Auditor Accountability and Market Reactions: The effect of Malpractice Penalties on Client Stock Returns

By

Sadig Huseynzade

Submitted to

Central European University

In partial fulfilment of the requirements for the degree of

Master of Arts in Economics

Supervisor: Tomy Lee

Academic Year 2023 - 2024

Acknowledgement

I would like to express my deepest gratitude to my supervisor, Professor Tomy Lee, for his unwavering support, invaluable guidance, and insightful feedback throughout the course of this research. His expertise and encouragement have been instrumental in the successful completion of this thesis.

I am profoundly grateful to my father, mother, and brother for their constant support, patience, and love. Their belief in me has been a source of strength and motivation throughout my academic journey.

A special thank you goes to my friends Gulagha, Celil, and Agil for their enduring friendship and unwavering support. Your companionship has been a cornerstone of my life during these years.

I am also immensely thankful to my friends Jacopo and Giorgi for making my experience at Central European University truly unforgettable. Your presence has enriched my time here in countless ways. On a lighter note, I must acknowledge the unique way you both have supported me during the thesis phase—by consistently losing to me in our football games, thus boosting my morale and providing much-needed stress relief. Thank you for those memorable moments!

Abstract

This thesis investigates the impact of audit malpractice penalties on the stock returns of clients audited by the Big Four firms—Deloitte, PricewaterhouseCoopers, Ernst Young, and KPMG—from 2002 to 2023. Utilizing an event study methodology, the research categorizes fines into high and low groups and considers the role of information uncertainty in shaping market reactions. The findings reveal that higher fines are associated with more negative cumulative abnormal returns, indicating significant market concerns over severe audit malpractices. This study's insights are valuable for policymakers, investors, and audit firms, highlighting the importance of robust audit quality and regulatory oversight in maintaining market confidence.

Contents

1 Introduction **1**

2 Literature Review **2**

3 Data **4**

4 Methodology **5**

4.1 Event Study 5

4.2 Regression Analysis 8

5 Results **9**

5.1 Overall Results of High and Low Fine Amount Groups 9

5.2 Results Based on Grouping by High and Low Information Uncertainty . . . 13

5.3 Regression Results 18

6 Conclusion **20**

7 Appendix **22**

7.1 Introduction to the Comparison 22

7.2 OLS Regression Results 22

7.3 MM estimator results 23

7.4 Comparison and Discussion 24

7.5 Conclusions 24

1 Introduction

The integrity of financial reporting is essential for the efficient functioning of capital markets. Auditors play a critical role in this ecosystem by providing independent assurance on the accuracy and reliability of financial statements. There are, however, few instances of auditing malpractices that have raised serious concerns over audit quality and the credibility of financial information. When discovered and punished, these malpractices can signal to investors profound deficiencies in audit quality and, therefore, affect decisions on investment.

This thesis examines the stock returns of auditors' clients that have been fined for auditing malpractice. While the direct impact of such fines on audit firms has been well-documented, the indirect effects of the reforms on the audited companies have remained less well understood.

This study evaluates most of the malpractices experienced by the Big Four Audit firms—Deloitte, PricewaterhouseCoopers, Ernst & Young, and KPMG—from 2002 to 2023. This is in contrast to the existing literature that analyzed certain episodes of audit breakages—for instance, the Enron-Arthur Andersen story, and is meant to provide a comprehensive view of the market implications of audit-related penalties. This is especially important because now one would be able to see a full view of the broader market implications of the audit quality problem. Since the enactment of the Sarbanes-Oxley Act (SOX) of 2002 and related regulations , the quality of audit has been a centerpiece issue in financial reporting. However, failures and malpractices still be registered in this domain, a sign that audit monitoring and evaluation have to be continuous.

This thesis serves to address the gap in the existing literature and is a continuation of the ongoing discourse of audit quality and investor protection. Most of the investigations have stressed single, high profile cases, like Enron's scandal and Lehman's fall Brothers, who had pointed out serious weaknesses in audit quality and had seriously undermined investor confidence. For instance, Chaney and Philipich (2002) demonstrated that for Arthur Andersen clients in the wake of Enron, there was a wide negative impact on their stock prices, with an average CAR of -2.03%.

The main research question for this paper is: How do imposed fines on auditors for the auditing malpractices affect the stock returns for their clients? The study attempts to test whether the immediate effect after the imposition of fines affects stock prices. An event study methodology is employed to focus on abnormal returns around the announcement dates of fines imposed on auditors. Moreover, fines are classified into Low and high groups to gain further insight into the nuanced market response.

The findings of this thesis reveal a distinct market reaction to audit malpractice penalties, with significant differences observed based on the magnitude of the fines. Specifically, higher fines result in more negative cumulative abnormal returns, indicating that investors perceive severe audit malpractices as substantial threats to the financial health and governance of the audited companies. Conversely, lower fines tend to elicit a more neutral or even positive market reaction, suggesting that investors view these penalties as manageable and less indicative of systemic issues. Additionally, the role of information uncertainty was found to amplify market reactions, with higher volatility leading to more pronounced responses to audit fines. These results underscore the critical importance of audit quality and regulatory scrutiny in protecting investor confidence and ensuring the integrity of financial markets.

The thesis is structured as follows: Chapter 2 presents a review of relevant literature on audit quality-related to market reactions toward audit failure and studies about the effect of regulatory changes toward audit practice. Chapter 3 and 4 outline methodology, sources of data, selection of samples, and the methods of event studies applied. Chapter 5 presents the results of this thesis and Chapter 6 concludes.

2 Literature Review

The literature on auditor malpractices is large and varied, with works primarily focused on the consequences of audit failures on the auditor's reputation and the economic implications to both auditors and their clients. On this premise, the current review takes some critical findings of seminal works in this area and contrasts them with the novel aspects of the research review here.

The reputation of auditors is critical to building market trust in financial statements. In this regard, Chaney and Philipich (2002) conducted a study on the consequences of the Enron scandal to Arthur Andersen's clients and found that the stock market reaction was overwhelmingly adverse, at an average CAR of -2.03%

Krishnamurthy et al. (2006) expanded this to include the market impact of Andersen's criminal indictment. Their results show a significant adverse market reaction with an average CAR of -0.80%, translating into an aggregate value loss of $11.4 billion for Andersen's clients.

Skinner and Srinivasan (2010) explored the effects of auditor reputation on stock prices in Japan, demonstrating that high-quality audits by reputable auditors lead to more positive market responses. Firms audited by high-reputation auditors experienced significantly less negative abnormal returns in the event of audit failures, emphasizing the protective effect of a strong auditor reputation.

