Earnings Volatility, Post-Earnings Announcement Drift and Information Uncertainty

First Draft:

This Draft: June 5, 2014

Abstract: We find that Sarbanes-Oxley Act (SOX) leads to lower Post-Earnings Announcement Drift (PEAD). PEAD is a function of both the magnitude of earnings surprise and its persistence. While previous literature has largely documents market reactions to the magnitude of the earnings surprise, in this study, we show that the persistence of earnings surprise, earnings smoothness, earnings volatility, information quality are equally important. A unique feature of the anomalous PEAD returns documented here is that we find post-earnings-announcement-drift (PEAD) decreases post SOX period. Besides demonstrating that firms with higher information uncertainty, lower earnings volatility, higher persistence, higher earnings smoothness have lower abnormal returns. We exploit this implication to empirically demonstrate that PEAD returns due to information uncertainty are not concentrated in the firms with large size, which is in contrast to the findings in prior anomaly studies.

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1. Introduction

This study investigates the relation between accruals quality and Post Earnings Announcement Drift for a large sample of firms over the period -2011. Our study is motivated by a recent empirical research that shows that rational investor responses to information uncertainty (IU) explain properties of and returns to the post-earnings-announcement-drift (PEAD) trading anomaly(Francis, Lafond, Olsson, and Schipper 2007). By information risk, we mean the likelihood that firm-specific information that is pertinent to investor pricing decisions is of poor quality. We assume that cash flow is the primitive element that investors price and identify accruals quality as the measure of information risk associated with a key accounting number-earnings. That is, accruals quality tells investors about the mapping of accounting earnings into cash flows. Relatively poor accruals quality weakens this mapping and, therefore, increases information risk.

Our paper makes three contributions. First, consistent with theories that demonstrate a role for information risk in asset pricing, we show that firms with poor accrual quality have higher PEAD than do firms with good accruals quality. This result is consistent with the view that information risk (as proxied by accruals quality) is a priced risk factor. Second, we find that accruals quality increase after SOX, which is contrasting with the previous literature that information is more precise after SOX (Bedard et al. 2009). While we find earnings volatility decreases, earnings persistence and smoothness increases after SOX which is consistent with prior studies (), we shed light on accrual quality measure, which is well documented in previous literatures (Francis, Lafond, Olsson, and Schipper 2005). While theory does not distinguish among the sources of information risk, prior research on discretionary accruals (e.g.,Guay et al., 1996; Subramanyam, 1996) provides a framework in which discretionary accruals quality and innate accruals quality will have distinct cost of capital effects. Briefly, this body of work suggests that, in broad samples, discretionary accrual choices are likely to reflect both opportunism (which exacerbates information risk) and performance measurement (which mitigates information risk); these conflicting effects will yield accrual quality is actually higher after SOX. Consistent with this view, we find that innate accruals quality has larger effect than does discretionary accruals quality. We argue managers may sacrifice accruals quality to smooth earnings, which conflicts with prior studies. (Paul and Tucker). Third, we find that earnings response coefficient increases in the short window (-1,+1) but decrease in the long window (+2,+60).

The accruals quality (AQ) metric we use is based on Dechow and Dichev's (2002) model which shows a relation between current period working capital accruals and operating cash flows in the prior, current and future periods. Following Francis (2005) and McNichols (2002) model, we include the change in revenues and property, plant and equipment (PPE) as additional variable. In this frame, working capital accruals reflect the difference between managerial estimates of cash flows and the factors driven cash flows, changes in revenues and PPE, the estimation errors are the opposite of accruals quality due to managers intended or estimation errors.

Our tests show the relation between AQ and ERC. We find that firms with poorer AQ have higher PEAD than firms with better AQ (all differences significant at the 0.001 level). Previous literatures well documented that there is a drift on the market reaction to earnings announcement, since market needs time to react to the news (Dontoh, Ronen and Sarath 2003). Because of the noise in the earnings announcement, the market tends to wait, so the information quality determines the speed of the market react to the news. If the information is not precise, the investors will wait for future confirmative of information, there will a delay reaction to the earnings news. Sarbanes-Oxley applies generally to publicly held companies and their audit firms. The statute creates the Public Company Accounting Oversight Board (PCAOB). The Securities and Exchange Commission (SEC) has oversight and enforcement authority over the PCAOB and is authorized to give it additional responsibilities. SOX effect is broad in four channels: 1) audit committee. These requirements relate to: the independence of audit committee members; the audit committee's responsibility to select and oversee the issuer's independent accountant; procedures for handling complaints regarding the issuer's accounting practices; the authority of the audit committee to engage advisors; and funding for the independent auditor and any outside advisors engaged by the audit committee. The rule implements the requirements of Section 10A (m) (1) of the Securities Exchange Act of 1934, as added by Section 301 of the

Sarbanes-Oxley Act of 2002. Each member of the audit committee must be an "independent" member of the board of directors, which is strictly defined and requires that audit committee members receive no fees from the company other than those for serving on the board. At least one audit committee member must be designated as a financial expert. 2) Board of directors. Directors were required to adhere to three basic duties: the duty of loyalty, the duty of care, and the duty of obedience. In addition to these three duties, when a liability case was before a court, the business judgment rule applied. Directors must obey the law and ensure that the corporations in which they are involved also obey the law. They are obligated to ensure that all actions taken and decisions made follow a thorough process. In liability cases, courts do not examine the outcome of a decision as much as the process that led to the result. The role of chairman of the board has clearly become more demanding. Sarbanes-Oxley prohibits registered public accounting firms from providing any non-audit services to an issuer contemporaneously with an audit. Exceptions permit firms to engage in non-audit services, including tax services, but only if the activity is approved in advance by the audit committee of the issuer. 3) Panel of CEO has strengthened. The CEO and CFO are required to prepare a statement for inclusion with the audit report that certifies the appropriateness of the financial statements and any disclosures contained in the periodic report. These certifications must state that financial statements and disclosures present, in all material respects, the operations and financial condition of the issuer. 4) The importance of responsibilities of the board and senior management as a corporation approaches the zone of insolvency cannot be overstated. Warning signs of a business failure are present between one and three years before a company runs out of capital sources and fails. One consequence may be that additional board oversight will increase instances of identifying the warning signs earlier in the zone of insolvency, which may reduce the number of business failures in future years, especially among those not marred by fraud. Prior research documents Sarbanes-Oxley Act (SOX) create faster reaction to information, Bedard et al. (2009) find that information is more precise after SOX. If SOX improves information environment, so we should observe a faster reaction to earnings announcement. In this paper, we examine the speed of market reaction to earnings announcement news before and after SOX, therefore, if we observe an increase/improve in the speed of market reaction to earnings announcement after SOX, this indicate that market perceives that information to be more precise. Francis et al. (2007) employ a similar scenario about accrual quality, by hypothesis that market will react faster to higher quality information than lower quality information. Consistent with previous papers, we find that earnings response more quickly in the short window, but more slowly in the long window.

We find that

2. Literature Review

Ball and Brown (1986) first discover the post-earnings announcement drift. A strand of research which is related to post earnings announcement drift concerns whether market really understands the earnings announce. The idea is that the market initially misunderstands the signal, the markets full response to the disclosure comes much later. Bernard and Thomas (1997) concentrate on the market lagged reaction to some information, for example, "post earnings announcement drift: delayed price response or risk premium? Two explanations have been documented in the literatures about the existence of PEAD. The first is that investors under-react to the information in earnings. Bernard and Thomas (1990) find that PEAD is caused by investors failing to include the earnings surprises into their earnings expectations. Abarbanell and Bernard (1992) find that PEAD is driven by analyst failure to incorporate earnings surprises in forecasting earnings. Consistently, Bartov (1992) and Ball and Bartov (1996)) suggest that PEAD is caused by investors fail to incorporate the time series properties of earnings. By contrary, Jacob et al. (1999) argue that previous literatures findings are driven mistakenly by their research method. Based on previous arguments, Livnat and Mendenhall (2006) find that the PEAD is larger when using analysts' forecasts data to predict earnings surprises. This argument is marked in both finance and accounting literatures (Latané and Jones 1979; Bernard and Thomas 1989; Bhushan 1994; Bartov et al 2000, Ng, Rusticus, and Verdi 2008; Chordia et al. 2009). Different firm chacteristics will also be driven factors of Post Earnings Announcement Drift, such as firm size, market to book ratio, liquidity, the number of analysts following.

Second explanation is the risk-premium hypothesis. It suggests that the delayed reaction to earnings announcement just compensate the risk premium (Sadka 2006). Ball, Sadka,and Sadka (2009) argue that the subsequently abnormal returns are just simply a fair compensation for information asymmetry risk and liquidity risk. Livnat and Mendenhall (2006), Konchitchki et al. (2012) argue that the PEAD is driven by risk-premium instead of under pricing, since they find that using reformed measure of earnings surprises, the PEAD reduced dramatically. In summary, there is no single story could fully explain PEAD. In our settings, we use ERC to measure PEAD. Coll and Koth JAE (1989) relate ERC to a number of commonly assumed ARIMA models, time series properties of earnings. They examine *temporal as well as cross sectional* determinants of ERC. Predict and document evidence that ERC is a function of riskless interest rates and riskiness, growth and/or persistence of earnings, so we use ERC as a measure for the market reaction to the information.

Our paper research is based on information economy theory and focus on the information environment change due to SOX (Sarbanes-Oxley Act). SOX law was enacted in 2002 to establish reforms in the financial market following a series of corporate scandals that negatively impacted investors' trust in the integrity of financial reporting. SOX has two main sections that are related specifically to internal control issues within public companies. The two provisions, Sections 302 and 404, focus on ICOFR (Internal Controls over Financial Reporting) and were enacted mainly to improve corporate financial reporting (Bedard et al. 2009) and they are argued to have the greatest potential of doing so (Nicolaisen 2004). In particular, Section 302, which became effective on August 29, 2002, requires top officers of all public firms to disclose quarterly all MWs in the firm's ICOFR. Beginning with fiscal year ending after November 15, 2004, Section 404 requires accelerated filers to assess the effectiveness of the ICOFR, and their auditors to both make their own evaluation and to attest to management's findings. In compliance with Section 404, non-accelerated filers are required, starting with fiscal years ending after December 15, 2007, to only document a management report on ICOFR.

