5. *The 2002 Sarbanes-Oxley Act and risk measures*

It is inconceivable that auditors are not concerned about classification shifting, especially after the passage of the Sarbanes-Oxley Act (SOX) in 2002, which imposes stiff penalties on both manipulating firms and their auditors. Li (2016) documents that SOX has a deterring effect on classification shifting, i.e., the magnitude of unexpected core earnings declines, and firms shift fewer core expenses to special items post-SOX. We split our sample into pre-and post-SOX, run the regressions in both subsamples, and report the results in Table A6. We observe an inverse association between non-operating income and all the risk measures across both sub-periods.

4.7.6. *Managerial ability and risk measures*

A firm's risk profile reflects its managers' choices. We divide the sample into firms with high vs. low skilled managers. High-skilled managers represent firms with managerial ability scores higher than the median industry scores over the past three years to eliminate chance occurrence. We refer to this category of firms as *SKILL* or high-ability managers. The other category of firms is categorized as *LUCK* or low-ability managers. We present the findings in

Table A7. The coefficients of *NONOPERINC* are significant in the subsample representing luck or low-ability managers. They are not significant in the subsample representing skilled or high-ability managers. Possible explanations include: more able managers make better investment decisions and thus help generate higher operating earnings, which, consequently, mitigate the effects of non-operating earnings; or high-ability managers are confident in their ability and choose not to invest in non-operating activities in the first place, a result documented in the first stage regression of the IV analysis (in Panel A of Table 7 whereby the coefficient of *SKILL* is negative). Conversely, low-ability managers engage in more non-operating activities to mitigate risks.

5. Conclusion

In this paper, we investigate whether non-operating activities significantly stabilize total earnings and reduce firm risk. We document strong and consistent empirical evidence that non-operating earnings reduce firm risk, and classification shifting and other types of earnings management fail to displace the contributory role of non-operating activities in reducing uncertainty. Further analysis shows that equity earnings, among other non-operating earnings, play a significant role in reducing firm risk. The results hold in various model specifications, variable measurements, various subsample analyses, and multiple robustness checks. We believe that the risk-reducing impacts of non-operating earnings may come from two sources embedded in the features of non-operating activities: diversification and reduced information asymmetry associated with the full disclosure of non-operating activities.

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Appendix

Table A1: Regressions to obtain expected operating earnings and expected non-operating earnings

Panel A: Regression to obtain expected operating earnings		
<i>Variable</i>	<i>Coefficients</i>	<i>t-stats</i>
Intercept	-0.019	-2.16**
<i>L.OPERINC</i>	0.798	15.87***
<i>ATO</i>	0.029	1.74*
<i>ACCRUALS</i>	0.227	3.36***
<i>L. ACCRUALS</i>	0.001	0.01
<i>SALECHG</i>	0.033	2.25**
<i>NEGSALECHG</i>	-0.019	-2.52**
<i>L.MKTADJRET</i>	0.006	0.69
<i>MKTADJRET</i>	0.026	5.62***
Aver. Adj. R-squared	0.837	213.73***
Number of industry-year combinations	1115	
Average number of observations per regressions	44.54	

Panel B: Regression to obtain expected non-operating earnings

<i>Variable</i>	<i>Coefficients</i>	<i>t-stats</i>
Intercept	0.012	4.48***
<i>L.NONOPERINC</i>	-0.018	-1.65*
<i>ATO</i>	-0.013	-1.55
<i>ACCRUALS</i>	0.027	1.29
<i>L.ACCRUALS</i>	0.007	0.37
<i>SALECHG</i>	-0.005	-1.3
<i>NEGSALECHG</i>	0.001	0.71
<i>L.MKTADJRET</i>	0.000	-0.03
<i>MKTADJRET</i>	0.002	0.98
Aver. Adj. R-squared	0.447	45.27***
Number of industry-year combinations	1115	
Average number of observations per regressions	44.54	

Note: This table presents the regression results of obtaining expected operating earnings and expected non-operating earnings. In Panel A, the dependent variable is *OPERINC*, measured as sales minus cost of goods sold minus selling, general, and administrative expenses then scaled by total assets. In Panel B, the dependent variable is *NONOPERINC*, measured as non-operating income-to-asset ratio. *ATO* is a asset turnover ratio, constructed as $SALES_t / ((NOA_t + NOA_{t+1}) / 2)$, where *NOA* is operating assets minus operating liabilities. Operating assets are total assets minus cash and short-term investments. Operating liabilities are total assets minus total debt minus book value of common and preferred equity minus minority interest. *ACCRUALS* is the income before extraordinary items minus cash from operations. *SALECHG* is the percentage change in sales. *NEGSALECHG* is equal to 1 if the sales decrease, and 0 otherwise. *MKTADJRET* is calculated as the buy-and-hold returns of the firm in year t minus the buy-and-hold returns of the CRSP value-weighted index in year t. We obtain the coefficients using all the observations in a particular industry-year except firm *i*. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table A2: Regression results by subsamples of operating profitability

<i>Variables</i>	<i>NONOPERINC</i>		<i>OPERINC</i>		<i>Adj. R-squared</i>	<i>N</i>	<i>Control variables</i>
<i>Panel A - ROAVOL</i>							
Negative <i>OPERINC</i>	-0.019	-2.255**	-0.236	-14.458***	0.268	16,119	Yes
Positive <i>OPERINC</i>	-0.013	-1.098	-0.015	-2.658***	0.089	55,785	Yes
<i>Panel B - TOTRISK</i>							
Negative <i>OPERINC</i>	-0.011	-2.411**	-0.142	-13.156***	0.418	16,162	Yes
Positive <i>OPERINC</i>	-0.006	-2.346**	-0.086	-14.692***	0.421	55,860	Yes
<i>Panel C - IDIORISK</i>							
Negative <i>OPERINC</i>	-0.014	-2.039**	-0.144	-13.702***	0.449	16,162	Yes
Positive <i>OPERINC</i>	-0.009	-1.968**	-0.080	-14.496***	0.459	55,860	Yes
<i>Panel D - NCSKEW</i>							
Negative <i>OPERINC</i>	-0.019	-2.314**	-0.043	-2.373**	0.046	12,501	Yes
Positive <i>OPERINC</i>	-0.018	-2.886***	-0.083	-11.035***	0.039	52,592	Yes