Firth (1990) assessed the impact of critical reports issued by government inspectors on auditor reputation, finding a small but statistically significant negative effect on the stock prices of the clients of criticized auditors. His study also showed that criticized auditors experienced a reduction in market share and audit fees, indicating economic losses directly tied to reputational damage.

Investors' reaction to news of audit malpractices is primarily adverse because it raises the issue of the quality of the audits being performed. As Francis (2004) writes, the perception of the audit quality is essential in maintaining investor confidence. When auditors are found to have indulged in malpractices, doubts about the financial statement reliability, as audited by them, are raised, which may lead to a reassessment of firm value and increased perceived risk.

My research is an extension of these foundational works that addresses several gaps in the existing literature: 1. Holistic Analysis: While earlier research studies focused on standalone audit scandals, the current research work presents plural events involving the Big Four over a time scale of two decades. 2. Fines Categorization: The total fines are divided into two groups: low and high categorizations will reveal specifics about

the penalties that set apart the market responses in new ways from previous work. 3. Methodological Innovations: The use of the MM estimator in this study, as opposed to the conventional Ordinary Least Squares (OLS) method, provides more robust results by effectively handling outliers and reducing the influence of anomalous data points. This innovation ensures greater accuracy and reliability in the estimation of abnormal returns, leading to more precise insights into the market reactions to auditing malpractices.

The literature on auditor reputation and related market reactions is well developed, where significant contributions have been drawn from the different studies to unfold the economic consequences of audit failures. The current research, in adding to this knowledge, provides a thorough and granular analysis of more than one audit event, innovative methodologies, and detailed auditor-level insights. These contributions are expected to improve our knowledge of the market implications of the broad scope of audit quality problems and inform both regulation and market practices.

3 Data

I collected events data on auditing malpractices from the Good Jobs First Violation Tracker database, focusing on the Big Four audit firms: Deloitte, PricewaterhouseCoopers, Ernst & Young, and KPMG. The primary motivation for this concentration is that the Big Four audit most of public companies in the USA, making the findings of this study broadly generalizable.

The dataset has 25 distinct events for the period between 2003 and 2023, where fines were pronounced by the regulators against the Big Four audit firms for various malpractices noted in the audit. The penalties ranged from $230,000 to $109 million.The regulators in this study includes SEC, PCAOB, and general attorneys.

To gather stock price data for the clients of the auditors, the EOD Historical Data API was utilized. This data source is crucial as it includes data for delisted, bankrupted, or merged firms, thereby reducing the survivorship bias problem. After calculating the stock returns, it was ensured that data availability for stock tickers was at least 80% in the 200-day estimation window, enhancing the robustness of the results.

The clients of fined auditors were tracked using the Capital IQ database. Though the Capital IQ database does not cover all the public companies in the USA that are clients of these Big Four audit firms, it does contain SNL-covered public companies (SP Capital IQ). This means that the estimates emerging from this dataset may be treated as lower-bound estimates since SNL-covered firms tend to be relatively large.

Auditor	**Number of Events**	**Total Fine Amount**	**Average Fine Amount**
Deloitte	5	$54,988,916	$10,997,783
EY	10	$259,176,157	$25,917,615
KPMG	5	$86,660,999	$17,332,199
PwC	5	$22,194,055	$4,438,811

Table 1: Summary of Events by Auditor

Table 1 provides a summary of the events by auditor. It shows the number of events, total fine amount, and average fine amount for each of the Big Four audit firms. Ernst & Young (EY) has the highest total fine amount at $259,176,157, spread across 10 events, resulting in an average fine of $25,917,615 per event. KPMG follows with a total fine amount of $86,660,999 from 5 events, with an average fine of $17,332,199 Deloitte has a total fine amount of $54,988,916 across 5 events, averaging $10,997,783 per event. PricewaterhouseCoopers (PwC) has the lowest total fine amount of $22,194,055 from 5 events, with an average fine of $4,438,811 per event. This summary highlights the variation in the frequency and magnitude of fines among the Big Four audit firms, providing insights into their audit practices and the associated regulatory scrutiny.

4 Methodology

4.1 Event Study

An event study is a statistical technique used to quantify the effect of an event on the value of a firm. This methodology is critical for analyzing the role of audit malpractices in affecting stock returns. Major steps include defining the estimation and event windows, calculating the abnormal returns, and summing them up to analyze the event's impact. For estimation purposes, I am using the period from 200 days to 30 days before the event

date, which serves as the benchmark of normal performance. The event window spans from 10 days before to 10 days after the event, thereby capturing the immediate market reaction to the audit malpractice.

The expected returns are estimated using the Fama-French three-factor model (Fama and French, 1993). This model controls for market risk, size risk, and value risk, providing a comprehensive adjustment to varying risk factors. The model is specified as follows:

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \beta_{iS}SMB_t + \beta_{iH}HML_t + \epsilon_{it}$$

where R_{it} is the return on stock i at time t, R_{ft} is the risk-free rate at time t, R_{Mt} is the market return at time t, SMB_t is the size factor, HML_t is the value factor, α_i, β_{iM}, β_{iS}, β_{iH} are the regression coefficients, and ϵ_{it} is the error term.

Abnormal returns (AR) are calculated as the difference between actual returns and expected returns estimated by the Fama-French model:

$$AR_{it} = R_{it} - (\alpha_i + \beta_{iM}R_{Mt} + \beta_{iS}SMB_t + \beta_{iH}HML_t)$$

These abnormal returns isolate the effect of the audit malpractice event from other market movements.

Given potential outliers and non-normality in financial return data, I employed MM-estimator for regression analysis. MM-estimator, particularly using Huber's T norm, is robust to outliers and can provide more reliable parameter estimates compared to ordinary least squares (OLS) regression (Huber, 1981). The RLM minimizes the impact of outliers by using a weighting function that reduces the influence of data points with large residuals, thereby ensuring more robust and reliable estimates (Sorokina et al., 2013).

Average Abnormal Returns (AAR) and Cumulative Average Abnormal Returns (CAAR) are calculated to evaluate the overall impact of the event:

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it}$$

$$CAAR_{t_1,t_2} = \sum_{t=t_1}^{t_2} AAR_t$$

where N is the number of stocks, AAR_t is the average abnormal return on day t, and $CAAR_{t_1,t_2}$ is the cumulative average abnormal return over the event window from t_1 to t_2.