Prior literatures examines whether SOX compliance results in better financial reporting quality. Using unexpected total and current accruals as measures of earnings quality, Bedard (2006) finds that internal control requirements lead to improved earnings quality. Similarly, Nagy (2010) provides evidence that firms with mandated audits of MW disclosures are less likely to restate their financial statements than noncomplying firms, and that MW disclosure is positively associated with the likelihood of future restatements. Ronen (2013) documents that SOX reduce earnings management.1 Finally, Bizzaro et al. (2010) find a significant association

[1] The book has a detail literature review of the literatures relates to whether SOX reduce earnings management or not.

between the incidence as well as the frequency of MWs and the probability of financial restatements. In all, SOX increase the financial information quality and increase the internal control efficiency. We would argue that after SOX, improved information environment will reduce the delay regression of the market, more timely reaction to the news in the short run and less post earnings announcement drift will be observed in the long run.

3. Research Method and Hypothesis Development

Hypothesis Development:

H1: After SOX, the information uncertainty increases.

H2: After SOX, the ERC increases in the short term window.

H3: After SOX, the ERC decreases in the long term window.

H4: After SOX, the hedge portfolio returns decreases.

4. Sample and Descriptive Statistics

4.1 SAMPLE DETAILS

Our sample is obtained from COMPUSTAT from 1993 to 2011. We use 2002 as a cut off year; we define 1993-2001 as prior SOX period. We define 2003-2011 as post SOX period. We begin by calculating IU before and after SOX.

4.2 DESCRIPTIVE STATISTICS

Table 1 reports descriptive statistics for information uncertainty.

4.3 Measuring Information Uncertainty

Our measure of information uncertainty is based on Dechow and Dichev’s (2002) model, the variables come from the modified Jones(1991) model, like PPE and change in revenues (all variables are scaled by average assets). We follow Francis (2007)'s measure for information uncertainty, we view that if the total current accruals cannot be explained by three years cash flow, change in revenue and PPE, the variance of the unexplained portion is the reverse measure of information quality.

$$TCA_{j,t}=ø_0+ ø_1CFO_{j,t-1}+ ø_2CFO_{j,t}+ ø_3CFO_{j,t+1} + ø_4\Delta Rev_{j,t}+ ø_5PPE_{j,t}+v_{j,t} \quad (1)$$

Where:
$TCA_{j,t}=\Delta CA_{j,t}-CL_{j,t}-Cash_{j,t}+STDEBT_{j,t}$ =firm j's total current accruals in year t,
$CFO_{j,t}=NIBE_{j,t}-TA_{j,t}$=firm j's cash flow from operations in year t,
$NIBE_{j,t}$ =firm j's net income before extraordinary items (Compustat #18) in year t,
$TA_{j,t}=(\Delta CA_{j,t}-CL_{j,t}-Cash_{j,t}+STDEBT_{j,t}- DEPN_{j,t})$=firm j's total accruals in year t,
$\Delta CA_{j,t}$= firm j's change in current assets (Compustat #4) between year t-1 and year t,
$\Delta CL_{j,t}$= firm j's change in current liabilities (Compustat #5) between year t-1 and year t,
$\Delta Cash_{j,t}$= firm j's change in cash (Compustat #1) between year t-1 and year t,
$DEPN_{j,t}$= firm j's depreciation and amortization expense (Compustat #14) in year t,
$\Delta Rev_{j,t}$= firm j's change in revenues (Compustat #12) between year t-1 and year t,
$PPE_{j,t}$=firm j's gross value of property, plant and equipment (Compustat #7) in year t.

We follow Francis et.al. (2005; 2007)'s paper to form our information uncertainty metric: $IU_{j,t}=\sigma(V_j)_t$, which is the standard deviation of firm j's residuals, calculated over years t-4 to t. Larger standard deviation of firm j's residuals, the lower quality of information.

We calculate IU for all firms with available data for years between 1993-2011; Table 1 panel A reports the number of observations each year. The number of firms range from 6269 to 9851. Panel B reports descriptive statistics about IU before and after SOX. The mean of IU before SOX equals to 0.3429(0.4279). The mean of IU after SOX equals to 0.5449(0.4775). It indicates that after SOX, the information quality increases rather than decreases.

Insert Table 1 Here

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5. Empirical Results

5.1 Abnormal Returns to PEAD Strategy

We follow Livnat (2007)'s paper Post Earnings Announcement Drift. The standard return is calculated based on six portfolio returns. (Two size high low, and three market to book, high media and low).

Table 1 panel B shows that more observation with large SD before than after. Small variation (0.09-1.09), less variation after SOX (0.47-1.18). Less variation of IU after SOX. 0.7<Half<1.18, threshold, after SOX,there is less variation, IU doesn't matter, volatility matters more after SOX than it is before.

5.2 Tests of Hypotheses 2-3

In order to test our hypothesis; we add the interaction of UE with SOX, and UE with IU in the model. [2]

$$CAR(0,1) = \gamma_0 + \gamma_1 UE_{j,q} + \gamma_2 UE_{j,q} \times SOX + \zeta_{j,q} (2)$$

$$CAR(0,1) = \gamma_0 + \gamma_1 UE_{j,q} + \gamma_2 UE_{j,q} \times SOX + \gamma_3 UE \times IU_{j,q} + \gamma_4 UE \times IU_{j,q} \times SOX + \zeta_{j,q} (4)$$

Where:

CAR (-1, 0) j,q = Absolute value of cumulative 2-day market-adjusted return around firm j's quarter q earnings announcement;

UE j,q = Unexpected earnings news revealed in firm j's quarter q earnings announcement, scaled by firm j's share price 20 days before the earnings announcement date. Expected earnings = the consensus analyst forecast for quarter q;

IU j,q =Decile rank of IU; observations with the highest (lowest) values of IU are included in decile 10 (decile 1);

SOX = Dummy variable; equals to 1 after 2002, 0 before 2002.

SOX make market more precise. High IU stands for poor information environment. UE*SOX*IU is negative in the short window, and positive in the long window.

[2] Positive r_2 means that CAR response more to UE in the presence of SOX. However, the increase in response of UE in the presence of SOX decreases in IU.

In the short window, the coefficient of UE*SOX is positive, given introduction of SOX to the improvement on expected earnings. We know that there is a positive reaction of unexpected earnings on CAR. If you consider information uncertainty, if SOX increases market response to unexpected earnings, Information uncertainty will decrease the positive contribution of SOX to UE, you expect less reaction. Table 2 Panel A shows that the coefficient of the interaction UE*IU*sox is -0.62 and significant. So our second hypothesis has been supported.

Insert Table 2 Here

In the long window, we find that IU influences the contribution of SOX on the price response to Unexpected Earnings[3]. r3 is the coefficient on the cross term UE*IU, which equals to -1.10 in the long term window and -0.50 in the short term window, and both are negative, which means if information environment is uncertain, there is lower reaction to unexpected earnings. If you put SOX on top of this, if environment is better, the negative correlation on UE*IU will be less, you expect the coefficient on UE*IU*SOX is positive in the long term window. Table 2 Panel B shows that the coefficient on the interaction term equals to 0.16, although it is not significant in the long term window. 4 So our third hypothesis has been supported.

Table 2 Panel C SUE_After is 9.30 and significant in the short window (-1, 0), the -3.65 is significant, which means it decreases after SOX. SUE_Before*IU is -0.50 and significant, it decreases in IU. SOX actually did increase internal control. SOX influence information quality.

Table 2 shows smaller influences of SOX(R Square increase a limited amount), however add SOX is better. If IU is high UE*SOX check the IU environment across without condition on IU. Effect of IU is highlighted, SOX should lower IU. IU increase more predictions for future, business uncertainty, high IU, more noise information. Low IU, more precise information, variance of residual, higher volatility in business. Three items interaction term, SOX mitigate the negative effect. SOX effect is stronger, results is positive. More uncertainty of the environment.

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[3] Negative r_3 means that in a high IU environment the incremental effect of SOX is reduced.

[4] The presence of SOX reduces in the long window dependent on CAR decreases SOX in the long window, because market reacts quickly due to SOX in the short window. If we introduce information environment, the dependence of UE decreases, but not much with information uncertainty.

SOX offset the effect of the impact of IU, IU more offset the effect of SOX, IU is not sufficient. In theory, IU Coefficient increase will lead to decrease in PEAD. Coefficient not only could predict one year, it could also predict four years.

Insert Table 2 Here

5.3 Market Responses to Hedge Portfolio returns.

Then we build the hedge portfolios for the long and short portfolio based on UE. And we calculate hedge portfolio returns based on the hedge portfolio returns using long minus short. We test the hedge portfolio returns using different models before and after SOX and our results are consistent.

We report the mean monthly abnormal return to the extreme UE portfolios (short, long, long-short). Long security is in the top quantile. Short security is in the bottom quantile. We report abnormal returns based on CAPM, 3-factor, and 4 factor models of expected returns.

$$(R_L - R_S)_m = \alpha_{LS}^{CAPM} + \beta_{LS} RMRF_m + \varepsilon_{LS}^{CAPM}$$
$$(R_L - R_S)_m = \alpha_{LS}^{3f} + b_{LS}^{3f} RMRF_m + s_{LS}^{3f} SMB_m + h_{LS}^{3f} HML + \varepsilon_{LS,m}^{3f}$$
$$(R_L - R_S)_m = \alpha_{LS}^{4f} + b_{LS}^{4f} RMRF_m + s_{LS}^{4f} SMB_m + h_{LS}^{4f} HML + e_{LS}^{4f} AQ + \varepsilon_{LS,m}^{4f}$$

Table 3 for each period, you would estimate matched group, book to market correspondent, contempaneous matched cross section returns Passed average/Beta.

IU increase, persistence increase. Table 3 shows that the difference between High IU and Low IU shrinking after SOX. After SOX, high IU, more accrual management, lower PEAD. Decrease more for high IU. The nature of IU changed, IU reflect better accruals, which caused persistent. After SOX, IU increase, earnings persistence increases. IU helps better predict future.

IU is proxy for business uncertainty, high risk. High IU increase underlining volatility of firm.

Insert Table 3 Here

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6. Volatility Test

Three measures of volatility have been used; the first is standard deviation of quarterly earnings; the second is implied volatility; the third is stock return volatility; Sensitivity, different uncertainty regimes. SOX greater for high volatility. Implied volatility surprise market reaction to sue both before and after. Implied volatility leads to higher perceived risk. We expect the coefficient both before and after to be negative in short window. We expect sue_after to be negative. We get 0.99=1.55=-0.56, which means incremental effect, if we measure uncertainty by implied volatility. Higher implied volatility, higher price reaction to SUE. IU leads to market volatility and earnings volatility, consistent results in short/ long window.

Table 4 volatility test, in the long window, there is a negative loading on SUE without any interaction. Is SUE reaction after in the long window, IU will be greater. If earnings volatility are high or low, earnings volatility in the long window. In the short window, market reaction to SUE is positive, Nobody believes in IU, interact with earnings volatility. Noise measure of IU, that's why 7.44 is different from -0.92. Table 4 Volatility Test, You assuming firm specific cash flows, the relationship between is the same the fact, high residual cross sectional relationship.