Note: This table reports the results from the panel data firm-fixed effect regressions for the subsample of firms with negative *OPERINC* vs. the subsample of firms with positive *OPERINC*. The dependent variables are ROA volatility (*ROAVOL* in Panel A), the two measures of stock price volatility (*TOTRISK* in Panel B and *IDIORISK* in Panel C), and one measure of stock price crash risk (*NCSKEW* in Panel D). ROA volatility (*ROAVOL*) is the standard deviation of return on assets over the 5 years period (from year -4 to the current fiscal year). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *NONOPERINC* is the ratio of non-operating income to assets at the end of the fiscal year. *OPERINC* is the ratio of operating income to assets at the end of the fiscal year. For brevity, only coefficients on *NONOPERINC* and *OPERINC* are reported. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table A3: Regression results by subsamples of financial leverage

<i>Variables</i>	<i>NONOPERINC</i>		<i>OPERINC</i>		<i>Adj. R-squared</i>	<i>N</i>	<i>Control variables</i>
<i>Panel A - ROAVOL</i>							
Lower <i>DEBT</i>	-0.011	-2.606***	-0.150	-9.728***	0.246	36,605	Yes
Higher <i>DEBT</i>	-0.010	-2.641***	-0.160	-10.438***	0.213	35,299	Yes
<i>Panel B - TOTRISK</i>							
Lower <i>DEBT</i>	-0.014	-2.583***	-0.228	-25.060***	0.507	36,635	Yes
Higher <i>DEBT</i>	-0.016	-2.885***	-0.196	-19.665***	0.473	35,387	Yes
<i>Panel C - IDIORISK</i>							
Lower <i>DEBT</i>	-0.015	-2.881***	-0.222	-24.851***	0.533	36,635	Yes
Higher <i>DEBT</i>	-0.017	-3.164***	-0.182	-18.495***	0.500	35,387	Yes
<i>Panel D - NCSKEW</i>							
Lower <i>DEBT</i>	-0.005	-0.559	-0.078	-6.384***	0.0527	32,478	Yes
Higher <i>DEBT</i>	-0.025	-3.132***	-0.076	-6.750***	0.0332	32,615	Yes

Note: This table reports the results from the panel data firm-fixed effect regressions for the subsample of firms with lower than the median *DEBT* ratio vs. the subsample of firms with higher than the median *DEBT* ratio. The dependent variables are ROA volatility (*ROAVOL* in Panel A), two measures of stock price volatility (*TOTRISK* in Panel B and *IDIORISK* in Panel C), and one measure of stock price crash risk (*NCSKEW* in Panel D). ROA volatility (*ROAVOL*) is the standard deviation of return on assets over 5 years (from year -4 to the current fiscal year). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *NONOPERINC* is the ratio of non-operating income to assets at the end of the fiscal year. *OPERINC* is the ratio of operating income to assets at the end of the fiscal year. For brevity, only coefficients on *NONOPERINC* and *OPERINC* are reported. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table A4: Regression results by subsamples of growth uncertainty

<i>Variables</i>	<i>NONOPERINC</i>		<i>OPERINC</i>		<i>Adj. R-squared</i>	<i>N</i>	<i>Control Variables</i>
<i>Panel A - ROAVOL</i>							
<i>XRD</i> = 0	0.003	0.414	-0.196	-14.357***	0.171	34,331	Yes
<i>XRD</i> > 0	-0.017	-2.455**	-0.143	-9.223***	0.279	37,573	Yes
<i>Panel B - TOTRISK</i>							
<i>XRD</i> = 0	-0.013	-2.457**	-0.183	-20.603***	0.489	34,358	Yes
<i>XRD</i> > 0	-0.012	-2.354**	-0.210	-22.064***	0.563	37,664	Yes
<i>Panel C - IDIORISK</i>							
<i>XRD</i> = 0	-0.014	-2.470**	-0.192	-21.425***	0.462	34,358	Yes
<i>XRD</i> > 0	-0.009	-2.228**	-0.215	-22.335***	0.535	37,664	Yes
<i>Panel D - NCSKEW</i>							
<i>XRD</i> = 0	-0.019	-2.436**	-0.078	-7.482***	0.0439	29,858	Yes
<i>XRD</i> > 0	-0.015	-2.227**	-0.074	-6.038***	0.0413	35,235	Yes

Note: This table reports the results from the panel data firm-fixed effect regressions for the subsamples based upon growth uncertainty. R&D expenditures (*XRD*) are used as a proxy for growth uncertainty. The regressions are estimated for the subsamples of firms with and firms without R&D expenditures. The dependent variables are ROA volatility (in Panel A), the two measures of stock price volatility (*TOTRISK* in Panel B and *IDIORISK* in Panel C) and one measure of stock price crash risk (*NCSKEW* in Panel D). ROA volatility (*ROAVOL*) is the standard deviation of return on assets over 5 years (from year -4 to the current fiscal year). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *NONOPERINC* is the ratio of non-operating income to assets at the end of the fiscal year. *OPERINC* is the ratio of operating income to assets at the end of the fiscal year. For brevity, only coefficients on *NONOPERINC* and *OPERINC* are reported. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table A5: Regression results by financial crisis sub-periods

<i>Variables</i>	<i>NONOPERINC</i>		<i>OPERINC</i>		<i>Adj. squared</i>	<i>R-N</i>	<i>Control variables</i>
<i>Panel A - ROAVOL</i>							
<i>1990-2006</i>	-0.018	-3.044***	-0.150	-11.795***	0.253	47,224	Yes
<i>2007-2009</i>	-0.012	-1.429	-0.067	-2.064**	0.138	7,734	Yes
<i>2010-2016</i>	0.002	0.211	-0.162	-5.813***	0.192	16,946	Yes
<i>Panel B - TOTRISK</i>							
<i>1990-2006</i>	-0.014	-2.986***	-0.228	-28.143***	0.498	47,291	Yes
<i>2007-2009</i>	-0.001	-0.050	-0.124	-4.750***	0.347	7,754	Yes
<i>2010-2016</i>	-0.014	-1.411	-0.131	-7.639***	0.382	16,977	Yes
<i>Panel C - IDIORISK</i>							
<i>1990-2006</i>	-0.016	-3.443***	-0.228	-28.636***	0.518	47,291	Yes
<i>2007-2009</i>	-0.008	-0.601	-0.111	-4.321***	0.379	7,754	Yes
<i>2010-2016</i>	-0.013	-1.377	-0.103	-6.073***	0.382	16,977	Yes
<i>Panel D - NCSKEW</i>							
<i>1990-2006</i>	-0.027	-3.813***	-0.071	-6.843***	0.0538	41,395	Yes
<i>2007-2009</i>	0.021	1.084	-0.036	-1.076	0.0117	7,381	Yes
<i>2010-2016</i>	-0.005	-0.377	-0.110	-4.871***	0.0190	16,317	Yes

