# THE EFFECT OF SARBANES-OXLEY ACT ON BOOK-TAX DIFFERENCES: HOW THEY RELATE TO AUDIT FIRMS AND FIRM SIZE

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## ABSTRACT

*This study investigates whether the relation between audit pricing and firm size has changed regarding book-tax differences in a pre- and post-Sarbanes Oxley Act (SOX) setting. We measure whether the SOX can mitigate the gap in book and taxable income, and whether it is a determinant of audit pricing. Our empirical results show a strong positive correlation between the book-tax differences and audit fees. Also, we find that book-tax difference during the post-SOX period is strongly related to audit fees compared to those during the pre-SOX period. Further, we find that both small firms and large firms have a strong impact on the costs of audit work. The results show that large firms have greater book-tax differences than smaller firms during the pre-SOX period; however, smaller firms start to drive a large gap between book and taxable income in the post-SOX period. Overall, this concludes that firm size is a useful proxy for evaluating the risk that affects audit fees. This study contributes to the literature by providing some insights into the effect of pre- and post-SOX on the relationship between book-tax differences and audit fees.*

**Keywords:** Book-tax Differences, Sarbanes Oxley Act (SOX), Audit Fees, Firm Size.

## INTRODUCTION

This study investigates whether the relation between audit pricing and firm size has changed with regard to book-tax differences in a pre- and post-Sarbanes Oxley Act (SOX) setting. Prior studies mentioned that SOX is marked as a momentous and historic event for auditors (Charles et al., 2010). Hanlon et al. (2012) find that there is a significantly positive relationship between book-tax differences and higher audit fees. Lots of studies investigate the relationship between book-tax differences and tax avoidance. However, there are limited investigations into the relationship between book-tax differences and audit fees (Hanlon et al., 2012). Hanlon et al. (2012) indicate that if book-tax differences affect audit fees, then it suggests that the differences are important and can lead to audit complexity and risk that come from earnings management or tax avoidance issues. Audit fee is an effective proxy to measure the quality of firms' accounting information (Hackenbrack et al., 2014; Hribar et al., 2014; Picconi & Reynolds, 2013). Hanlon et al. (2012) suggest that auditors should be paid higher due to the additional effort and higher riskof lawsuits as well as the risk of reputation damage. In the United States, the growing difference between book and taxable income has become a critical research area for analysis.

Although book and taxable income represent the same economic activities, they are regulated by different rules (Heltzer, 2008). Heltzer (2008) points out that book and taxable income are usually different under various pressures since managers have incentives to report higher book income than taxable income. Thus, a debate has been going on for years about whether book and taxable income should use the same measurement instead of two sets of different income measures



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(Kuo & Lee, 2016). When a company has high accruals, the association between book-tax differences and audit fees will be larger. Kuo & Lee (2016) indicate that book-tax conformity can mitigate tax accruals and enhance tax authorities' monitoring, thus can lead to lower audit fees, and decreased audit workload and risk.

Before SOX implementation, the disclosure of non-audit services such as tax fees was not required. Therefore, firms' choice to disclose them voluntarily could lead to self-selection bias. The SOX was able to eliminate the bias because it requires auditors to disclose tax fees (Halperin & Lai, 2015). Consistent with Hanlon et al. (2012), our results show a strong positive correlation between the book-tax differences and audit fees. Also, we find that book-tax difference during the post-SOX period is strongly related to audit fees compared to those during the pre-SOX period. Later, we did a size-based analysis on large firms and small firms, they are partitioned by the median of total assets. Firms above the median are labeled as large size, and firms below the median are labeled as small size. The results show that during the pre-SOX period, large firms have greater book-tax differences than smaller firms; however, in the post-SOX period, smaller firms are the ones driving a large gap between book and taxable income. Furthermore, we use two groups of sample, negative book-tax difference, and positive book-tax difference, to examine which of them have a greater impact on the results. We find that the coefficient on positive book-tax difference is significantly positive during the pre-SOX period, but the coefficient on negative book-tax difference is not. This indicates that overstated earnings impact audit fees greatly before SOX. After the SOX implementation, negative book-tax difference is the one that stays at a higher level of significance, suggesting that the overstated earnings are more influenced by the Sarbanes-Oxley Act.