Insert Table 4 Here

6.1 Eanrings Persistance

Correlation of the errors.

$SUEt = \alpha_0 + \alpha_1 SUE$

As error term becomes more correlated, it's easier to predict earnings

Correlation of the earnings.

$$E_t = \alpha_0 + \alpha_1 E_{t+1}$$

6.2 Other factors included in the model

For table 5, Big-5 you observe opposite, people are misled with Big5, people over react with Big-5, so it's opposite effect as PEAD. Big-5 overreact both cases. Interaction term before and after SOX. Consistently, we see an overreaction after SOX. TA is not significant in the long run, which means there is no overreaction in the long run due to SOX.

SOX effect be greater if BIG-5 is responsible . provision of SOX is followed. Before SOX, we need presence of auditor to improve information environment, that's why we got 0.28 ***for SUE_Before, SUE_After, you don't need auditor as before, If you are going to hire the auditor, it doesn't give extra effect.

7. **Robust Tests**
   It doesn't really matter other effects. Information environment change.
8. **Conclusions**

We find that after SOX, the information environment becomes more precise. So the investors respond more quickly to the earnings announcement in the short window (-1, 0), which means investors have more confidence about the market. On the other hand, in the long window (+2, +60), we get the lower returns. Because SOX increases the transparency of information, less profit could be extracted from the market.

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Appendix A:

Variable definitions:

TCA	ΔCA j,t-CL j,t-Cash j,t+STDEBT j,t =firm j's total current accruals in year t
TA	ΔCA j,t-CL j,t-Cash j,t: +STDEBT j,t-DEPN j,t= firm j's total accruals in year t
CFO	Firm j's cash flow from operations in year t
ΔCA	Firm j's change in current assets (Compustat #4) between year t-1 and year t
ΔCL	Firm j's change in current liabilities (Compustat #5) between year t-1 and year t
ΔCash	Firm j's change in cash (Compustat #1) between year t-1 and year t
DEPN	Firm j's depreciation and amortization expense (Compustat #14) in year t
ΔRev	Firm j's change in revenues (Compustat #12) between year t-1 and year t
PPE	Firm j's gross value of property, plant and equipment (Compustat #7) in year t
CAR (0,+ 1)	Absolute value of cumulative 2-day market-adjusted return around firm j's quarter q earnings announcement
CAR (+2,+60)	Absolute value of cumulative 59 days market-adjusted return around firm j's quarter q earnings announcement
UE	Unexpected earnings news revealed in firm j's quarter q earnings announcement, scaled by firm j's share price 20 days before the earnings announcement date. Expected earnings = the consensus analyst forecast for quarter q
IU	Decile rank of IU; observations with the highest (lowest) values of IU are included in decile 10 (decile 1)
SOX	Dummy variable; equals to 1 after 2002, 0 before 2002
AQ factor-mimicking portfolio	Equal to the difference between the monthly excess returns of the top two AQ quintiles (Q4 and Q5) and the bottom AQ quintiles (Q1 and Q2). This procedure (similar to that used by Fama and French (1993) to construct size and book-to-market factor-mimicking portfolios) yields a series of 228 monthly AQfactor returns.

Appendix B:

We follow Ronen and Sadan (1981)'s measure of earnings smoothness. The sequence of steps implemented is as follows:

1. We regress sales on time as shown in equation (1)
   $L_t=a_0+a_1t+u_t$ (1)
   (1a) Using the Durbin-Watson statistic (SW), we evaluated the serial correlation present. If the DW was too low at 2.5% level of significance, we used the Cochrane-Orcutt procedure' to estimate the serial correlation coefficients.
   (1b) Since the R^2 obtained under the Cochrane-Orcutt procedure is upward biased, we arbitrarily selected a relatively high cut-off point of .5. Thus, if the final R^2 is greater than .5, we utilized the residuals of the regression, denoted as EL, for the next step; otherwise, we made use of L itself. In the regression equation below, both alternative variables are denoted by EL.
2. We regressed the operating income series (OP) on EL and t and followed the same procedure as in (1a) and (1b) above.
3. We similarly regressed the extraordinary items series (X2) on EL and t and subjected it to the steps described in (1a) and (1b) above.
4. As a result of the above three steps we obtained a series of minimally correlated independent variables EL, EOP, t, and EX_2. We utilized these uncorrelated variables in the following equations to which the Cochrane-Orcutt procedure was also applied:
   4a. $X_1=b_0+b_1t+b_2EL+b_3EX_2+B_4EOP+e_1$,
   4b. $X_2=c_0+c_1t+c_2EL+c_3EX_2+e_2$,
   4c. $XX= d_0+d_1t+d_2EL+d_3EX_2+e_3$,
   Where, X_1 is the discretionary expense, X_0 is the operating expense, and XX is the sum of X_0 and X_1.
   As explained above, we could not include the intertemporal test in the regressions 4b and 4c because of the identity of X_0=L-OP; therefore, in these equations, EOP had to be dropped.
5. The above regressions were done twice, once with a model linear in t and the second with a model exponential in t. The exponential equation is reflected in:
   $L_t=a_0e^{a1t}+u_t$

Figure 1

Hedge Portfolio Returns to PEAD strategy before and after SOX

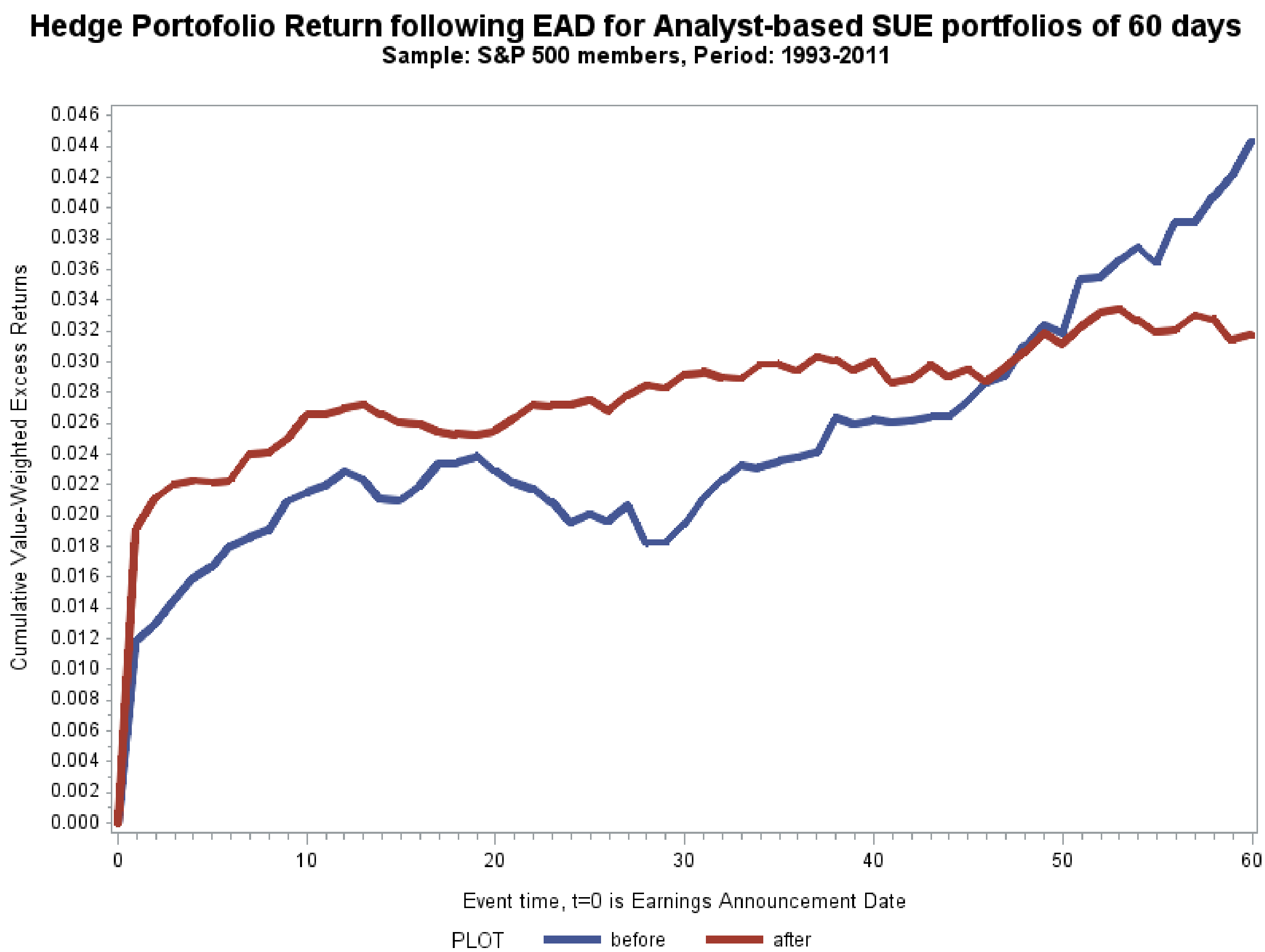
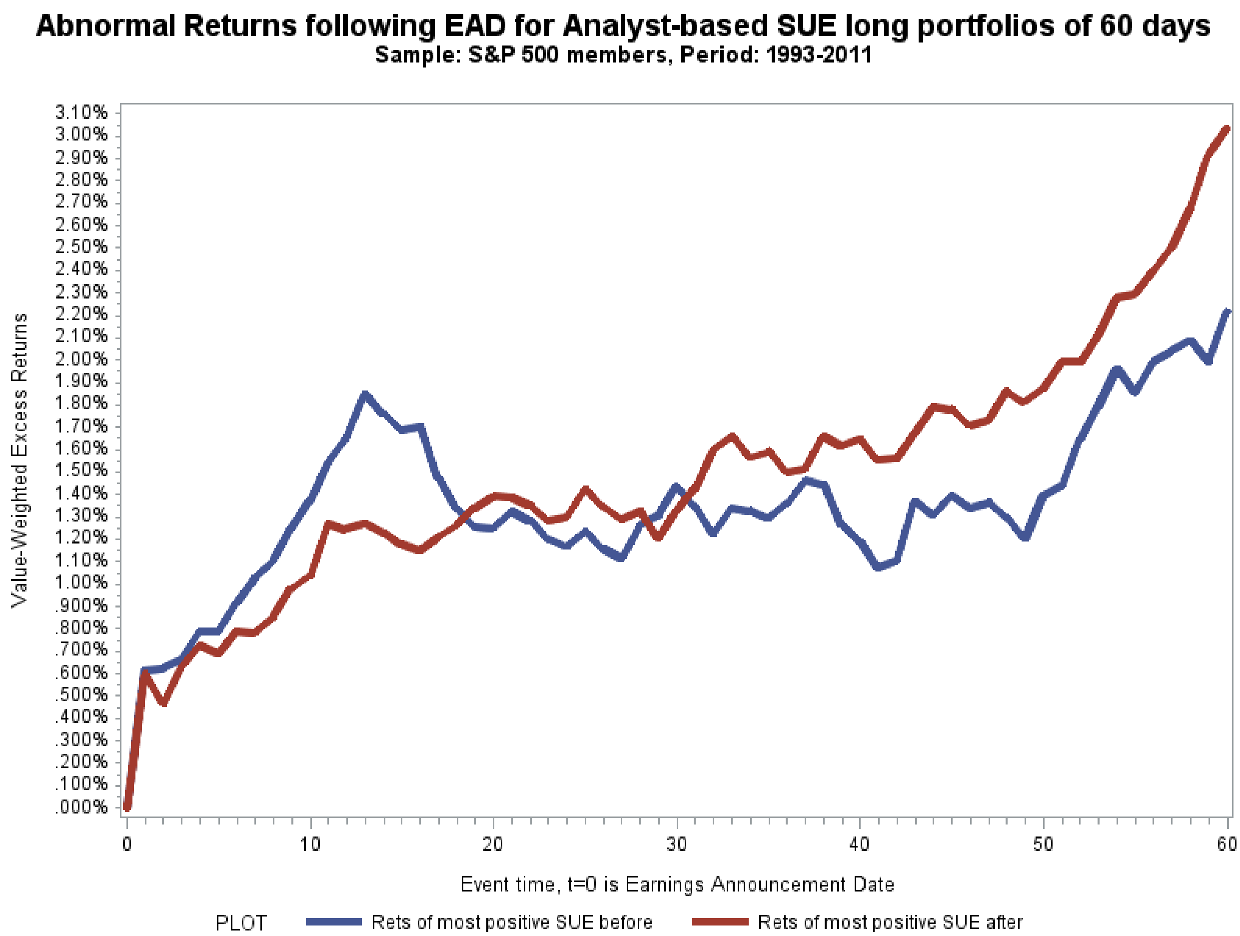