Note: This table reports the results from the panel data firm-fixed effect regressions for the three sub-periods: 1990-2006 (pre-crisis period), 2007-2009 (crisis period), and 2010-2016 (post-crisis period). The dependent variables are ROA volatility (*ROAVOL* in Panel A), the two measures of stock price volatility (*TOTRISK* in Panel B and *IDIORISK* in Panel C), and one measure of stock price crash risk (*NCSKEW* in Panel D). ROA volatility (*ROAVOL*) is the standard deviation of return on assets over the 5 years period (from year -4 to the current fiscal year). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *NONOPERINC* is the ratio of non-operating income to assets at the end of the fiscal year. *OPERINC* is the ratio of operating income to assets at the end of the fiscal year. For brevity, only coefficients on *NONOPERINC* and *OPERINC* are reported. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively

Table A6: Regression results by pre-SOX vs. post-SOX sub-periods

<i>Variables</i>	<i>NONOPERINC</i>		<i>OPERINC</i>		<i>Adj. R-squared</i>	<i>N</i>	<i>Control variables</i>
<i>Panel A - ROAVOL</i>							
<i>PRE-SOX</i>	-0.026	(-3.837 ***)	-0.183	(-12.848 ***)	0.281	38,986	Yes
<i>POST-SOX</i>	0.010	(1.647 *)	-0.121	(-6.702 ***)	0.183	32,918	Yes
<i>Panel B - TOTRISK</i>							
<i>PRE-SOX</i>	-0.015	(-2.932 ***)	-0.238	(-26.927 ***)	0.482	39,037	Yes
<i>POST-SOX</i>	-0.017	(-2.668 ***)	-0.134	(-12.614 ***)	0.446	32,985	Yes
<i>Panel C - IDIORISK</i>							
<i>PRE-SOX</i>	-0.017	(-3.422 ***)	-0.239	(-27.410 ***)	0.500	39,037	Yes
<i>POST-SOX</i>	-0.016	(-2.550 **)	-0.124	(-11.324 ***)	0.445	32,985	Yes
<i>Panel D - NCSKEW</i>							
<i>PRE-SOX</i>	-0.021	(-2.579 ***)	-0.069	(-5.981 ***)	0.0574	28,322	Yes
<i>POST-SOX</i>	-0.007	(-0.767)	-0.096	(-7.228 ***)	0.0201	27,000	Yes

Note: This table reports the results from the panel data firm-fixed effect regressions for the two sub-periods: pre-Sarbanes Oxley Act (SOX) and post-SOX. The dependent variables are ROA volatility (*ROAVOL* in Panel A), the two measures of stock price volatility (*TOTRISK* in Panel B and *IDIORISK* in Panel C), and one measure of stock price crash risk (*NCSKEW* in Panel D). ROA volatility (*ROAVOL*) is the standard deviation of return on assets over 5 years (from year -4 to the current fiscal year). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *NONOPERINC* is the ratio of non-operating income to assets at the end of the fiscal year. *OPERINC* is the ratio of operating income to assets at the end of the fiscal year. For brevity, only coefficients on *NONOPERINC* and *OPERINC* are reported. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table A7: Regression results by managerial skill vs. luck

<i>Variables</i>	<i>NONOPERINC</i>		<i>OPERINC</i>		<i>Adj. squared</i>	<i>R-N</i>	<i>Control variables</i>
<i>Panel A - ROAVOL</i>							
Luck	-0.009	-1.681*	-0.164	-12.653***	0.265	52,837	Yes
Skill	-0.009	-0.975	-0.151	-7.362***	0.190	19,067	Yes
<i>Panel B - TOTRISK</i>							
Luck	-0.009	-2.110**	-0.214	-26.475***	0.494	52,899	Yes
Skill	-0.003	-0.313	-0.184	-14.464***	0.481	19,123	Yes
<i>Panel C - IDIORISK</i>							
Luck	-0.011	-2.549**	-0.207	-26.292***	0.524	52,899	Yes
Skill	-0.005	-0.611	-0.172	-13.629***	0.514	19,123	Yes
<i>Panel D - NCSKEW</i>							
Luck	-0.021	-2.976***	-0.090	-8.121***	0.0423	38,599	Yes
Skill	-0.014	-1.317	-0.056	-3.822***	0.0375	16,723	Yes

Note: This table reports the results from the panel data firm-fixed effect regressions for the two subsamples based upon managerial skills. *SKILL* is an indicator variable which equals to 1 for firms with managerial ability scores higher than the median industry scores in the past three years, and 0 otherwise (*LUCK*). The dependent variables are ROA volatility (in Panel A), the two measures of stock price volatility (*TOTRISK* in Panel B and *IDIORISK* in Panel C) and one measure of stock price crash risk (*NCSKEW* in Panel D). ROA volatility (*ROAVOL*) is the standard deviation of return on assets over 5 years (from year -4 to the current fiscal year). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *NONOPERINC* is the ratio of non-operating income to assets at the end of the fiscal year. *OPERINC* is the ratio of operating income to assets at the end of the fiscal year. For brevity, only coefficients on *NONOPERINC* and *OPERINC* are reported. Firm fixed effects and year fixed effects are included. We calculate the significance levels of the variables using standard errors adjusted for firm clustering effects. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table 1: Sample distribution by year and by Fama-French 48-sector classification

<i>Year</i>	<i>N</i>	<i>Percent</i>	<i>Industry</i>	<i>N</i>	<i>Percent</i>
1990	1,870	2.59	AERO	476	0.66
1991	1,904	2.64	AGRIC	251	0.35
1992	2,238	3.1	AUTOS	1,348	1.87
1993	2,478	3.44	BEER	317	0.44
1994	2,692	3.73	BLDMT	1,781	2.47
1995	2,876	3.99	BOOKS	626	0.87
1996	3,069	4.26	BOXES	277	0.38
1997	3,312	4.59	BUSSV	9,634	13.36
1998	3,330	4.62	CHEM	1,805	2.5
1999	3,236	4.49	CHIPS	5,638	7.82
2000	3,161	4.38	CLTHS	1,172	1.63
2001	3,095	4.29	CNSTR	960	1.33
2002	2,944	4.08	COAL	133	0.18
2003	2,854	3.96	COMPS	3,410	4.73
2004	2,795	3.88	DRUGS	3,939	5.46
2005	2,743	3.8	ELCEQ	1,212	1.68
2006	2,721	3.77	FABPR	314	0.44
2007	2,629	3.65	FOOD	1,472	2.04
2008	2,617	3.63	FUN	1,187	1.65
2009	2,520	3.5	GOLD	650	0.9
2010	2,456	3.41	GUNS	128	0.18
2011	2,435	3.38	HLTH	1,436	1.99
2012	2,431	3.37	HSHLD	1,555	2.16
2013	2,411	3.34	LABEQ	2,073	2.88
2014	2,473	3.43	MACH	3,237	4.49
2015	2,577	3.57	MEALS	1,503	2.08
2016	<u>2,233</u>	<u>3.1</u>	MEDEQ	3,014	4.18
Total	72,100	100	MINES	454	0.63
			OIL	3,440	4.77
			PAPER	1,133	1.57
			PERSV	945	1.31
			RTAIL	4,456	6.18
			RUBBR	748	1.04
			SHIPS	193	0.27
			SMOKE	101	0.14
			SODA	218	0.3
			STEEL	1,338	1.86
			TELCM	2,551	3.54
			TOYS	635	0.88
			TRANS	2,314	3.21
			TXTLS	451	0.63
			WHLSL	2,925	4.06
			OTHER	650	0.9