The t-test and the Wilcoxon signed-rank tests are conducted to test the abnormal returns for statistical significance. The t-test shows whether the mean abnormal return differs from zero, while the Wilcoxon test is a non-parametric test of the median abnormal return. The use of the Wilcoxon test is particularly important as the data I am using is not normally distributed. (Wilcoxon, 1945).

Fines were stratified into distinct categories based on their magnitude, with the median fine amount serving as the dividing threshold. This stratification allowed for a more granual examination of the implications associated with variations in penalty severity.

To calculate the confidence intervals for both high and low fine groups, I use the standard errors of the AAR and divide them by the square root of the number of events:

$$CI = \bar{x} \pm \frac{z \cdot \sigma}{\sqrt{n}}$$

where $\bar{x}$ is the sample mean, z is the z-score, σ is the standard deviation, and n is the number of events.

The MM estimator used in my study, as introduced by Yohai (1987), provides a robust alternative to OLS by combining high breakdown point estimators with efficient scale estimators. This method is particularly effective in dealing with outliers and non-normal data distributions, offering more reliable parameter estimates in the presence of data irregularities.

In summary, the robust methodologies and detailed event study techniques applied in this research are designed to accurately measure the effect of audit malpractices on stock returns, providing insights into market behavior and investor reactions. The segmentation of events into low and high fine groups further enriches the analysis by uncovering

differential market responses based on the magnitude of fines.

4.2 Regression Analysis

To analyze the impact of audit fines on stock returns, I employ the following regression model, with the cumulative abnormal return over the event window CAR$[-4, 3]$ as the dependent variable:

$$\text{CAR}[-4,3]_{it} = \beta_0 + \beta_1 \text{Uncertainty} + \beta_2 \text{Fine Category (High)} + \beta_3 \text{Fine Category (Low)} + \sum_j \gamma_j D_j + \epsilon_{it} \quad (1)$$

where

- CAR$[-4, 3]_{it}$ is the cumulative abnormal return for stock i from 4 days before to 3 days after the event,
- Uncertainty is measured by the volatility of stock returns during the event window,
- Fine Category (High) and Fine Category (Low) are dummy variables representing the magnitude of fines,
- D_j are dummy variables for each auditor (excluding EY as the baseline),
- ϵ_{it} is the error term.

The independent variables include the fine categories to capture the impact of high and low fines, uncertainty measured as the mean log standard deviation of stock returns during the event window, and dummy variables for auditors. Volatility is used as a proxy for uncertainty because it captures the degree of fluctuation in stock returns, which reflects the market's perception of risk associated with the firm.

Using fine categories rather than the natural logarithm of the fine amount helps to clearly distinguish the effects of different levels of fines. This approach avoids the issues of skewed distributions and provides a straightforward interpretation of how high and low fines impact CARs.

The dependent variable is the cumulative abnormal return over the event window CAR$[-4, 3]$. The regression analysis results are interpreted to describe how the severity of the fine and the associated uncertainty affect stock returns. Such findings contribute to understanding the broad implications of audit malpractice and the effectiveness of regulatory actions.

To address the issue of within-group correlation, clustered standard errors are computed at the event level. Adjusting for clustered standard errors acknowledges that observations related to the same event are not independent. This adjustment helps in reducing the likelihood of underestimating the true variability of the regression coefficients, leading to more accurate inferences about the effect of audit fines on stock returns.

Additionally, bootstrap standard errors are used to ensure the robustness of the results. The bootstrap method involves repeatedly resampling the data with replacement and estimating the model on each resampled dataset. This technique is particularly valuable in validating the clustered standard errors by event and ensuring that the results are not driven by any specific data peculiarities.

5 Results

5.1 Overall Results of High and Low Fine Amount Groups

Low Fine Amount Group:

The analysis is going to start with the audit fines that were classified as low because, through this, I will analyze and discuss how low fines affected the stock returns of the audited companies. Figure 1 contains the AAR plot for the group with a low fine amount. The daily abnormal returns are averaged over all these events of the low fine category. There are some visible fluctuations around the event date in the plot; indeed, some are positive spikes, and some are negative spikes. However the spikes do not indicate any consistent direction of market reaction. For instance, there are positive abnormal returns observed on days 2, -1, 1, and 3 relative to the event, while on days 0, -3, and -5, negative abnormal returns are recorded. It points to the mixed response of the market to the

low fine, where it does not highlight a positive or negative direction. The CAAR plot, concerning the low fine amount group, is in Figure 1. CAAR generally rises in the event window, suggesting a cumulative positive stock return after the event. Overall, from day -10 to day 10, CAAR rises from approximately 0 to about 0.03. This positive trend may suggest that the market views low fines on a more aggregate level as less destructive, even possibly taking them as a signal that the malpractices were not severe enough to cause significant concern.