Figure 2

Cumulative Abnormal Returns to PEAD strategy before and after SOX

Panel A: Positive SUE



Panel B: Negative SUE

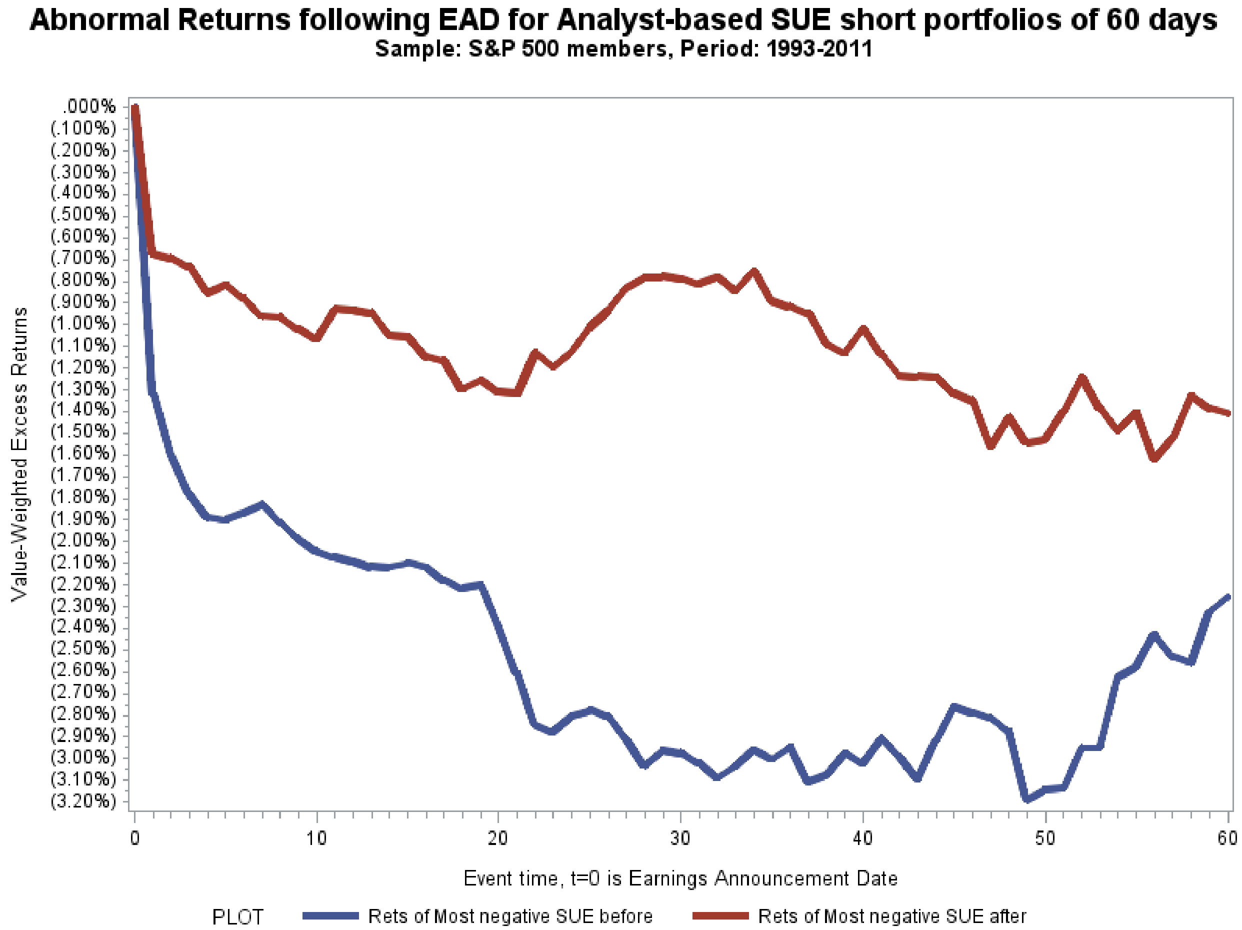
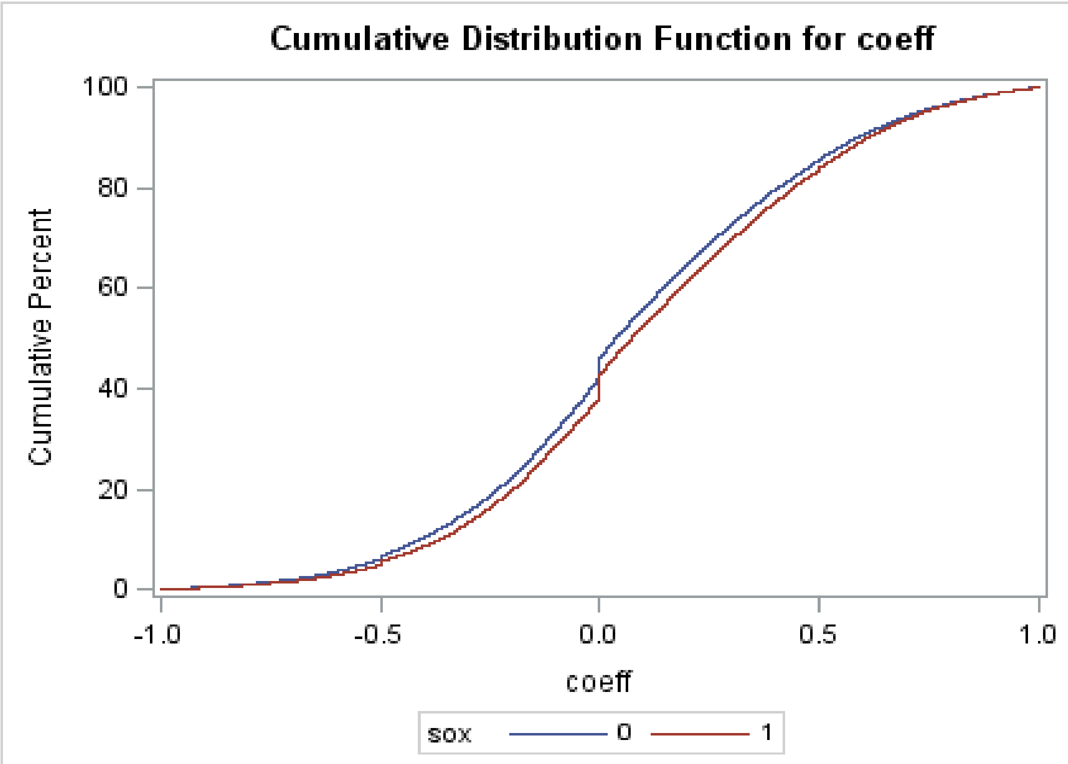
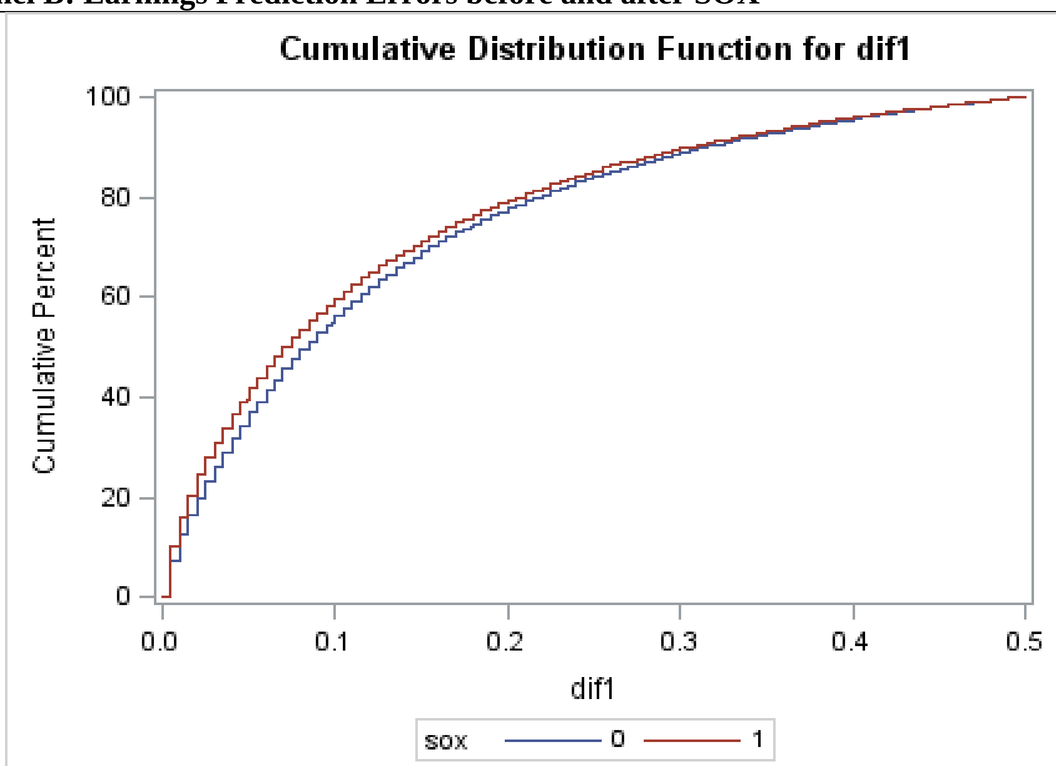