Table 2: Summary statistics

<i>Variables</i>	<i>Mean</i>	<i>Median</i>	<i>25th percentile</i>	<i>75th percentile</i>	<i>Standard deviation</i>
<i>ROAVOL</i>	0.087	0.043	0.021	0.097	0.126
<i>TOTRISK</i>	0.581	0.493	0.344	0.717	0.336
<i>IDIORISK</i>	0.535	0.445	0.300	0.669	0.335
<i>NCSKEW</i>	-0.093	-0.116	-0.538	0.309	0.846
<i>DUVOL</i>	-0.098	-0.094	-0.420	0.222	0.513
<i>COUNT</i>	-0.030	0.000	0.000	0.000	0.645
<i>NONOPERINC</i>	0.008	0.004	0.000	0.013	0.017
<i>OPERINC</i>	0.038	0.072	0.011	0.123	0.176
<i>LNAT</i>	5.829	5.671	4.306	7.210	2.100
<i>DEBT</i>	0.172	0.119	0.002	0.278	0.189
<i>XRD</i>	0.050	0.003	0.000	0.059	0.106
<i>XAD</i>	0.014	0.000	0.000	0.007	0.048
<i>MKTCON</i>	0.111	0.078	0.060	0.116	0.101
<i>INSTOWN_TRA</i>	0.107	0.070	0.011	0.164	0.120
<i>INSTOWN_QIX</i>	0.249	0.188	0.049	0.399	0.235
<i>INSTOWN_DED</i>	0.058	0.011	0.000	0.085	0.093
<i>SKILL</i>	0.265	0.000	0.000	1.000	0.442
<i>TURNOVER</i>	13.696	13.833	13.006	14.550	1.198
<i>MKBK</i>	2.978	2.017	1.192	3.513	3.804
<i>RET</i>	0.000	0.000	0.000	0.000	0.000
<i>SIGMAN</i>	0.012	0.011	0.007	0.015	0.006
<i>DTURN</i>	0.007	0.005	0.002	0.009	0.008
<i>DISACC</i>	0.043	0.032	-0.025	0.103	0.146
<i>REALEM</i>	0.021	0.051	-0.110	0.210	0.354

Note: This table presents summary statistics for the sample. *ROAVOL* is the standard deviation of income before extraordinary items to assets ratios over five years (from year -4 to the current fiscal year). *TOTRISK* is the annualized standard deviation of the daily stock returns in the year. *IDIORISK* is the annualized standard deviation of the residuals from the Fama-French 4-factor model using stock daily returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *DUVOL* is the log of the ratio of the standard deviation on down weeks to the standard deviation on up weeks. *COUNT* is the number of crashes minus the number of jumps over the fiscal year. *NONOPERINC* is the ratio of non-operating earnings to assets at the end of the fiscal year. *OPERINC* is the ratio of operating earnings to assets at the end of the fiscal year. *LNAT* is the natural log of total assets at the end of the fiscal year. *DEBT/XRD/XAD* is the ratio of long-term debt/R&D expenditure/advertising expenditure to total assets at the end of the fiscal year. *MKTCON* is the Herfindahl sales-based industry concentration index. *INSTOWN_TRAN/INSTOWN_QIX/INSTOWN_DED* is the percentage of firm shares held by transient institutional owners/quasi-index institutional owners/dedicated institutional owners. *SKILL* is a dummy variable that equals 1 for firms with managerial ability scores above the industry median managerial ability scores in the past three years, and 0 otherwise. *TURNOVER* is the natural log of the ratio of total number of shares traded to the number of shares outstanding in the year. *MKBK* is market-to-book ratio at the end of the fiscal year. *RET* is the average of the firm-specific weekly return over the preceding fiscal year. *SIGMA* is the standard deviation of the firm-specific weekly return over the preceding fiscal year. *DTURN* is the difference between average monthly turnover over fiscal year t-1 and the prior fiscal year's average monthly turnover. *DISACC* is the abnormal discretionary accruals. *REALEM* is the sum of abnormal production cost, abnormal discretionary expenditures, and abnormal operating cash flows.

Table 3: The relation between non-operating income and ROA volatility

<i>Variables</i>	<i>Panel A – OLS</i>	<i>Panel B - FE</i>	<i>Panel C - FGLS</i>
<i>NONOPERINC</i>	-0.017 (-2.976***)	-0.010 (-1.987**)	-0.008 (-8.700***)
<i>OPERINC</i>	-0.360 (-35.499***)	-0.167 (-14.887***)	-0.166 (-81.169***)
<i>LNAT</i>	-0.201 (-27.025***)	-0.484 (-17.439***)	-0.157 (-75.430***)
<i>DEBT</i>	0.036 (5.022***)	0.049 (5.308***)	0.007 (5.209***)
<i>XRD</i>	0.143 (12.601***)	0.065 (4.762***)	0.107 (34.375***)
<i>XAD</i>	0.043 (5.415***)	0.018 (1.813*)	0.009 (5.449***)
<i>INSTOWN_TRAN</i>	0.045 (7.533***)	0.002 (2.519**)	0.004 (4.624***)
<i>INSTOWN_QIX</i>	-0.062 (-9.772***)	-0.020 (-3.295***)	-0.012 (-10.444***)
<i>INSTOWN_DED</i>	-0.021 (-4.379***)	-0.012 (-2.940***)	-0.003 (-4.292***)
<i>SKILL</i>	0.005 (1.169)	-0.012 (-2.865***)	0.001 (0.938)
<i>MKTCON</i>	-0.001 (-2.172**)	-0.007 (-2.664***)	-0.009 (-6.295***)
Constant	0.135 (11.361***)	0.219 (25.537***)	0.100 (98.281***)
Adj. R-squared	0.343	0.246	NA
Year fixed effect	Yes	Yes	Yes
Industry fixed effect	Yes	No	No
Firm fixed effect	No	Yes	Yes
Clustered standard errors	Yes	Yes	NA
Number of firms	9,659	9,659	8,091
Observations	71,699	71,904	70,336