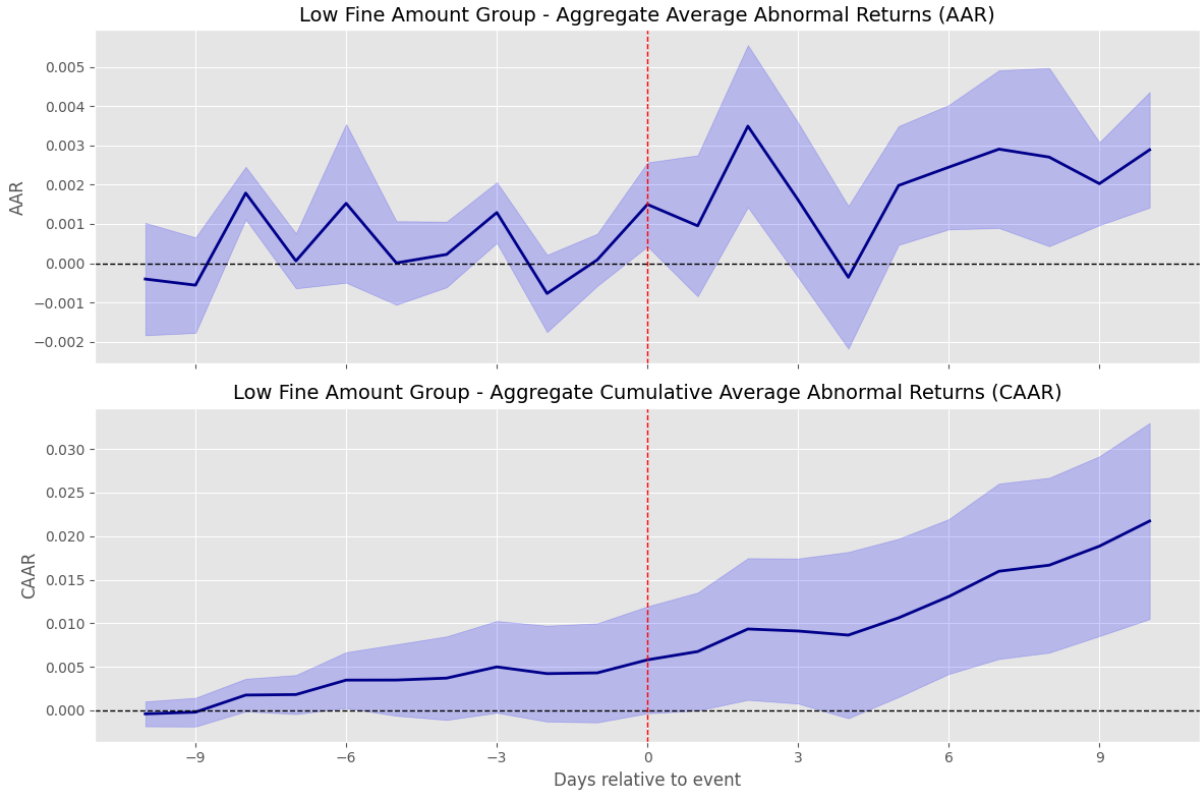

Figure 1: Low Fine Amount Group - Aggregate Average Abnormal Returns (AAR) and Cumulative Average Abnormal Returns (CAAR)

The table below summarizes the key statistics for the low fine amount group over various event windows:

The positive CAR values across different windows, although not always statistically significant, suggest that the market may view low fines as manageable for the audited companies. In particular, the CAR[-10,10] and CAR[0,10] windows show significant positive cumulative returns, indicating a favorable market reaction over these periods.

High Fine Amount Group:

Window	Mean CAR	t-Statistic	p-Value	Wilcoxon p-Value
AR[0]	0.001519	1.346830	0.202921	0.243896
CAR[-4,1]	0.003408	0.944330	0.363627	0.305420
CAR[-4,2]	0.006009	1.180443	0.260694	0.454834
CAR[-5,5]	0.007415	1.114590	0.286852	0.273438
CAR[-10,10]	0.022374	1.826868	0.092683	0.190918
CAR[-10,0]	0.005939	0.902536	0.384531	0.497314
CAR[0,10]	0.017954	2.409041	0.032970	0.068115

Table 2: Summary statistics for the low fine amount group

The second set of graphs (Figure 2) depicts the AAR and CAAR for the high fine amount group. The AAR graph for the high fine amount group shows more pronounced negative abnormal returns around the event date, indicating a stronger adverse reaction from the market. The CAAR graph also reflects a downward trend, suggesting a cumulative negative impact on stock returns due to higher fines.

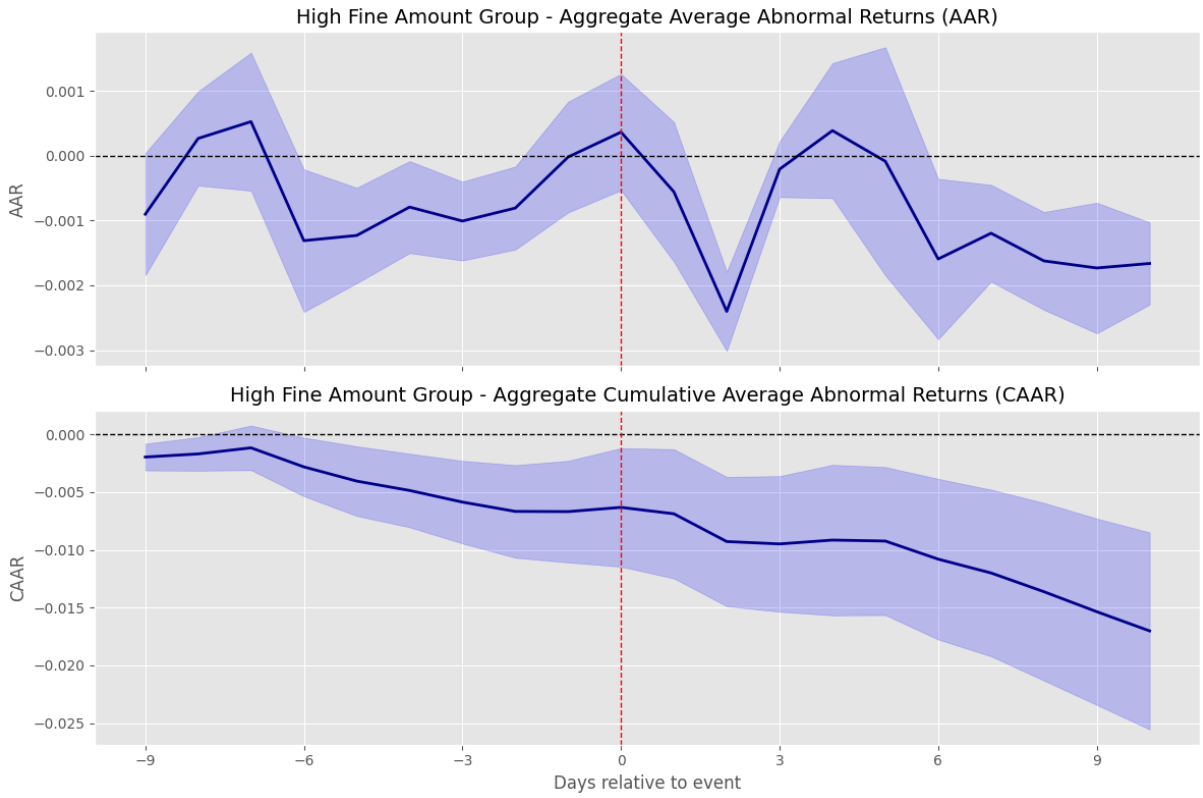

Figure 2: High Fine Amount Group - Aggregate Average Abnormal Returns (AAR) and Cumulative Average Abnormal Returns (CAAR)

The table below summarizes the key statistics for the high fine amount group over various event windows:

Window	Mean CAR	t-Statistic	p-Value	Wilcoxon p-Value
AR[0]	0.000334	0.349221	0.733517	0.850098
CAR[-4,1]	-0.003003	-0.959779	0.357788	0.569336
CAR[-4,2]	-0.005439	-1.671146	0.122867	0.266113
CAR[-5,5]	-0.006767	-1.384829	0.193548	0.301270
CAR[-10,10]	-0.017679	-1.900136	0.083931	0.176270
CAR[-10,0]	-0.006509	-1.188352	0.259718	0.469727
CAR[0,10]	-0.010836	-2.047177	0.065292	0.077148

Table 3: Summary statistics for the high fine amount group

The negative CAR values, especially in the longer event windows, suggest that higher fines are perceived more negatively by the market, likely due to concerns about the severity of the malpractices.