Although there are some studies examining the effect of tax-book differences on audit fees, the existing literature barely investigates the pre- and post-SOX effects on this topic. Our study fills this gap and contributes to the literature by adding SOX as an influencing factor to investigate the changing pattern between book-tax difference and audit fees. Second, our results shed some light on the driven factors of book-tax differences after SOX implementation. Thus, our findings would be interesting for academics and policymakers. Further, through investigating this relationship, readers will have more knowledge about the effect of SOX on tax issue practices of the firms.

We develop our hypotheses in the second section. Research design is in section three, and empirical results are described in section four. Summary and conclusion are in section five.

## BACKGROUND AND HYPOTHESIS DEVELOPMENT

Companies usually calculate their income each year for two purposes: First, it is calculated for the financial reporting purposes under GAAP; Second, the tax liabilities need to be determined in accordance with the Internal Revenue Code (IRC) (Hanlon, 2005). The book-tax differences of each year are the changes between the firm's book-based balance sheet and tax-based balance sheet. Book-tax differences can increase or decrease either way because of the changing requirements for the recognition of income and expense under different timing (Hanlon, 2005). For book purposes, revenue should be recognized when earned, and expense should match against the relevant revenue. For tax purposes, IRC Section 446 (b) indicates that the tax must "clearly reflect income". Revenue needs to be recorded when the cash is received; therefore, unearned revenue is not acceptable under IRC.

Bell et al. (2001), Seetharaman et al. (2002), and Gul et al. (2003) state in their studies that risk of earnings management is associated with higher audit fees. Hanlon et al. (2012) predicted



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that book-tax differences are positively associated with earnings quality because prior studies show evidence that the larger differences between the book and taxable income, the lower the earnings quality. Prior studies indicate that book-tax difference can be used as a proxy for audit risk. Further, they find that positive book-tax differences have a much bigger impact on audit risk compared to negative book-tax differences. Heltzer & Shelton (2015) obtained auditor data via a survey, and their results indicate that one-third of the auditors use book-tax difference as an indicator for audit risk and that the top reason for them to use book-tax difference as a measurement is because it indicates earnings management. If greater book-tax differences indicate lower earnings quality, then auditors are more likely to put more effort in the work, including more hours and more specialists (Hanlon et al., 2012). Thus, this would lead to an increase of audit fees for firms with large book-tax differences compared to those with smaller ones. Under this situation, auditors usually ask for additional fees at the beginning of the engagement, in order to do more examination when needed (Hanlon et al., 2012). Deslandes & Landry (2007) suggest that book-tax differences can assess earnings quality because it is unusual to report high earnings in the financial statement while only showing a little portion of tax liability. They also find that measurement of taxable income is stricter than reported earnings, thus, the big gap between book and taxable income may show evidence of financial statement manipulations.

Donohoe & Knechel (2014) indicate that the complexity in tax issues and auditors making judgments often occur in misstated financial statements. In 2008, Deloitte mentioned that 37 percent of earnings restatement issues are within accounting income taxes. Also, Ernst & Young (2011) found that 11 percent of Fortune 500 companies reported deferred tax as their primary reason for restatements. Donohoe & Knechel (2014) suggest that it is hard to understand the tax position if the clients are trying to avoid taxes aggressively. Since the aggressive tax positions can influence auditors' reputation and litigation costs, Donohoe & Knechel (2014) conclude that audit effort or higher audit fees are indicators of bigger differences in book and taxable income. Hanlon & Heitzman (2010) point out that auditors need additional effort for professional audit procedures, documentation, and consultation help from tax professionals. However, auditors' additional effort still cannot prevent questionable problems to happen when there arecomplicated transactions, because those transactions have a higher possibility of exposing auditors to litigation, regulatory, and reputation risks. There are consequences if the tax positions are under regulatory inspection, where the reputation of the auditors could be harmed, and regulators can enforce penalties for incorrect tax-related transactions (Donohoe & Knechel, 2014).