Note: This table reports the results from the regressions of ROA volatility using three alternative estimation techniques: ordinary least squares regression (OLS) with year fixed effects and industry fixed effects, panel-data fixed effect regression (FE), and feasible generalized least squares regression (FGLS). The dependent variable is ROA volatility (*ROAVOL*), constructed as the standard deviation of return on assets over five years (from year -4 to the current fiscal year). *NONOPERINC* is the ratio of non-operating earnings to assets at the end of the fiscal year. *LNAT* is the natural log of total assets at the end of the fiscal year. *OPERINC/DEBT/XRD/XAD* is the ratio of operating earnings/long-term debt/R&D expenditure/advertising expenditure to total assets at the end of the fiscal year. *INSTOWN_TRAN/INSTOWN_QIX/INSTOWN_DED* is the percentage of firm shares held by transient institutional owners/quasi-index institutional owners/dedicated institutional owners. *SKILL* is a dummy variable that equals 1 for firms with managerial ability scores above the industry median managerial ability scores in the past three years, and 0 otherwise. *TURNOVER* is the natural log of the ratio of total number of shares traded to the number of shares outstanding in the year. *MKTCON* is the Herfindahl sales-based industry concentration index. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table 4: The relation between non-operating income and stock price volatility

<i>Variables</i>	<i>Panel A – TOTRISK</i>	<i>Panel B - IDIORISK</i>
<i>NONOPERINC</i>	-0.019 (-4.724***)	-0.022 (-5.629***)
<i>OPERINC</i>	-0.196 (-27.597***)	-0.186 (-26.687***)
<i>LNAT</i>	-0.416 (-22.313***)	-0.463 (-25.618***)
<i>TURNOVER</i>	0.256 (30.823***)	0.201 (24.997***)
<i>MKBK</i>	-0.018 (-4.865***)	-0.025 (-6.923***)
<i>DEBT</i>	0.064 (9.267***)	0.067 (9.988***)
<i>OPERLEV</i>	0.024 (2.059**)	0.025 (2.165**)
<i>DIVYIELD</i>	-0.042 (-10.126***)	-0.038 (-9.651***)
<i>INSTOWN_TRAN</i>	0.063 (1.010)	0.070 (1.529)
<i>INSTOWN_QIX</i>	-0.057 (-5.832***)	-0.062 (-6.246***)
<i>INSTOWN_DED</i>	-0.040 (-9.038***)	-0.038 (-8.723***)
<i>SKILL</i>	-0.012 (-3.395***)	-0.009 (-2.815***)
<i>MKTCON</i>	-0.006 (-0.717)	-0.003 (-0.324)
Constant	0.049 (1.413)	0.259 (7.841***)
Adj. R-squared	0.492	0.521
Year fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Clustered std err by firm	Yes	Yes
Number of firms	9,659	9,659
Observations	71,862	71,862

Note: This table reports the results from the panel data firm-fixed effect regressions of the two measures of stock price volatility. The dependent variables are *TOTRISK* (in Panel A) and *IDIORISK* (in Panel B). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NONOPERINC* is the ratio of non-operating earnings to assets at the end of the fiscal year. *OPERINC* is the ratio of operating earnings to assets at the end of the fiscal year. *LNAT* is the natural log of total assets at the end of the fiscal year. *TURNOVER* is the natural log of the ratio of total number of shares traded to the number of shares outstanding in the year. *MKBK* is market-to-book ratio at the end of the fiscal year. *DEBT/OPERLEV* is the ratio of long-term debt/net property, plant and equipment to total assets at the end of the fiscal year. *DIVYIELD* is dividend yield. *INSTOWN_TRAN/INSTOWN_QIX/INSTOWN_DED* is the percentage of firm shares held by transient institutional owners/quasi-index institutional owners/dedicated institutional owners. *SKILL* is a dummy variable that equals 1 for firms with managerial ability scores above the industry median managerial ability scores in the past three years, and 0 otherwise. *MKTCON* is the Herfindahl sales-based industry concentration index. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively

Table 5: The relation between non-operating income and crash risk

<i>Variables</i>	<i>Panel A – NCSKEW</i>	<i>Panel B – DUVOL</i>	<i>Panel C - COUNT</i>
<i>NONOPERINC</i>	-0.014 (-2.419**)	-0.014 (-2.487**)	-0.007 (-2.222**)
<i>OPERINC</i>	-0.041 (-5.055***)	-0.053 (-6.634***)	-0.021 (-2.719***)
<i>LNAT</i>	0.310 (12.779***)	0.330 (13.766***)	0.231 (9.720***)
<i>RET</i>	-0.040 (-2.100**)	-0.042 (-2.421**)	-0.008 (-0.465)
<i>SIGMA</i>	-0.106 (-5.117***)	-0.125 (-6.353***)	-0.050 (-2.690***)
<i>DTURN</i>	0.037 (5.046***)	0.039 (5.299***)	0.034 (3.902***)
<i>MKBK</i>	0.080 (11.525***)	0.087 (12.590***)	0.060 (9.174***)
<i>DEBT</i>	-0.076 (-8.056***)	-0.085 (-9.082***)	-0.051 (-5.419***)
<i>DISACC</i>	0.021 (3.923***)	0.020 (3.903***)	0.016 (2.899***)
<i>REALEM</i>	0.062 (2.638***)	0.070 (2.596***)	0.056 (2.690***)
<i>INSTOWN_TRAN</i>	0.098 (13.495***)	0.115 (16.642***)	0.071 (9.811***)
<i>INSTOWN_QIX</i>	0.005 (0.507)	0.017 (1.711*)	0.012 (1.252)
<i>INSTOWN_DED</i>	-0.011 (-1.624)	-0.009 (-1.261)	-0.011 (-1.650*)
<i>SKILL</i>	0.024 (3.943***)	0.023 (3.950***)	0.018 (2.989***)
<i>MKTCON</i>	0.011 (0.906)	0.014 (1.079)	-0.005 (-0.388)
Constant	-0.622 (-9.761***)	-0.545 (-14.228***)	-0.344 (-7.026***)
Adj. R-squared	0.041	0.084	0.022
Year fixed effect	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes
Clustered std err by firm	Yes	Yes	Yes
Number of firms	7,201	7,201	7,201
Observations	65,093	65,093	65,093