The negative CAR values observed in the high fine amount group, particularly in the CAR[-10,10] and CAR[0,10] windows, are statistically significant at the 10% level, indicating that the market reacts negatively to high fines. This negative reaction is evident from the AAR graph, which shows pronounced dips around the event date. The CAAR graph further supports this observation, showing a persistent downward trend over the event window, indicating cumulative negative returns.

The negative market reaction to high fines can be attributed to several factors. High fines may signal severe audit malpractices, raising concerns about the overall financial health and governance practices of the audited companies. Investors may perceive such malpractices as indicative of broader issues within the firm, leading to a loss of confidence and a sell-off of the stock.

On the other hand, the low fine amount group shows a different market reaction. The AAR graph for the low fine amount group exhibits both positive and negative spikes around the event date, with no clear downward trend. The CAAR graph indicates a general upward trend, suggesting that the market may not view low fines as a significant threat to the financial health or governance practices of the audited companies. Instead, low fines may be perceived as manageable, leading to a more neutral or even positive market reaction.

The table summarizing the key statistics for the low fine amount group shows that the CAR values are generally positive across different event windows. Although not all

the CAR values are statistically significant, the positive values suggest that the market may view low fines as less detrimental. For instance, the CAR[0,10] window shows a mean CAR of 0.017954 with a t-statistic of 2.409041 and a p-value of 0.032970, indicating a statistically significant positive cumulative return following the event. This positive market reaction could be due to the perception that low fines are unlikely to have a substantial financial impact on the audited companies.

The permutation test results further highlight the differences in market reactions between the low and high fine groups. The permutation test assesses the significance of the differences in CARs between the two groups. The test results indicate significant differences, particularly in the longer event windows. For example, the permutation test p-values for CAR[-10,10] and CAR[0,10] are 0.016 and 0.004, respectively. These low p-values suggest that the differences in market reactions between the low and high fine groups are not due to random chance.

Overall, these findings suggest that the market distinguishes between low and high fines, with higher fines eliciting a more negative response. This underscores the importance of the magnitude of fines in shaping investor perceptions and highlights the broader implications of audit quality and regulatory actions on market behavior. The contrasting market reactions to low and high fines also emphasize the need for companies to maintain robust governance practices and ensure high audit quality to avoid severe penalties and negative market repercussions.

In summary, the analysis of the low and high fine amount groups reveals distinct market reactions to audit malpractices.

5.2 Results Based on Grouping by High and Low Information Uncertainty

The analysis proceeds by examining the impact of audit fines on stock returns but keeps a particular focus on grouping the events under high or low information uncertainty. Information uncertainty was achieved by using the volatility of the stock returns in the estimation window. The events were thus split into high and low uncertainty groups, and

results were run on each fine amount group; high and low were considered separately.

Low Fine Amount Group:

For the low fine amount group, Figure 3 illustrates the Aggregate Average Abnormal Returns (AAR) and the Aggregate Cumulative Average Abnormal Returns (CAAR), further categorized by high and low information uncertainty.

The AAR plot for the low fine amount group (Figure 3) shows that events with high information uncertainty exhibit larger fluctuations in abnormal returns compared to those with low uncertainty. Specifically, the high uncertainty group shows more pronounced positive spikes around the event date, while the low uncertainty group remains relatively stable with minor fluctuations. This suggests that higher information uncertainty amplifies market reactions to audit fines, leading to greater volatility in abnormal returns.

The CAAR plot for the low fine amount group further emphasizes this observation. The high uncertainty group exhibits a noticeable upward trend in cumulative abnormal returns, with the CAAR increasing steadily from day -10 to day 10. In contrast, the low uncertainty group shows a much flatter CAAR, indicating a more muted market reaction. The increasing CAAR for the high uncertainty group suggests that the market perceives low fines with high uncertainty as less detrimental, possibly interpreting them as less significant or manageable issues.

High Fine Amount Group:

The figures for the high fine amount group (Figure 4) reveal a contrasting pattern. The AAR plot shows that the high uncertainty group experiences more pronounced negative abnormal returns around the event date, while the low uncertainty group exhibits smaller fluctuations. This suggests that high information uncertainty exacerbates the negative market reaction to high fines, leading to greater volatility and negative abnormal returns.

The CAAR plot further supports this observation. The high uncertainty group shows a significant downward trend in cumulative abnormal returns, with the CAAR decreasing steadily from day -10 to day 10. In contrast, the low uncertainty group shows a less steep decline in CAAR, indicating a less severe but still negative market reaction. The declining CAAR for the high uncertainty group suggests that the market perceives high fines with