Figure 3: Comparison before and after SOX

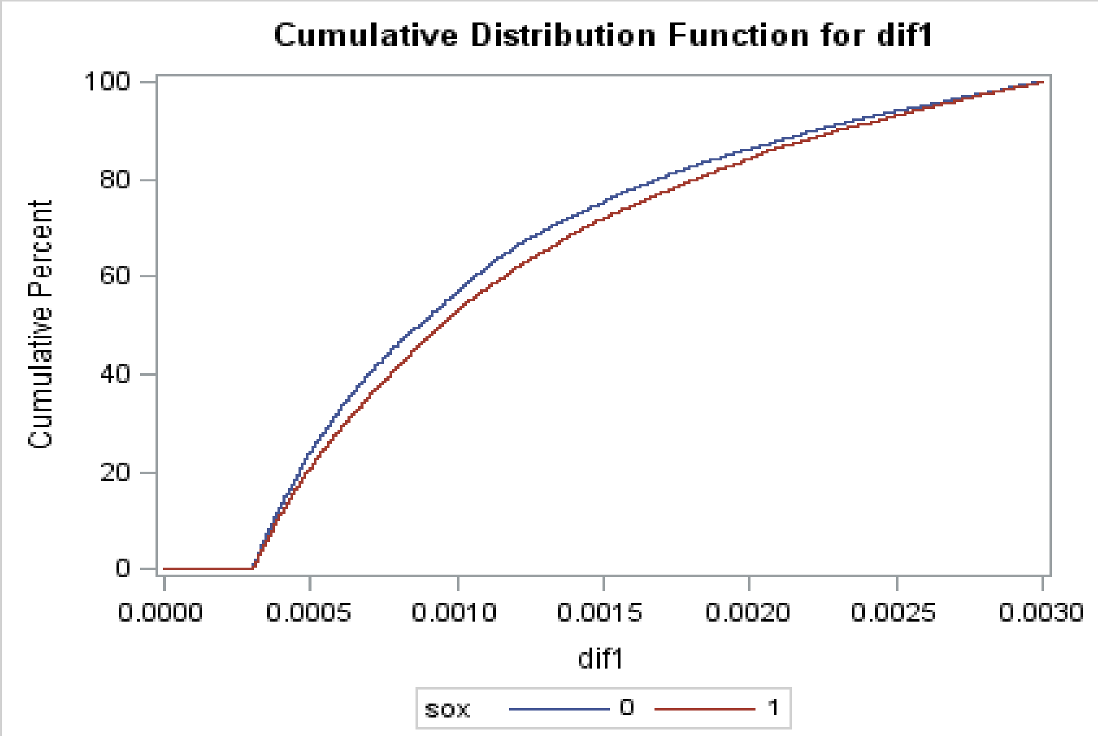
Panel A: Earnings Persistence before and after SOX



Panel B: Earnings Prediction Errors before and after SOX



Panel C: SUE Persistence before and after SOX



Panel D: Idiosyncratic volatility

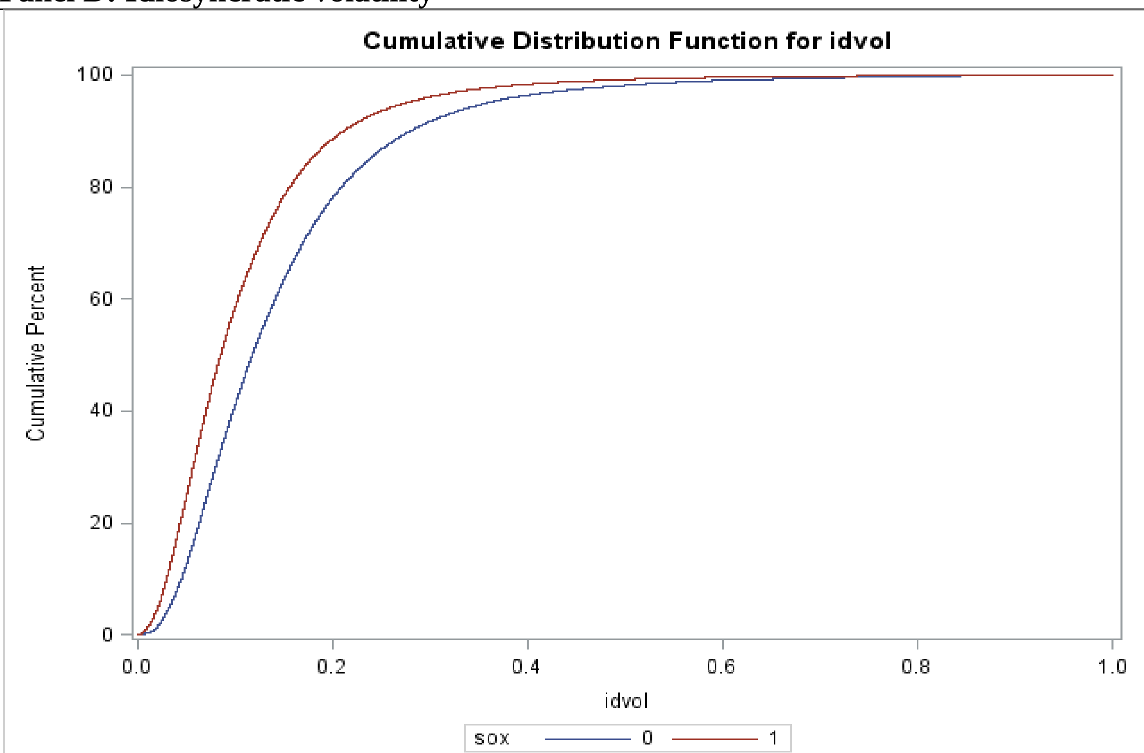


Table 1

Descriptive Statistics about the Information Uncertainty Metric

Panel A: Number of Firms with Data on the Information Uncertainty Metric, by Year			
Year	No. of Firms	Year	No. of Firms
1993	9748	2003	9865
1994	10221	2004	9851
1995	10585	2005	9609
1996	11078	2006	9498
1997	10833	2007	9513
1998	10399	2008	9559
1999	10361	2009	9356
2000	10257	2010	9224
2001	10049	2011	6269

Panel B: Distribution of the Information Uncertainty (IU) Metric							
Before SOX	Mean	Std. Dev.	10%	25%	Median	75%	90%
IU	0.3429	0.4279	0.000	0.0141	0.0985	0.8467	1.0132
After SOX	Mean	Std. Dev.	10%	25%	Median	75%	90%
IU	0.5449	0.4775	0.000	0.0000	0.4749	0.9662	1.1847
IU=σ(v) is the standard deviation of the residuals from rolling five-year regressions of current accruals on lagged, current and future cash flows from operations. The IU sample consists of all firms with the necessary data to calculate IU in years t=1992-2011.							

Panel C: Distribution of Volatility

Volatility	Mean	STD	10%	25%	Median	75%	90%
Before SOX	0.106	0.056	0.051	0.066	0.094	0.129	0.175
After SOX	0.095	0.0526	0.0456	0.061	0.082	0.114	0.157

Panel D: Idiosyncratic Volatility

Volatility	Mean	STD	10%	25%	Median	75%	90%
Before SOX	0.151	0.137	0.051	0.066	0.094	0.129	0.175
After SOX	0.111	0.106	0.0456	0.061	0.082	0.114	0.157
Dif	0.04	Sig.	***				

Panel E: Distribution of Earnings Persistence

Volatility	Mean	STD	10%	25%	Median	75%	90%
Before SOX	0.199	0.488	-0.264	-0.073	0.161	0.440	0.723
After SOX	0.284	0.487	-0.232	-0.040	0.244	0.569	0.883

Panel F: Smoothing

	Correlation of idiosyncratic volatility and residual
Before SOX	-0.022***
After SOX	-0.040***

Panel A shows the summary statistics of the comparison of IU (standard deviation of residual from Dechow and Dichev 2002 and Francis et al. 2005's model) before and after SOX. Panel B shows the distribution of IU. Panel C shows the comparison of distribution of volatility (standard deviation of quarterly earnings over the year ending at the end of year t) before and after SOX. Panel D shows the idiosyncratic volatility (average by each firm) before and after SOX. Panel E presents the distribution of earnings' persistence. Earnings' persistence is measured using the following equation: $E_t=\alpha+\beta E_{t-4},$ β represents earnings persistence. Panel F describes smoothing measure before and after SOX. Our measure of smoothing include four steps: 1) residual from DD's model 2) draw a trend line of earnings less the residuals 3) calculate deviation of the residual from the trend line 4) deviation correlated with residual.

Table 2

Market Responses to Unexpected Earnings

Conditional on the SOX of the Unexpected Earnings Signal

Panel A: Short Term Window				
(0,+1) days	(1)	(2)	(3)	(4)
Intercept	-0.007 (-0.01)	-0.000 (-0.00)	-0.000 (-0.00)	-0.000 (-0.00)
(1)SUE	0.140*** (47.27)	0.136*** (45.65)	0.136*** (44.81)	0.132*** (42.70)
(2)SUE*SOX[5]		0.210*** (8.63)	0.178* (1.80)	4.072*** (6.04)
(3)SUE*IU			0.003 (0.34)	0.014 (1.40)
(4)SUE*IU*SOX				-0.402*** (-5.84)
N	26204	26204	26204	26204
R Square	0.12	0.12	0.12	0.12

Panel B: Long Term Window				
(+2,+60)days	(1)	(2)	(3)	(4)
Intercept	0.331* (1.76)	0.330* (1.75)	0.330* (1.75)	0.330* (1.75)
(1)SUE	0.005 (0.53)	0.003 (0.33)	0.005 (0.53)	0.008 (0.93)
(2)SUE*SOX		-0.456*** (-6.66)	-0.152 (-0.55)	-3.947** (-2.08)
(3)SUE*IU			-0.031 (-1.13)	-0.041 (-1.48)
(4)SUE*IU*SOX				0.392** (2.02)
N	26204	26204	26204	26204
R Square	0.12	0.12	0.12	0.12

[5] This results are based on the SOX adoption years. If the firm's market value of equity is smaller than 75 million, then we define SOX adoption year in 2003; If the firm's market value of equity is higher than 700 million, then we define SOX adoption year in 2006; If the firm's market value of equity is higher than 75 million but lower than 700 million, then we define SOX adoption year in 2004.