Note: This table reports the results from the panel data firm-fixed effect regressions of the three measures of crash price risk (*NCSKEW*, *DUVOL* and *COUNT*). *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *DUVOL* is the log of the ratio of the standard deviation on down weeks to the standard deviation on up weeks. *COUNT* is the number of crashes minus the number of jumps over the fiscal year. *NONOPERINC* is the ratio of non-operating earnings to assets at the end of the fiscal year. *OPERINC* is the ratio of operating earnings to assets at the end of the fiscal year. *LNAT* is the natural log of total assets at the end of the fiscal year. *RET* is the average of the firm-specific weekly returns over the preceding fiscal year. *SIGMA* is the standard deviation of the firm-specific weekly returns over the preceding fiscal year. *DTURN* is the difference between average monthly turnover over fiscal year t-1 and the prior fiscal year's average monthly turnover. *MKBK* is market-to-book ratio at the end of the fiscal year. *DEBT* is the ratio of long-term debt to total assets at the end of the fiscal year. *DISACC* is the abnormal discretionary accruals. *REALEM* is the sum of abnormal production cost, abnormal discretionary expenditures, and abnormal operating cash flows. *INSTOWN_TRAN*/*INSTOWN_QIX*/*INSTOWN_DED*

is the percentage of firm shares held by transient institutional owners/quasi-index institutional owners/dedicated institutional owners. *SKILL* is a dummy variable that equals 1 for firms with managerial ability scores above the industry median managerial ability scores in the past three years, and 0 otherwise. *MKTCON* is the Herfindahl sales-based industry concentration index. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively

Table 6: The Relation between non-operating income and firm risk – Change regressions

<i>Dependent Variables</i>	<i>Independent variables</i>				Adj.R-squared	N	Control variables
	<i>NONOPERINC</i>		<i>OPERINC</i>				
<i>ROAVOL</i>	-0.021	-3.845***	-0.156	-12.657***	0.109	66,098	Yes
<i>TOTRISK</i>	-0.020	-3.661***	-0.081	-11.962***	0.219	66,098	Yes
<i>IDIORISK</i>	-0.025	-4.313***	-0.084	-11.517***	0.168	66,098	Yes
<i>NCSKEW</i>	-0.008	-1.964**	-0.022	-3.519***	0.034	62,922	Yes

Note: This table reports the results from the panel data firm-fixed effect regressions of the change in ROA volatility, the changes in the two measures of stock price volatility (*TOTRISK* and *IDIORISK*), and the change in stock price crash risk (*NCSKEW*). ROA volatility (*ROAVOL*) is the standard deviation of return on assets over 5 years (from year -4 to the current fiscal year). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *NONOPERINC* is the change in the ratio of non-operating earnings to assets at the end of the fiscal year. *OPERINC* is the change in the ratio of operating earnings to assets at the end of the fiscal year. Other control variables are measured in the first difference. For brevity, only coefficients on *NONOPERINC* and *OPERINC* are reported. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table 7: The relation between non-operating income and firm risk – Instrument variable analyses

<i>Panel A - Stage 1</i>		<i>Panel B - Stage 2</i>						
Independent variables	Coef. (t-stats)	Dependent variables	Instrumented Independent variables	<i>OPERI NC</i>	Adj. R-squared	R-N	Control variables	
<i>IND_NONOPERINC</i>	0.132	<i>ROAVOL</i>	-0.006	-0.153	0.22	1	66,098	Yes
	(10.539***)		(-2.254**)	(-12.886***)				
<i>OPERINC</i>	-0.015	<i>TOTRISK</i>	-0.018	-0.199	0.48	5	66,098	Yes
	(-2.431**)		(-4.222***)	(-28.740***)				
<i>LNAT</i>	-0.020	<i>IDIORISK</i>	-0.017	-0.189	0.51	5	66,098	Yes
	(-0.702)		(-4.842***)	(-28.038***)				
<i>MKTCON</i>	0.010	<i>NCSKEW</i>	-0.021	-0.077	0.04	33	62,922	Yes
	(0.637)		(-3.782***)	(-9.482***)				
<i>SKILL</i>	-0.021	Hansen J-statistics = 0.271						
	(-3.599***)							
Constant	0.008							
	(6.527***)							
Adj. R-squared	0.0633							
Number of firms	8,058							
Year fixed effect	Yes							
Firms fixed effect	Yes							
Clustered std err by firm	Yes							

Note: This table reports the results of the relations between non-operating income and the risk measures using an instrumental variable approach. Panel A reports the first stage regression results of 2SLS. The median non-operating earnings of firms in the same Fama-French 48 sector classification (*IND_NONOPERINC*) is used as an instrument variable for a firm's non-operating earnings (*NONOPERINC*). We regress *NONOPERINC* on *IND_NONOPERINC* and other firm characteristics with firm fixed effects. *NONOPERINC* is the ratio of non-operating income to assets at the end of the fiscal year. *OPERINC* is the ratio of operating income to assets at the end of the fiscal year. *LNAT* is the natural log of total assets at the end of the fiscal year. *MKTCON* is the Herfindahl sales-based industry concentration index. *SKILL* is a dummy variable that equals 1 for firms with managerial ability scores above the industry median managerial ability scores in the past three years, and 0 otherwise. Panel B reports the results of the second stage regressions where we run the tests in Tables 3-5 by replacing the actual non-operating earnings (*NONOPERINC*) with the predicted values from the first stage regression. ROA volatility (*ROAVOL*) is the standard deviation of return on assets over 5 years (from year -4 to the current fiscal year). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. Firm fixed effects and year fixed effects are included. We calculate the significance levels of the variables using standard errors adjusted for firm clustering effects. For brevity, only coefficients on *NONOPERINC* and *OPERINC* are reported in Panel B. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table 8: Components of non-operating earnings and firm risk

<i>VARIABLES</i>	<i>ROAVOL</i>	<i>TOTRISK</i>	<i>IDIORISK</i>	<i>NCSKEW</i>
<i>ESUB</i>	-0.015 (-2.833***)	-0.007 (-1.776*)	-0.006 (-1.754*)	-0.004 (-1.128)
<i>IRENT</i>	0.001 (0.062)	0.006 (1.055)	0.006 (1.044)	0.003 (0.416)
<i>IDIT</i>	-0.008 (-1.156)	0.006 (1.070)	0.002 (0.446)	-0.018 (-2.503**)
<i>INTC</i>	0.002 (0.207)	0.003 (0.297)	0.001 (0.101)	0.003 (0.347)
<i>AM</i>	0.024 (2.549**)	0.009 (1.940*)	0.007 (1.558)	0.000 (0.074)
<i>FCA</i>	-0.001 (-0.563)	-0.001 (-1.225)	-0.001 (-0.963)	-0.003 (-2.563**)
<i>OPERINC</i>	-0.163 (-14.639***)	-0.208 (-30.262***)	-0.200 (-29.707***)	-0.076 (-9.240***)
Adj. R-squared	0.249	0.492	0.521	0.0427
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Clustered std err by firm	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes
Observations	71,906	72,024	72,024	55,095
Number of firms	9,659	9,659	9,659	6,998