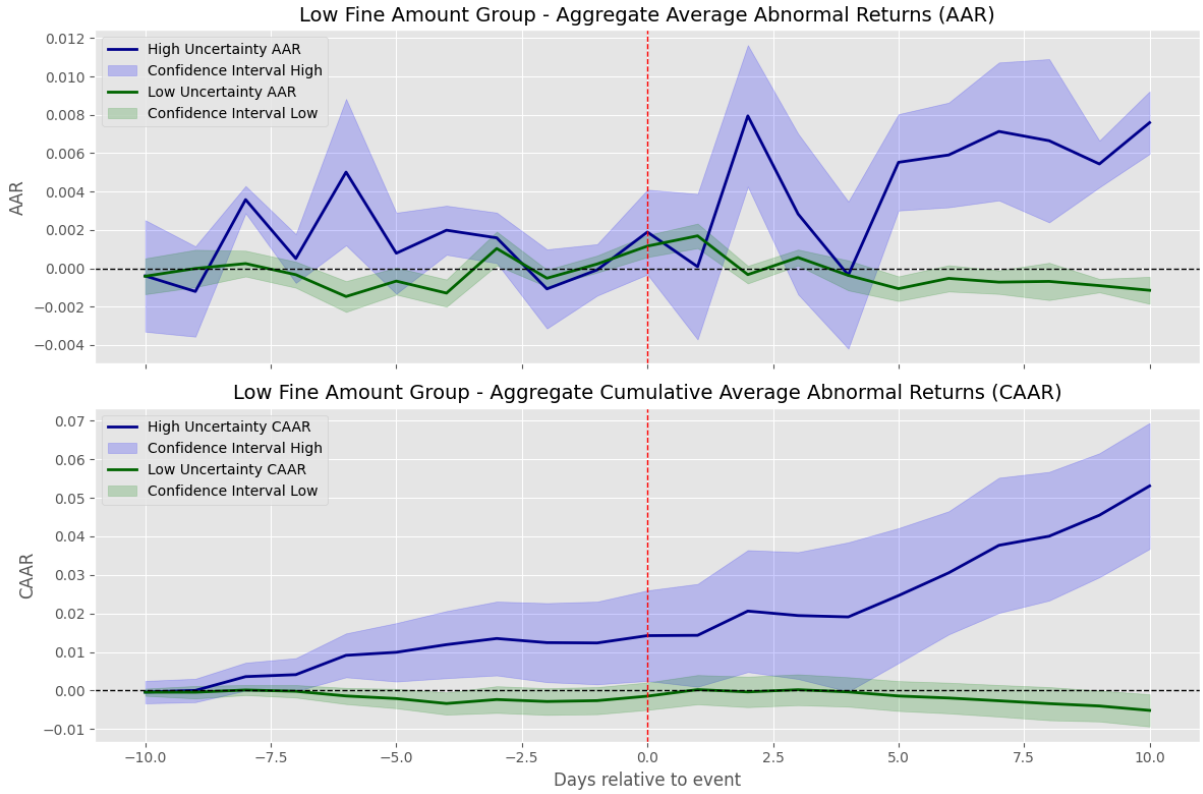

Figure 3: Low Fine Amount Group - Aggregate Average Abnormal Returns (AAR) and Cumulative Average Abnormal Returns (CAAR) by Information Uncertainty

high uncertainty as more detrimental, possibly due to heightened concerns about the severity of the malpractices.

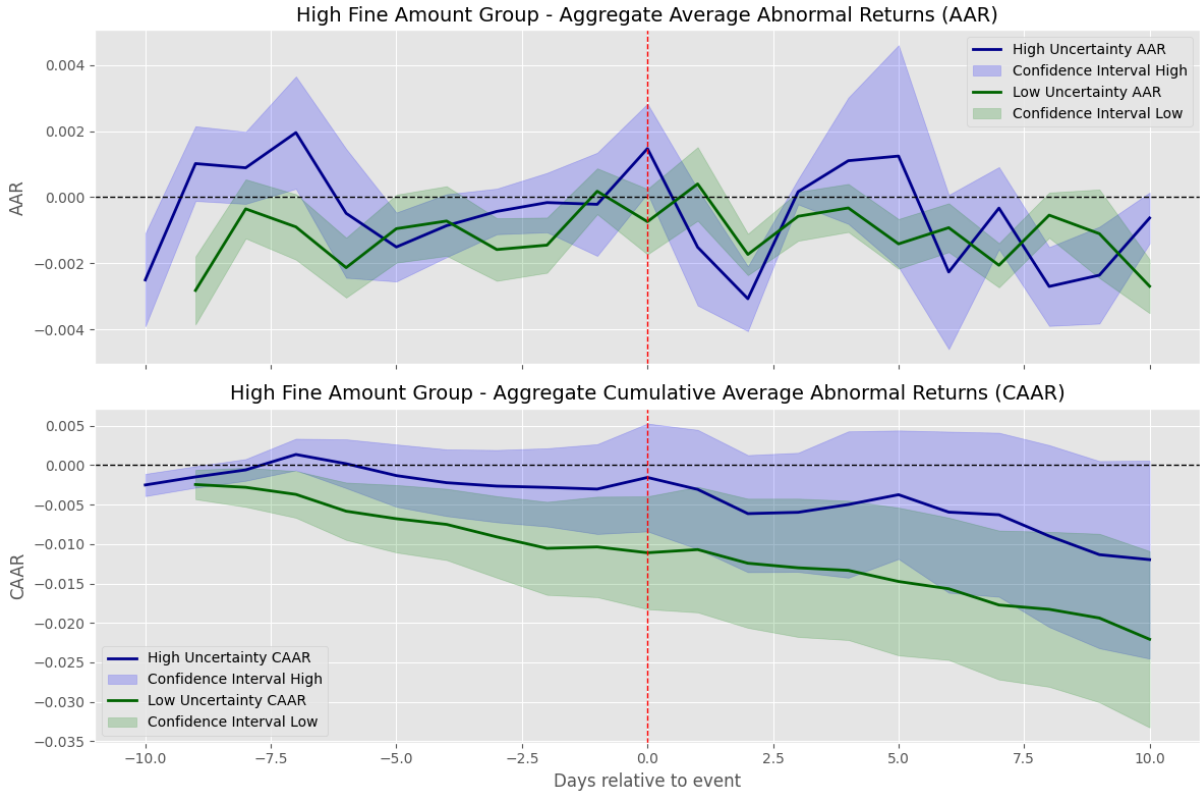

Figure 4: High Fine Amount Group - Aggregate Average Abnormal Returns (AAR) and Cumulative Average Abnormal Returns (CAAR) by Information Uncertainty

Table 4: Summary statistics for fine amount groups based on information uncertainty

Fine Category	Window	High Mean CAR (High Information Uncertainty)	p-Value	Low Mean CAR (Low Information Uncertainty)	p-Value
Low	AR[0]	0.0019	0.4701	0.0012	0.1105
Low	CAR[-4,1]	0.0044	0.5810	0.0023	0.3258
Low	CAR[-4,2]	0.0107	0.3541	0.0017	0.4944
Low	CAR[-5,5]	0.0155	0.2895	0.0001	0.9476
Low	CAR[-10,10]	0.0531	0.0313	-0.0051	0.2988
Low	CAR[-10,0]	0.0143	0.3182	-0.0014	0.7190
Low	CAR[0,10]	0.0407	0.0031	-0.0025	0.3166
High	AR[0]	0.0015	0.3673	-0.0007	0.5255
High	CAR[-4,1]	-0.0017	0.6950	-0.0039	0.4451
High	CAR[-4,2]	-0.0048	0.2960	-0.0056	0.3200
High	CAR[-5,5]	-0.0039	0.5764	-0.0089	0.2692
High	CAR[-10,10]	-0.0120	0.4239	-0.0221	0.1314
High	CAR[-10,0]	-0.0016	0.8442	-0.0111	0.2156
High	CAR[0,10]	-0.0089	0.3664	-0.0117	0.0826

5.3 Regression Results

The regression analysis aims to investigate the relationship between audit fines, information uncertainty, and cumulative abnormal returns (CARs). The dependent variable in the regression models is the CAR[-4,3] window, which captures the cumulative abnormal returns from four days before to three days after the event. This window is chosen to provide a balanced view of market reactions both before and after the announcement of the audit fine.