Panel C: Separate SUE Before and After		
Window	(0,+1)	(+2,60)
Intercept	0.021 (0.32)	0.345* (1.86)
(1)SUE_Before	4.041*** (5.41)	4.465** (2.19)
(2) SUE_Before*IU	-0.331*** (-4.11)	-0.499** (-2.27)
(3) SUE_After	9.302*** (13.59)	-3.646* (-1.95)
(4) SUE_After*IU	-0.900*** (-13.07)	0.321* (1.71)
Firm Fixed Effect	Yes	Yes
Quarter Fixed Effect	Yes	Yes
Industry Fixed Effect	Yes	Yes
N	26135	26140
R Square	0.06	0.12
Dif:(1)-(2)	5.261	8.111
F Test Sig.	3.78 ***	5.12 ***

This table shows whether information uncertainty is associated with PEAD begins by investigating whether signals with higher information uncertainty have more muted immediate market responses but less profit in the long run after SOX. We define CAR (0, +1) as cumulative 2-day market adjusted return around firm j's quarter q earnings announcement. The earnings surprise (SUE) is actual earnings minus expected earnings, scaled by stock price. Expected earnings are set to the consensus analyst forecast for quarter q. IU is decile ranking of IU; observations with the highest(lowest) values of IU are included in decile 10 (decile 1); SOX is defined as 1 after 2002; 0 otherwise.

Table 3

High IU Low IU

Window (0,+1)			
Window	Low IU	Middle IU	High IU
Intercept	0.08 (0.85)	0.04 (1.3)	0.02 (0.34)
(1)SUE_Before	24.53*** (3.24)	9.68 (1.97)	3.62*** (2.78)
(2) SUE_Before*IU	-6.23*** (-2.81)	-1.13 (-1.57)	-0.29** (-2.09)
(3) SUE_After	106.02 (1.34)	19.38 (4.04)	14.53*** (15.74)
(4) SUE_After*IU	-24.44 (-1.22)	-2.70 (-3.84)	-1.42*** (-15.36)
Firm Fixed Effect	Yes	Yes	Yes
Quarter Fixed Effect	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes
N	256	3412	8700
R Square	0.06	0.12	0.07

In this table, we divide the whole IU into low, middle and high IU group and we find our results are shown stronger in high IU group, which is consistent with the theory that SOX effect is strongest in high IU group.

Table 4

Average Monthly Abnormal Returns to High and Low Information Uncertainty Securities

Panel A: Average Monthly Abnormal Returns to Securities before and after SOX

Contemporaneous Matched Cross section Return					**3 Factor** $(R_L - R_S)_m = \alpha_{LS}^{3f} + b_{LS}^{3f} RMRF_m + s_{LS}^{3f} SMB_m + h_{LS}^{3f} HML + \varepsilon$			
	Long	Short	Dif	Sig	Long	Short	Dif	Sig
After	0.120 (0.22)	0.076*** (2.11)	0.044 (4.18)	***	0.021 (1.11)	0.006 (1.23)	0.015 (4.39)	***
Before	0.122 (1.02)	-0.086* (1.55)	0.208 (4.24)	***	0.141 (1.45)	-0.002** (1.78)	0.143 (3.34)	**
Dif	0.002 (1.53)	-0.162** (2.22)	0.164 (2.93)	**	0.12 (1.14)	-0.008* (1.60)	0.128 (2.54)	**
CAPM $(R_L - R_S)_m = \alpha_{LS}^{CAPM} + \beta_{LS} RMRF_m + \varepsilon_{LS}^{CAPM}$					**4 Factor** $(R_L - R_S)_m = \alpha_{LS}^{4f} + b_{LS}^{4f} RMRF_m + s_{LS}^{4f} SMB_m + h_{LS}^{4f} HML + e_{LS}^{4f} AQ + \varepsilon$			
	Long	Short	Dif	Sig	Long	Short	Dif	Sig.
After	0.009 (1.21)	-0.004*** (2.78)	0.013 (4.0)	**	0.019*** (2.12)	0.007*** (3.42)	0.012 (4.33)	**
Before	0.101 (1.06)	-0.001*** (2.35)	0.102 (3.67)	***	0.125*** (2.22)	0.005*** (4.23)	0.120 (3.91)	**
Dif	0.092 (1.18)	0.003*** (2.58)	0.089 (2.07)	**	0.106*** (2.10)	-0.002*** (3.44)	0.108 (2.00)	**
Accrual Quality 4 Factor $(R_L - R_S)_m = \alpha_{LS}^{4f} + b_{LS}^{4f} RMRF_m + s_{LS}^{4f} SMB_m + h_{LS}^{4f} HML + e_{LS}^{4f} AQ + \varepsilon_{LS,m}^{4f}$								
	Long	Short	Dif	Sig				
After	0.015 (1.44)	0.001* (1.60)	0.014 (4.43)	**				
Before	0.122 (1.25)	- 0.007** (2.10)	0.129 (3.52)	**				
Dif	0.107 (1.35)	-0.008* (2.00)	0.115 (2.71)	**				

We report the mean monthly abnormal return to the extreme UE portfolios (short, long, long-short). Long security is in the top quantile. Short security is in the bottom quantile. We report abnormal returns based on CAPM, 3-factor, and 4 factor models of expected returns. Significance at *** at 0.01, ** at 0.05, * at 0.1.

Panel B: Average Monthly Abnormal Returns to High and Low Information Uncertainty Securities before and after SOX

Contemporaneous Matched Cross section Return								
	Long		Short		Dif		Sig	
	High IU	Low IU	High IU	Low IU	High IU	Low IU	High IU	Low IU
After	0.101 (0.32)	0.076 (0.11)	-0.002 (-0.08)	0.005 (0.09)	0.103 (0.35)	0.071 (0.10)		
Before	0.142 (1.02)	0.086 (0.88)	-0.011 (-0.03)	0.003 (0.005)	0.153 (1.83)	0.083 (0.78)	*	
Dif	0.041 (1.53)	0.010 (1.47)	0.09 (1.23)	-0.002 (-0.02)	-0.049 (1.95)	0.012 (1.60)	*	*
CAPM $(R_L - R_S)_m = \alpha_{LS}^{CAPM} + \beta_{LS} RMRF_m + \varepsilon_{LS}^{CAPM}$								
	Long		Short		Dif		Sig	
	High IU	Low IU	High IU	Low IU	High IU	Low IU	High IU	Low IU
After	0.126 (1.73)	0.058*** (1.41)	-0.003 (-0.10)	-0.001 (-0.06)	0.129 (2.02)	0.061 (1.43)	**	
Before	0.106 (1.11)	0.016 (0.44)	-0.053 (-0.98)	-0.021 (-0.96)	0.159 (1.99)	0.037 (0.88)	**	
Dif	-0.020 (-1.40)	-0.142** (-2.83)	-0.050 (-1.75)	-0.010 (-1.02)	0.030 (1.42)	-0.141 (2.80)		**
3 Factor $(R_L - R_S)_m = \alpha_{LS}^{3f} + b_{LS}^{3f} RMRF_m + s_{LS}^{3f} SMB_m + h_{LS}^{3f} HML + \varepsilon_{LS,m}^{3f}$								
	Long		Short		Dif		Sig	
	High IU	Low IU	High IU	Low IU	High IU	Low IU	High IU	Low IU
After	0.158 (2.01)	0.076 (1.56)	-0.102 (-1.99)	0.011 (1.21)	0.260 (3.42)	0.065 (1.23)	**	
Before	0.153 (2.36)	0.054 (1.15)	-0.124 (-1.55)	0.101 (1.43)	0.277 (3.53)	-0.047 (-1.04)	**	
Dif	0.102 (1.82)	0.010** (0.47)	0.09 (0.73)	-0.005 (-0.21)	0.012 (0.48)	0.015 (0.53)		
We report the mean monthly abnormal return to the extreme UE portfolios (short, long, long-short). Long security is in the top quantile. Short security is in the bottom quantile. We report abnormal returns based on CAPM, 3-factor models of expected returns. Significance at *** at 0.01, ** at 0.05, * at 0.1.								

Panel A reports the mean monthly abnormal return to the securities within each of the extreme UE portfolios (short, long, long-short) before and after SOX. We report abnormal returns based on Contemporaneous matched cross section return (calculated as the raw return from the Center for Research in Security Prices (CRSP) minus the daily return on the portfolio of firms with approximately the same size and book-to-market ratio (Based on classification of the population into six (two size and three B/M) portfolios; 3-factor, CAPM, 4-factor, and a 4-factor model that adds an accruals quality (AQ) mimicking factor to the 3-factor model. To the traditional CAPM, we add a variable capturing accruals quality. Specifically, we calculate an AQfactor-mimicking portfolio equal to the difference between the monthly excess returns of the top two AQ quintiles (Q4 and Q5) and the bottom AQ quintiles (Q1 and Q2). This procedure (similar to that used by Fama and French (1993) to construct size and book-to-market factor-mimicking portfolios) yields a series of 228 monthly AQfactor returns. Panel A shows the results of regressions which include AQfactor as an additional independent variable; these tests allow us to assess the degree to which accruals quality overlaps with and adds to the market risk premium in explaining returns. Specifically, we report the mean of the J=9,540 loadings, βj and λj, from firm-specific estimations of Eq. Panel B reports the mean monthly abnormal return to the High IU and low IU securities within each of the extreme UE portfolios (short, long, long-short). Low IU securities are those in the bottom two deciles of the ranked distribution of the IU metric, while High IU securities are in the top two deciles. Variable definitions and sample description are shown in Appendix A.