Note: This table reports the results from the panel data firm-fixed effect regressions of ROA volatility, *TOTRISK*, *IDIORISK*, and crash risk (*NCSKEW*) on the components of non-operating income. ROA volatility (*ROAVOL*) is the standard deviation of return on assets over 5 years (from year -4 to the current fiscal year). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *ESUB/IRENT/IDIT/INTC/AM/FCA* is equity earnings in unconsolidated subsidiaries/rental income/total interest and related income/capitalized interest amortization of intangibles/foreign exchange income or loss scaled by total assets. *OPERINC* is the ratio of operating earnings to assets at the end of the fiscal year. For brevity, only coefficients on the components of *NONOPERINC* and *OPERINC* are reported. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table 9: Regressions of firm risk on unexpected operating earnings and non-operating income

<i>Dependent variables</i>	<i>NONOPERINC</i>		<i>OPERINC_PREDICTED</i>		<i>OPERINC_UNEXPECTED</i>		<i>Adj. R-squared</i>	<i>Control variables</i>	<i>N</i>
<i>ROAVOL</i>			-0.177	(-15.589***)	-0.035	(-6.111***)	0.217	Yes	58,939
<i>TOTRISK</i>			-0.197	(-28.552***)	-0.043	(-12.428***)	0.519	Yes	59,059
<i>IDIORISK</i>			-0.211	(-30.011***)	-0.044	(-12.491***)	0.489	Yes	59,059
<i>NCSKEW</i>			-0.078	(-9.641***)	-0.033	(-6.290***)	0.0423	Yes	51,040
<i>ROAVOL</i>	-0.003	(-0.648)	-0.177	(-15.601***)	-0.036	(-6.132***)	0.217	Yes	58,939
<i>TOTRISK</i>	-0.013	(-3.430***)	-0.198	(-28.751***)	-0.044	(-12.684***)	0.519	Yes	59,059
<i>IDIORISK</i>	-0.011	(-2.715***)	-0.212	(-30.173***)	-0.045	(-12.693***)	0.489	Yes	59,059
<i>NCSKEW</i>	-0.023	(-3.992***)	-0.079	(-9.756***)	-0.034	(-6.505***)	0.0426	Yes	51,040

Note: This table reports the results from the panel data firm-fixed effect regressions of ROA volatility, stock price volatility (*TOTRISK* and *IDIORISK*) and stock price crash risk (*NCSKEW*). ROA volatility (*ROAVOL*) is the standard deviation of return on assets over 5 years (from year -4 to the current fiscal year). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *NONOPERINC* is the ratio of non-operating income to assets at the end of the fiscal year. *OPERINC_PREDICTED* and *OPERINC_UNEXPECTED* are the expected value obtained from the estimation of the regression in Table A1 and the difference between the actual *OPERINC* and *OPERINC_PREDICTED*, respectively. For brevity, only coefficients on *NONOPERINC*, *OPERINC_PREDICTED*, and *OPERINC_UNEXPECTED* are reported. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table 10: Regressions of firm risk on unexpected non-operating income and unexpected operating income

<i>VARIABLES</i>	<i>ROAVOL</i>	<i>TOTRISK</i>	<i>IDIORISK</i>	<i>NCSKEW</i>
<i>NONOPERINC_PREDICTED</i>	-0.023 (-4.537***)	-0.010 (-2.609***)	-0.009 (-2.250**)	0.000 (0.076)
<i>NONOPERINC_UNEXPECTED</i>	0.006 (1.166)	-0.010 (-2.555**)	-0.009 (-2.062**)	-0.023 (-3.674***)
<i>OPERINC_PREDICTED</i>	-0.182 (-16.140***)	-0.199 (-29.715***)	-0.213 (-31.160***)	-0.080 (-9.846***)
<i>OPERINC_UNEXPECTED</i>	-0.039 (-6.743***)	-0.043 (-12.723***)	-0.045 (-12.775***)	-0.034 (-6.312***)
Adj. R-squared	0.213	0.521	0.490	0.0427
Control variables	Yes	Yes	Yes	Yes
N	58,428	58,545	58,545	50,722

Note: This table reports the results from the panel data firm-fixed effect regressions of ROA volatility, stock price volatility (*TOTRISK* and *IDIORISK*) and crash risk (*NCSKEW*). ROA volatility (*ROAVOL*) is the standard deviation of return on assets over 5 years (from year -4 to the current fiscal year). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *OPERINC_PREDICTED*/*NONOPERINC_PREDICTED* is the expected *OPERINC*/*NONOPERINC* obtained from the estimation of the regression in Table A1/Table A2. *OPERINC_UNEXPECTED*/*NONOPERINC_UNEXPECTED* is the difference between the reported *OPERINC* and *OPERINC_PREDICTED*/the reported *NONOPERINC* and *NONOPERINC_PREDICTED*. For brevity, only coefficients on *OPERINC_PREDICTED*, *NONOPERINC_PREDICTED*, *OPERINC_UNEXPECTED*, and *NONOPERINC_UNEXPECTED* are reported. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table 11: Non-operating income and firm risk: Controlling for operating and non-operating assets

<i>Variables</i>	<i>ROAVOL</i>	<i>TOTRISK</i>	<i>IDIORISK</i>	<i>NCSKEW</i>	<i>DUVOL</i>	<i>COUNT</i>
<i>NONOPERINC</i>	-0.011 (-2.168**)	-0.019 (-4.425***)	-0.016 (-3.765***)	-0.014 (-2.405**)	-0.015 (-2.492**)	-0.006 (-2.075**)
<i>OPERINC</i>	-0.402 (-52.376***)	-0.208 (-28.091***)	-0.215 (-28.611***)	-0.048 (-5.660***)	-0.060 (-7.052***)	-0.027 (-3.235***)
<i>NON-OPERATING ASSET RATIO</i>	-0.115 (-17.356***)	-0.088 (-10.853***)	-0.085 (-10.083***)	0.019 (1.685*)	0.024 (2.174**)	0.008 (0.632)
<i>OPERATING ASSET RATIO</i>	-0.095 (-15.044***)	-0.088 (-10.984***)	-0.090 (-10.858***)	0.026 (2.298**)	0.029 (2.647***)	0.017 (1.543)
Adj. R-squared	0.323	0.389	0.376	0.0393	0.0735	0.0214
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Clustered std err by firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	64,741	64,904	64,904	48,225	48,225	48,225