The regression models include both MM estimator and Ordinary Least Squares (OLS) for comparison. Here, we focus on the MM estimator results, which are particularly useful in handling potential outliers and providing robust estimates. However on the appendix , I will also compare the results of both models.

Overall Regression Summary:

The summary table below presents the results of the MM estimator regression analysis:

Coefficient	**Estimate**	**Std. Error**	**z-Statistic**	**p-Value**
Intercept	0.0164	0.0120	1.365	0.172
uncertainty	0.0039	0.0029	1.351	0.176
fine_category_High	-0.0041	0.0017	-2.473	0.013
fine_category_Low	0.0068	0.0018	3.826	0.000
Deloitte	-0.0006	0.0018	-0.330	0.741
KPMG	-0.0083	0.0015	-5.613	0.000
PwC	-0.0016	0.0023	-0.710	0.478

Table 5: Robust Linear Model Regression Results

Interpretation of Coefficients:

The intercept term is 0.0164, with a p-value of 0.172. This indicates that in the absence of other factors, the baseline CAR[-4,3] is not significantly different from zero, suggesting no inherent tendency for cumulative abnormal returns to be either positive or negative around the event window.

The coefficient for uncertainty is 0.0039, with a z-statistic of 1.351 and a p-value of 0.176. Although this coefficient is positive, it is not statistically significant at the conventional 5% level ($p < 0.05$). This suggests that while there is a positive association between uncertainty and CAR, the evidence is not strong enough to conclude a significant

relationship.

The coefficient for high fine category is -0.0041, with a z-statistic of -2.473 and a p-value of 0.013. This result is statistically significant and indicates that higher fines within the high category are associated with more negative cumulative abnormal returns. Specifically, companies facing high fines see a decrease in CAR[-4,3] by 0.0041, reflecting investor concerns about the severity of the audit malpractices.

The coefficient for low fine category is 0.0068, with a z-statistic of 3.826 and a p-value of 0.000. This significant positive coefficient suggests that companies facing low fines experience an increase in CAR[-4,3] by 0.0068. This could imply that lower fines are perceived less negatively or even positively by the market.

The coefficient for Deloitte is -0.0006, with a z-statistic of -0.330 and a p-value of 0.741. This result is not statistically significant, indicating that being audited by Deloitte does not significantly affect the CAR[-4,3] compared to the baseline group (EY).

The coefficient for KPMG is -0.0083, with a z-statistic of -5.613 and a p-value of 0.000. This significant negative coefficient suggests that companies audited by KPMG tend to have more negative cumulative abnormal returns in response to audit fines compared to those audited by EY. This might reflect market perceptions of KPMG's audit quality or its historical association with more severe audit issues. However, I want to highlight the fact that for KPMG , I have used 5 events therefore, one should be very careful for this specific result.

The coefficient for PwC is -0.0016, with a z-statistic of -0.710 and a p-value of 0.478. Similar to Deloitte, this result is not statistically significant, indicating no significant difference in the market reaction to audit fines for companies audited by PwC compared to EY.

The regression analysis reaffirms the earlier findings that higher fines within the high category are associated with more negative cumulative abnormal returns, highlighting the market's sensitivity to the severity of audit malpractices. The positive but not statistically significant coefficient for information uncertainty suggests that the market may have a nuanced response to uncertainty, potentially viewing it as less detrimental when fines are

lower.

The auditor fixed effects reveal interesting nuances in market reactions, with KPMG-audited companies experiencing more negative abnormal returns, potentially indicating lower market confidence in KPMG's audit quality.

Overall, the robust linear regression model provides a comprehensive understanding of the factors influencing cumulative abnormal returns in response to audit fines, emphasizing the importance of fine magnitude, information uncertainty, and auditor reputation in shaping market perceptions and reactions.

6 Conclusion

The integrity of financial reporting is crucial for the efficient functioning of capital markets, with auditors playing a pivotal role in ensuring the accuracy and reliability of financial statements. This thesis investigated the impact of fines imposed on auditors for malpractice on the stock returns of their clients, focusing on the Big Four audit firms—Deloitte, PricewaterhouseCoopers, Ernst Young, and KPMG—from 2002 to 2023. By employing an event study methodology and robust regression analysis, the research provides comprehensive insights into market reactions to audit fines and addresses significant gaps in the existing literature.

The findings reveal that higher fines are associated with more negative cumulative abnormal returns (CARs), indicating that the market perceives severe audit malpractices as substantial threats to financial health and governance. This reaction underscores the importance of maintaining high audit quality to protect investor confidence. Furthermore, the study highlights the role of information uncertainty, showing that higher volatility amplifies market reactions to audit fines, emphasizing the need for transparency and reliability in financial reporting.

Auditor-specific effects indicate varying market perceptions of audit quality among the Big Four firms, with KPMG-audited companies experiencing more negative abnormal returns compared to those audited by EY. This suggests that market confidence can differ significantly between audit firms, potentially influencing regulatory scrutiny and

client decision-making.

The implications of this research are profound for policymakers, investors, and audit firms. Policymakers can leverage these insights to enhance regulatory frameworks and strengthen audit oversight, thereby fostering a more reliable financial reporting environment. Investors gain a better understanding of the risks associated with audit failures, aiding more informed investment decisions. Audit firms can use the findings to improve audit quality, restore market confidence, and mitigate the risk of severe penalties.

In conclusion, this thesis contributes to the discourse on audit quality and investor protection, offering a comprehensive analysis of the market implications of audit-related penalties. The robust methodologies and detailed event study techniques applied ensure accurate measurement of the effects of audit malpractices on stock returns. Future research could build on these findings by exploring the long-term impact of audit fines on corporate governance and financial performance, as well as the role of media coverage and public perception in shaping market reactions.

7 Appendix

7.1 Introduction to the Comparison

The comparison between Ordinary Least Squares (OLS) and MM estimator results is crucial to understand the robustness of the findings and the implications of the methodological choices made. OLS is a commonly used method for regression analysis; however, it is sensitive to outliers, which can skew the results. In contrast, MM estimator is designed to provide robust estimates by mitigating the influence of outliers through methods such as the Huber T norm and Iteratively Reweighted Least Squares (IRLS). This section presents a detailed comparative analysis of the regression results obtained from both OLS and MM estimator methods.