Table 5

Market Responses to Unexpected Earnings Conditional on the Volatility Signal

Panel A: Standard Deviation of Quarterly Earnings

$$CAR = \gamma_0 + \gamma_1 SUE\_BeforeSOX_{j,q} + \gamma_2 SUE\_BeforeSOX_{j,q} \times IU_{j,q} + \gamma_3 SUE\_AfterSOX_{j,q}$$
$$+ \gamma_4 SUE\_AfterSOX_{j,q} \times IU_{j,q} + \gamma_5 SUE\_Before_{j,q} * StdEPS_{j,q} + \gamma_6 SUE\_After_{j,q} * StdEPS_{j,q} + \zeta_{j,q}$$

CAR	Short Window (0,+1)			Long Window (2,60)		
	Coeff.	t Statis.	Sig.	Coeff.	t Statis.	Sig.
Intercept	0.01	0.1		0.34	1.85	*
sue_before	1.46	8.38	***	1.10	2.03	**
sueiu_before	0.73	1.08		-4.37	-2.42	**
sue_after	0.19	2.53	**	-0.35	-1.71	*
sueiu_after	0.79	5.06	***	-0.30	-0.69	
suestdeps_before	-0.33	-3.81	***	-0.82	-2.14	**
suestdeps_after	0.01	2.48	**	0.00	0.25	
Fixed Effect Included	Yes			Yes		
			25762			25767
			0.06			0.12

$Step1: \text{Re}\,gress$

$$IU = \gamma_0 + \gamma_1 StdEPS_{j,q} + \gamma_2 \text{Re}\,sidual_{j,q}$$

$Step2: Plugin\ \text{Re}\,sidual\ \ from\ step1$

$$CAR = \gamma_0 + \gamma_1 SUE\_Before_{j,q} + \gamma_2 SUE\_Before_{j,q} \times \text{Re}\,sidual_{j,q} + \gamma_3 SUE\_After_{j,q}$$
$$+ \gamma_4 SUE\_After_{j,q} \times \text{Re}\,sidual_{j,q} + \gamma_5 SUE\_Before_{j,q} \times StdEPS\_Before_{j,q} + \gamma_6 SUE\_After_{j,q} \times StdEPS_{j,q}\_After_{j,q} +$$

Intercept	0.01	0.1		0.34	1.85	*
sue_before	1.73	8.25	***	-0.58	-0.92	
sue*residual_before	0.73	1.08		-4.37	-2.42	**
sue_after	0.49	13.9	***	-0.46	-4.89	***
sue*residual_after	0.79	5.06	***	-0.30	-0.69	
suestdeps_before	-0.33	-3.78	***	-0.83	-2.16	**
suestdeps_after	0.01	3.11	***	0.00	0.18	
Fixed Effect Included	Yes			Yes		
			25762			26030
			0.06			0.12

$$CAR = \gamma_0 + \gamma_1 SUE\_Before_{j,q} + \gamma_2 SUE\_After_{j,q} + \gamma_3 SUE\_Before_{j,q} \times StdEPS\_Before_{j,q} + \gamma_4 SUE\_After_{j,q} \times StdEPS_{j,q}\_After_{j,q} + \zeta_{j,}$$

Intercept	0.02	0.32		0.34	1.86	*
sue_before	1.56	11.02	***	0.49	1.04	
sue_after	0.33	12.92	***	-0.46	-6.69	***
suestdeps_b	-0.33	-3.84	***	-0.72	-1.92	*

suestdeps_a	0.02	5.01	***	0.00	0.08	
Fixed Effect Included	Yes			Yes		
			26025			26030
			0.05			0.12

Panel B: Implied Volatility

$$CAR=\gamma_0+\gamma_1 SUE\_Before_{j,q}+\gamma_2 SUE\_Before_{j,q}\times IU_{j,q}+\gamma_3 SUE\_After_{j,q}$$
$$+\gamma_4 SUE\_After_{j,q}\times IU_{j,q}+\gamma_5 SUE\_Before_{j,q}\times \mathrm{Im}\,pVol\_Before_{j,q}+\gamma_6 SUE\_After_{j,q}\times \mathrm{Im}\,pVol\_After_{j,q}+\zeta_{j,q}$$

	Short Window			Long Window		
	Coeff.	t Statis.	P-Value	Coeff.	t Statis.	P-Value
Intercept	-0.02	-1.39		-0.05	-1.3	
sue_before	2.11	4.03	***	-2.86	-1.24	
sueiu_before	0.53	0.53		-6.18	-2.05	**
sue_after	4.43	6.33	***	-2.42	-1.32	
sueiu_after	-0.75	-1.02		-1.52	-0.98	
suevolatility_before	0.02	0.02		9.20	2.54	**
suevolatility_after	-2.96	-4	***	4.83	1.9	*
			8906			8943
			0.10			0.17

$Step1:\mathrm{Re}\,gress$

$IU=\gamma_0+\gamma_1\,\mathrm{Im}\,pVol_{j,q}+\gamma_2\,\mathrm{Re}\,sidual_{j,q}$

$Step2: Plugin\ \mathrm{Re}\,sidual\ \ from\ step1$

$$CAR=\gamma_0+\gamma_1 SUE\_Before_{j,q}+\gamma_2 SUE\_Before_{j,q}\times \mathrm{Re}\,sidual_{j,q}+\gamma_3 SUE\_After_{j,q}$$
$$+\gamma_4 SUE\_After_{j,q}\times \mathrm{Re}\,sidual_{j,q}+\gamma_5 SUE\_Before_{j,q}\times \mathrm{Im}\,pVol\_Before_{j,q}+\gamma_6 SUE\_After_{j,q}\times \mathrm{Im}\,pVol_{j,q}\_After_{j,q}+\zeta$$

Intercept	-0.02	-1.39		-0.05	-1.3	
sue_before	2.39	4.05	***	-6.24	-2.8	***
sue*residual_before	0.53	0.53		-6.18	-2.05	**
sue_after	4.03	8.34	***	-3.25	-2.14	**
sue*residual_after	-0.75	-1.02		-1.52	-0.98	
suevolatility_before	-0.09	-0.1		10.28	2.86	***
suevolatility_after	-2.81	-3.58	***	5.09	1.98	**
			8906			8943
			0.10			0.17

$$CAR=\gamma_0+\gamma_1 SUE\_Before_{j,q}+\gamma_2 SUE\_After_{j,q}+\gamma_3 SUE\_Before_{j,q}\times \mathrm{Im}\,pVol\_Before_{j,q}+\gamma_4 SUE\_After_{j,q}\times \mathrm{Im}\,pVol_{j,q}\_After_{j,q}+\zeta$$

Intercept	-0.02	-1.37		-0.05	-1.27	
sue_before	2.22	4.59	***	-4.78	-2.26	**
sue_after	3.90	8.35	***	-3.42	-2.27	**
suevolatility_b	0.01	0.01		10.12	2.81	***
suevolatility_a	-3.10	-4.28	***	4.72	1.86	*
			8906			8943
			0.10			0.17

Panel C Stock Return Volatility

$CAR=\gamma_0+\gamma_1 SUE\_Before_{j,q}+\gamma_2 SUE\_Before_{j,q}\times IU_{j,q}+\gamma_3 SUE\_After_{j,q}$ $+\gamma_4 SUE\_After_{j,q}\times IU_{j,q}+\gamma_5 SUE\_Before_{j,q}\times Sto\mathrm{Re}tVol\_Before_{j,q}+\gamma_6 SUE\_After_{j,q}\times Sto\mathrm{Re}tVol\_After_{j,q}+\zeta_{j,q}$						
	Short Window			Long Window		
	Coeff.	t Statis.	P-Value	Coeff.	t Statis.	P-Value
Intercept	0.02	0.45		0.03	0.31	
sue_before	2.77	9	***	0.67	0.78	
sueiu_before	1.06	1.61		-5.06	-2.73	***
sue_after	3.19	17.81	***	0.57	1.17	
sueiu_after	-0.86	-4.28	***	-0.26	-0.47	
suevolatility_before	-8.05	-6.3	***	-1.16	-0.27	
suevolatility_after	-5.69	-14.04	***	-3.44	-3.08	***
			24651			24650
			0.06			0.13
$Step1:\mathrm{Re}gress$ $IU=\gamma_0+\gamma_1 Sto\mathrm{Re}tVol_{j,q}+\gamma_2\mathrm{Re}sidual_{j,q}$ $Step2:Plugin\ \mathrm{Re}sidual\ \ from\ step1$ $CAR=\gamma_0+\gamma_1 SUE\_Before_{j,q}+\gamma_2 SUE\_Before_{j,q}\times\mathrm{Re}sidual_{j,q}+\gamma_3 SUE\_After_{j,q}$ $+\gamma_4 SUE\_After_{j,q}\times\mathrm{Re}sidual_{j,q}+\gamma_5 SUE\_Before_{j,q}\times Sto\mathrm{Re}t\_Before_{j,q}+\gamma_6 SUE\_After_{j,q}\times Sto\mathrm{Re}t_{j,q}\_After_{j,q}+\zeta_{j,q}$						
Intercept	0.02	0.45		0.03	0.31	
sue_before	3.22	9.1	***	-1.46	-1.44	
sue*residual_before	1.06	1.61		-5.06	-2.73	***
sue_after	2.82	19.58	***	0.46	1.15	
sue*residual_after	-0.86	-4.28	***	-0.26	-0.47	
suevolatility_before	-8.54	-6.46	***	0.85	0.19	
suevolatility_after	-5.29	-12.63	***	-3.33	-2.89	***
			24651			24650
			0.06			0.13
$CAR=\gamma_0+\gamma_1 SUE\_Before_{j,q}+\gamma_2 SUE\_After_{j,q}+\gamma_3 SUE\_Before_{j,q}\times Sto\mathrm{Re}t\_Before_{j,q}+\gamma_4 SUE\_After_{j,q}\times Sto\mathrm{Re}tVol_{j,q}\_After_{j,q}+\zeta_{j,q}$						
Intercept	0.03	0.93		0.03	0.3	
sue_before	2.92	9.84	***	0.10	0.13	
sue_after	2.52	17.99	***	0.70	1.83	*
suevolatility_b	-8.03	-6.27	***	-2.44	-0.58	
suevolatility_a	-6.31	-15.71	***	-3.67	-3.33	***
			24905			24902
			0.06			0.13

Panel D: Correlation Table

Short Time

	iu	stdepspiq	impl_volatility	Tot_Vol
iu	1	0.03621	-0.0902	-0.06682
stdepspiq		1	0.0518	0.08449
impl_volatility			1	0.65751
Tot_Vol				1

Long Time

	iu	stdepspiq	impl_volatility	Tot_Vol
iu	1	0.03971	-0.07355	-0.05657
stdepspiq		1	0.04514	0.09998
impl_volatility			1	0.67685
Tot_Vol				1

This table shows whether volatility is associated with PEAD begins by investigating whether signals with high volatility have more muted immediate market responses, and does it substitute IU's influence on PEAD. We use three measures of volatility: standard deviation of quarterly earnings, implied volatility and stock return volatility. The dependent variable is CAR in the short window (0,+1) and long window (+2,60). Panel A shows standard deviation of quarterly earnings in the fiscal year t as a measure of volatility; Panel B shows implied volatility, where the theoretical option price is set equal to the midpoint of the best closing bid price offer price for the option. The Black-Scholes formula is then inverted using a numerical search technique to calculate the implied volatility for the option. Panel C shows stock return volatility which represents total stock return volatility in the last 24 months. Panel D shows the correlation table among IU and three volatility measures (Standard deviation of quarterly earnings, implied volatility, and stock return volatility) both in the short term and long term. Residual equals to the residual from IU regress on volatility measures.