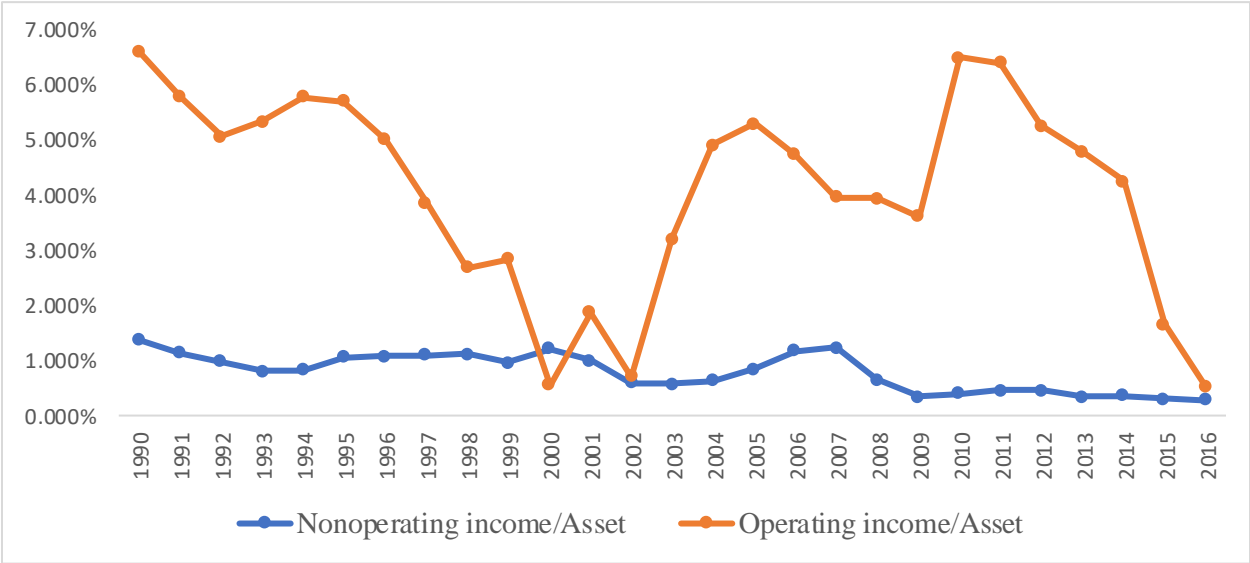
Note: This table reports the results from the regressions of the risk measures controlling for operating assets and non-operating assets. The dependent variable is one of the risk measures. ROA volatility (*ROAVOL*) is the standard deviation of return on assets over 5 years (from year -4 to the current fiscal year). Total risk (*TOTRISK*) is the annualized standard deviation of the daily stock returns in the year. Idiosyncratic risk (*IDIORISK*) is the annualized standard deviation of the residuals from the Fama-French 4-factor model using daily stock returns in the year. *NCSKEW* is the negative conditional skewness of firm-specific weekly return, calculated as the negative third central moment of firm-specific weekly returns divided by the cubed standard deviation of firm-specific weekly returns. *DUVOL* is the log of the ratio of the standard deviation on down weeks to the standard deviation on up weeks. *COUNT* is the number of crashes minus the number of jumps over the fiscal year. *NONOPERINC* is the ratio of non-operating income to assets at the end of the fiscal year. *OPERINC* is the ratio of operating income to assets at the end of the fiscal year. Operating asset ratio (*OPERATING ASSET RATIO*) is the sum of cash, total receivables, inventories, prepaid expenses, deferred taxes, and net plant and property and equipment, goodwill and intangibles scaled by total assets. Non-operating asset ratio (*NON-OPERATING ASSET RATIO*) is the sum of short-term investment and total investment and advances scaled by total assets. Control variables are the same as those used in the corresponding regression models in Tables 3-5. For brevity, only coefficients on *NONOPERINC*, *OPERINC*, *NON-OPERATING ASSET RATIO*, and *OPERATING ASSET RATIO* are reported. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Table 12: Non-operating earnings and earnings volatility (profit margin and asset turnover volatility)

<i>Variables</i>	<i>PROFIT MARGIN VOLATILITY</i>	<i>ASSET TURNOVER VOLATILITY</i>
<i>NONOPERINC</i>	-0.017 (-2.679***)	-0.023 (-5.003***)
<i>OPERINC</i>	-0.134 (-9.541***)	0.024 (2.758***)
<i>LNAT</i>	-0.152 (-5.833***)	-0.282 (-10.494***)
<i>DEBT</i>	0.009 (0.774)	0.046 (5.816***)
<i>XRD</i>	0.018 (0.723)	-0.031 (-2.826***)
<i>XAD</i>	-0.013 (-2.494**)	0.030 (2.417**)
<i>INSTOWN_TRAN</i>	0.005 (1.092)	0.015 (2.852***)
<i>INSTOWN_QIX</i>	-0.000 (-0.038)	-0.042 (-5.671***)
<i>INSTOWN_DED</i>	-0.016 (-3.928***)	-0.011 (-2.200**)
<i>SKILL</i>	-0.035 (-7.139***)	0.001 (0.256)
<i>MKTCON</i>	-0.008 (-0.914)	0.031 (2.356**)
Constant	0.723 (10.428***)	0.350 (25.640***)
Adj. R-squared	0.151	0.0936
Year fixed effect	Yes	Yes
Firm fixed effect	Yes	Yes
Clustered std err by firm	Yes	Yes
Observations	71,812	71,902

Note: This table reports the regression results of the components of ROA volatility (the profit margin volatility and the asset turnover volatility) on non-operating earnings. Profit margin is net income scaled by sales. Assets turnover is sales divided by total assets. Volatility is defined as the standard deviation of the variable over the last five years. *NONOPERINC* is the ratio of non-operating earnings to assets at the end of the fiscal year. *OPERINC* is the ratio of operating earnings to assets at the end of the fiscal year. *LNAT* is the natural log of total assets at the end of the fiscal year. *DEBT/XRD/XAD* is the ratio of long-term debt/R&D expenditure/advertising expenditure to total assets at the end of the fiscal year. *INSTOWN_TRAN/INSTOWN_QIX/INSTOWN_DED* is the percentage of firm shares held by transient institutional owners/quasi-index institutional owners/dedicated institutional owners. *SKILL* is a dummy variable that equals 1 for firms with managerial ability scores above the industry median managerial ability scores in the past three years, and 0 otherwise. *MKTCON* is the Herfindahl sales-based industry concentration index. *, ** and *** indicate the significance levels of 10%, 5% and 1%, respectively.

Figure 1: Time series of operating income to assets and non-operating earnings to assets



Note: This figure displays the average operating earnings to total assets ratio and the average non-operating earnings to total assets ratio of 72,100 firm year observations from 1990 to 2016.