7.2 OLS Regression Results

The OLS regression results are summarized in the table below.

Coefficient	**Estimate**	**Std. Error**	**z-Statistic**	**p-Value**
Intercept	-0.0224	0.024	-0.933	0.351
uncertainty	-0.0059	0.009	-0.665	0.506
fine_category_High	-0.0195	0.012	-1.683	0.092
fine_category_Low	-0.0030	0.013	-0.223	0.824
Deloitte	0.0096	0.010	0.980	0.327
KPMG	0.0045	0.009	0.529	0.597
PwC	0.0040	0.010	0.416	0.677

Table 6: Ordinary Least Squares (OLS) Regression Results

The OLS regression results indicate that the coefficient for the high fine category is -0.0195, with a z-statistic of -1.683 and a p-value of 0.092. Although the coefficient is negative, indicating that higher fines are associated with more negative cumulative abnormal returns, it is not statistically significant at the 5% level. The coefficient for information uncertainty is -0.0059, with a z-statistic of -0.665 and a p-value of 0.506, which is also not statistically significant.

The auditor fixed effects show that the coefficient for Deloitte is 0.0096, with a z-statistic of 0.980 and a p-value of 0.327, indicating no significant difference in the market

reaction to audit fines for companies audited by Deloitte compared to EY. The coefficient for KPMG is 0.0045, with a z-statistic of 0.529 and a p-value of 0.597, and the coefficient for PwC is 0.0040, with a z-statistic of 0.416 and a p-value of 0.677, both of which are not statistically significant.

7.3 MM estimator results

The MM estimator results, previously presented in Section 7, are summarized again for convenience.

Coefficient	**Estimate**	**Std. Error**	**z-Statistic**	**p-Value**
Intercept	0.0164	0.0120	1.365	0.172
uncertainty	0.0039	0.0029	1.351	0.176
fine_category_High	-0.0041	0.0017	-2.473	0.013
fine_category_Low	0.0068	0.0018	3.826	0.000
Deloitte	-0.0006	0.0018	-0.330	0.741
KPMG	-0.0083	0.0015	-5.613	0.000
PwC	-0.0016	0.0023	-0.710	0.478

Table 7: Robust Linear Model Regression Results

The robust regression results indicate that the coefficient for the log of the fine amount is -0.0024, with a z-statistic of -5.314 and a p-value of 0.000. This result is highly significant and indicates that higher fines are associated with more negative cumulative abnormal returns. The coefficient for information uncertainty is 0.0049, with a z-statistic of 1.647 and a p-value of 0.100, suggesting a positive but not statistically significant relationship with cumulative abnormal returns.

The auditor fixed effects show that the coefficient for Deloitte is 0.0017, with a z-statistic of 1.068 and a p-value of 0.285, indicating no significant difference in the market reaction to audit fines for companies audited by Deloitte compared to EY. The coefficient for KPMG is -0.0083, with a z-statistic of -5.526 and a p-value of 0.000, indicating that companies audited by KPMG tend to have more negative cumulative abnormal returns in response to audit fines. The coefficient for PwC is -0.0018, with a z-statistic of -0.825 and a p-value of 0.409, indicating no significant difference in the market reaction to audit fines for companies audited by PwC compared to EY.

7.4 Comparison and Discussion

Comparing the OLS and MM estimator results reveals several important insights. First, the MM provides more robust estimates by mitigating the influence of outliers, as evidenced by the higher significance levels of the coefficients. For instance, the coefficient for the high fine category is significantly negative in both models, but the MM's estimate is more precise and statistically significant (p = 0.013) compared to the OLS estimate, which is marginally significant (p = 0.092).

Second, the coefficient for uncertainty is positive in the MM model but negative in the OLS model. Although neither coefficient is statistically significant, the difference in sign suggests that the OLS model may be influenced by outliers or other factors not accounted for, whereas the MM provides a more robust estimate.

Third, the auditor fixed effects show that the coefficient for KPMG is significantly negative in the RLM model, indicating a market perception of lower audit quality for KPMG compared to EY. This significant result is not observed in the OLS model, further demonstrating the robustness of the MM approach.

Lastly, the R-squared value for the OLS model is 0.003, indicating that the model explains very little of the variance in the CAR[-4,3]. This low explanatory power, combined with the sensitivity to outliers, highlights the limitations of the OLS approach in this context.

7.5 Conclusions

The comparison of OLS and MM results underscores the importance of using robust methods in the presence of potential outliers. The MM model provides more reliable and interpretable results, reinforcing the conclusions drawn from the analysis. The significant negative relationship between higher fines and cumulative abnormal returns, as well as the significant negative coefficient for KPMG in the MM model, highlight the market's sensitivity to audit quality and the perceived severity of audit malpractices. These findings emphasize the need for robust statistical methods to accurately capture the market's reactions to audit-related events.

References

Chaney, Paul K and Krista L Philipich (2002) "Shredded reputation: The cost of audit failure," *Journal of Accounting Research*, 40 (4), 1221–1245.

Fama, Eugene F and Kenneth R French (1993) "Common risk factors in the returns on stocks and bonds," *Journal of Financial Economics*, 33 (1), 3–56.

Firth, Michael (1990) "Perceptions of auditor independence and official ethical guidelines," *Accounting Review*, 451–466.

Francis, Jere R (2004) "What do we know about audit quality?" *The British accounting review*, 36 (4), 345–368.

Huber, Peter J (1981) *Robust statistics*: Wiley New York.

Krishnamurthy, Srinivasan, Jun Zhou, and Nanjegowda Zhou (2006) "Auditor reputation, auditor independence, and the stock-market impact of Andersen's indictment on its client firms," *Contemporary Accounting Research*, 23 (2), 465–490.

Skinner, Douglas J and Suraj Srinivasan (2010) "Does auditor reputation matter? The case of KPMG Japan's tax shelter scandal," *Journal of Accounting and Economics*, 49 (1-2), 75–83.

Sorokina, Natalia, David E Booth, and John H Thornton Jr (2013) "Robust methods in event studies: Empirical evidence and theoretical implications," *Journal of Data Science*, 11 (3), 405–423.

Wilcoxon, Frank (1945) "Individual comparisons by ranking methods," *Biometrics Bulletin*, 1 (6), 80–83.

Yohai, Víctor J (1987) "High breakdown-point and high efficiency robust estimates for regression," *The Annals of Statistics*, 642–656.