Table 6

Comparison of Earnings Persistence, Earnings Prediction Errors, SUE Persistence before and after SOX and corresponding coefficients

Panel A: Earnings Persistence Before and After SOX

$E_t = \alpha + \beta E_{t-4}$					
	Q1	Q2	Q3	Q4	Total
(1)Before SOX	0.09	0.07	0.05	0.0001	0.05
(2)After SOX	0.12	0.11	0.08	0.03	0.08
Dif (1)-(2)	-0.03	-0.04	-0.03	-0.0299	0.03
T Statistic	-1.25	-3.43	2.41	-2.76	-4.36
P Value	0.21	0.0006	0.02	0.006	<0.001
Sig.		***	**	***	***

$$CAR = \gamma_0 + \gamma_1 SUE\_Before_{j,q} + \gamma_2 SUE\_Before_{j,q} \times IU_{j,q} + \gamma_3 SUE\_After_{j,q} + \gamma_4 SUE\_After_{j,q} \times IU$$
$$+\gamma_5 SUE\_Before_{j,q} \times Beta\_Before_{j,q} + \gamma_6 SUE\_After_{j,q} \times Beta\_After_{j,q} + \zeta_{j,q}$$

		Short Window			Long Window		
		Coeff.	t Statis.	P-Value	Coeff.	t Statis.	P-Value
	Intercept	-0.01	-0.28		0.26	2.16	**
r_1	sue_before	4.64	5.89	***	6.49	3.02	***
r_2	sueiu_before	-0.36	-4.3	***	-0.63	-2.73	***
r_3	sue_after	12.65	15.68	***	-2.64	-1.19	
r_4	sueiu_after	-1.23	-15.08	***	0.24	1.09	
r_5	sue_b*beta_b	-0.38	-1.55		-3.03	-4.84	***
r_6	sue_a*beta_a	-0.29	-3.04	***	-0.73	-2.73	***
	F test: B_3+B_6	11.32	15.26	***	-3.01	-1.42	
				24914			24683
				0.06			0.11

$Step1: \mathrm{Re}\,gress$

$$IU = \gamma_0 + \gamma_1 Beta_{j,q} + \gamma_2 \,\mathrm{Re}\,sidual_{j,q}$$

$Step2: Plugin\ \mathrm{Re}\,sidual\ \ from\ step1$

$$CAR = \gamma_0 + \gamma_1 SUE\_Before_{j,q} + \gamma_2 SUE\_Before_{j,q} \times \mathrm{Re}\,sidual_{j,q} + \gamma_3 SUE\_After_{j,q}$$
$$+\gamma_4 SUE\_After_{j,q} \times \mathrm{Re}\,sidual_{j,q} + \gamma_5 SUE\_Before_{j,q} * Beta\_Before_{j,q} + \gamma_6 SUE\_After_{j,q} * Beta_{j,q}\_$$

	Intercept	-0.01	-0.28		0.26	2.16	**
r_1	sue_before	1.54	11.07	***	1.10	2.93	***
r_2	sue_b*residual_before	-0.36	-4.3	***	-0.63	-2.73	***
r_3	sue_after	1.27	19.85	***	-0.37	-2.1	**
r_4	sue_a*residual_after	-1.23	-15.08	***	0.24	1.09	
r_5	sue_b*beta_b	-0.31	-1.29		-2.93	-4.66	***
r_6	sue_a*beta_a	0.05	0.47		-0.80	-2.83	***
				24914			24683
				0.06			0.11

Panel B: Earnings Prediction Errors before and after SOX (E Stands for Earnings)

	$\varepsilon_1 = \left\lvert \frac{E_2 + E_3 + E_4}{3} - E_1 \right\rvert$	$\varepsilon_2 = \left\lvert \frac{E_2 + E_3 + E_4 + E_5}{4} - E_1 \right\rvert$	$\varepsilon_3 = \left\lvert \frac{E_2 + E_3 + E_4 + E_5 + E_6}{5} - E_1 \right\rvert$	$\varepsilon_4 = \left\lvert \frac{E_2 + E_3 + E_4 + E_5 + E_6 + E_7}{6} - E_1 \right\rvert$
(1)Before SOX	0.1798	0.1777	0.1856	0.1935
(2)After SOX	0.178	0.1726	0.1791	0.1838
Dif (1)-(2)	0.00187	0.00511	0.00645	0.0097
T Statistic	2.4	6.73	8.32	12.19
P Value	0.0163	<.0001	<.0001	<.0001
Sig.	**	***	***	***
Dif (Scaled by Price[6]) and Sig.	0.00025*** (2.99)	0.00035*** (3.03)	0.00036*** (2.89)	0.00054*** (4.64)

[6] Price is the same date as E_1's report date.

Panel C: SUE Persistence Before and After SOX

$SUE_t=\alpha+\beta SUE_{t-4}$					
	Q1	Q2	Q3	Q4	Total
(1)Before SOX	0.26	0.29	-0.25	0.14	0.11
(2)After SOX	0.36	0.57	-0.06	0.19	0.265
Dif (1)-(2)	-0.10	-0.28	-0.19	-0.05	-0.155
T Statistic	-1.25	-2.35	5.21	-3.10	-0.3725
P Value	0.20	0.02	0.0002	0.005	0.045
Sig.		***	***	***	**

Panel D: Overall distribution

DISTRIBUTION									
Earnings Persistence				**Earnings Prediction Errors**			**SUE Persistence**		
	Total	**Before SOX**	**After SOX**	**Total**	**Before SOX**	**After SOX**	**Total**	**Before SOX**	**After SOX**
Mean	0.12	0.11	0.14	0.27	0.27	0.27	0.21	0.24	0.18
Median	0.07	0.05	0.08	0.11	0.11	0.1	0.19	0.24	0.16
SD	0.69	0.72	0.64	0.43	0.42	0.45	1.91	1.92	1.90
Q1	-0.17	-0.18	-0.15	0.03	0.04	0.03	-0.11	-0.07	-0.15
Q3	0.40	0.39	0.42	0.29	0.30	0.29	0.57	0.60	0.55
N	680144	365382	314762	691830	400457	291373	26061	11336	14725

This table shows comparison of earnings signals before and after SOX. Panel A shows summary statistics of earnings persistence and regression analysis of whether earnings persistence is associated with PEAD begins by investigating whether signals with higher earnings persistence have more muted immediate market responses. we measure earnings persistence using the coefficient of quarterly earnings regress on last quarterly earnings. Panel B show summary statistics of earnings prediction errors before and after SOX. Panel C shows comparison statistics of SUE persistence before and after SOX. Panel D shows overall distributions of Earnings Persistence, earnings prediction errors and SUE persistence.

Table 7
Comparison of Earnings Smoothing, Smoothness Before and After SOX

Panel A: Smoothing

Before SOX	0.53
After SOX	1.56

$$Accruals_t = a(1/Assets_{t-1}) + b\Delta Sales_t + cPPE_t + dROA_t + \mu_t$$

In regression (3), the total accruals (Accruals)(Accruals=NI(Data 18)-CFO(Data 308)); change in sales (ΔSales(Data 12)); and gross property, plant, and equipment(PPE)(Data 7) are each deflated by the beginning-of-year total assets(Assets) (Data 6). NDAP are the fitted values of Regression (3) and the discretionary accruals (DAP) are the deviations of actual accruals from NDAP. The pre-discretionary income (PDI) is calculated as net income minus discretionary accruals (PDI=NI-DAP). The income-smoothing measure is the correlation between the change in discretionary accruals and the change in pre-discretionary income: Corr(ΔDAP, ΔPDI), using the current year's and past four years' observations.

Panel B: Smoothing (See Appendix B)

Before SOX	0.37
After SOX	1.10
Methodology is presented in Appendix C	

Panel C: Smoothness (See Appendix B)

Before SOX	0.21
After SOX	0.45
Methodology is presented in Appendix C	

This table shows comparison of earnings smoothing, smoothness before and after SOX. Panel A shows statistics of earnings smoothing following Tucker and Zarowin (2006)'s measure. Panel B describes the comparison of other measures of smoothing, which is documented in Ronen & Sadan (1981). We also show comparison of how smooth a series is, following Ronen & Sadan (1981). The detail method is presented in Appendix B.

Table 8

Different Measures of IU

Panel A: Summary Statistics

Measures	IU_TCA	IU_TA	IU_ROA
1993	0.29	0.19	0.18
1994	0.30	0.19	0.18
1995	0.28	0.15	0.15
1996	0.30	0.18	0.16
1997	0.31	0.20	0.17
1998	0.30	0.19	0.17
1999	0.29	0.20	0.17
2000	0.28	0.20	0.19
2001	0.36	0.32	0.24
2002	0.74	0.52	0.48
2003	0.76	0.60	0.57
2004	0.79	0.65	0.60
2005	0.80	0.62	0.57
2006	0.50	0.59	0.54
2007	0.46	0.52	0.43
2008	0.38	0.40	0.34
2009	0.39	0.48	0.42
2010	0.39	0.48	0.54
2011	0.33	0.44	0.51
Before SOX	0.03	-0.001	0.07
After SOX	0.3	0.08	0.43
Sig.	***	***	***

Panel B: Hedge Portfolio Returns

TCA Model			
DIFFERENCE	LOW IU	MIDDLE	HIGH IU
AFTER SOX	0.0314	0.0281	0.0145
BEFORE SOX	0.0423	1.0276	1.4758
DIFFERENCE	0.0109	0.9995	1.4613
SIG.		*	***
TA Model			
DIFFERENCE	LOW IU	MIDDLE	HIGH IU
AFTER SOX	-0.01	0.10	0.45
BEFORE SOX	0.02	0.14	0.58
DIFFERENCE	0.03	0.04	0.13
SIG.		*	*

This table shows robust tests on different measures of IU use different models. Panel A shows the summary statistics of IU measures using TA, TCA and add ROA in the TA model. We use total accruals (TA) instead of total current accruals (TCA), the difference is TA equals to TCA minus depreciation and amortization expense. Panel B presents hedge portfolio returns using different IU models.