Nowadays, the difference between book and taxable income has attracted considerable attention from researchers. Phillips et al. (2003) showed evidence that book-tax differences and earnings management are positively related. In addition, book-tax differences are positively related to financial statement restatements (Badertscher et al., 2009), and is also associated with accounting fraud (Ettredge et al., 2008). Therefore, the regulators might want to consider using book-tax differences to assess earnings management and detect accounting fraud (Heltzer and Shelton, 2015). Decreased book-tax conformity not only can lighten the audit workload but also can reduce audit risk by letting tax authorities scrutinize the financial statement (Kuo and Lee, 2016). Therefore, it would reduce the financial reporting manipulation and would lower the risk of not detecting the misstatements. For the above reason, we expect a positive relationship between book-tax difference and audit fees.

In a survey of senior tax executives, Arlinghaus (2007) states that 60 percent of the executives think that the tax department starts to spend significantly less time on tax planning after passing the SOX. This is due to more detailed tax-related discussions and positions provided by



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SOX. About 42 percent of the executives believe the company's board starts to pay more attention to tax positions because of SOX, and they think that SOX better taught the audit committee about the effect of tax on the company (Arlinghaus, 2007). The SOX has more strict regulations that impose extra costs on audit firms, thus leading large audit firms to act more conservatively in the after-SOX period and charge a premium for additional work (Huang, 2007). Huang (2007) points out that auditors are less likely to "lowball" the audit fees after SOX implementation compared to the pre-SOX period. Legislators and regulators have concerned that low-balling can cause low audit quality. Huang (2007) finds that in the pre-SOX period, audit fee discount is significantly higher than the fee discount in the post-SOX period.

There has been an ongoing debate that more policies should be established to decrease the degree of book-tax difference after the Enron-era wave scandals. Prior literature shows that SOX affects audit fees both directly and indirectly (Charles et al., 2010; Eshleman & Lawson, 2017; Krishnan et al., 2008; Raghunandan & Rama, 2006). Charles et al. (2012) indicates that the risk between audit fees and financial risk increased significantly in 2002, and this may be due to the increased litigation risk that the auditors are facing, additional proposed rules and regulations after the SOX implementation. Therefore, we predict that auditors would increase their fees after the SOX in order to have enough assurance when they do more attestation.

***H1:*** *Book-tax difference has a stronger positive correlation with audit fees after theSarbanes-Oxley Act.*

Empirical evidence offers two theories to investigate the relationship between firm size and tax payments. Political power theory argues that large-size firms pay less income tax than small size firms because larger ones have more resources (1) to influence the political power in their favor, (2) have more experts in tax planning, and (3) can minimize tax liabilities (Chan et al., 2013). On the other hand, political cost theory holds that large-size firms pay more political costs because they are more conspicuous when facing public and government scrutiny (Chan et al., 2013). Since tax avoidance is a type of political cost, large-size firms would have to pay more taxes compared to the smaller ones. When small firms contribute more to society, economic growth, and employment over time, people are hoping the government could give small businesses more tax relief (Chan et al., 2013). In addition, Chan et al. (2013) suggest that government should heighten its scrutiny level for large-size firms when there is a large book-tax difference. The association between firm size and book-tax difference is crucial for tax policymakers (Chan et al., 2013). Furthermore, the size of the firm is a vital factor for determining audit fees (Hanlon et al., 2012). The size of a firm has been used in many studies as a proxy to assess audit fees in accounting and auditing research. Krishnan et al. (2008) suggest that larger entities should result in higher audit costs because more transactions that occur daily would cause a more complex internal control structure compared to those in smaller entities. Thus, we predict the following:

***H2:*** *The positive association between audit fees and book-tax difference is stronger for large-size firmsthan for small-size firms.*

## RESEARCH DESIGN

This study covers an eighteen-year period from 2000-2017. We adopted and combined the models in (Hanlon et al., 2012; Donohoe & Knechel, 2014). The main variables of interest in this study are the log of the absolute value of book-tax differences (*LABSBTD*) and the interaction term between book-tax differences and SOX (*LABSBTD*SOX*). Book-tax difference is the



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difference between the financial accounting book income and the reported taxable income.

**Model 1**

$$LAF = \alpha + \beta_1 LABSBTD + \beta_2 LABSACC + \beta_3 SOX + \beta_4 LABSBTD*SOX + \beta_5 BIG4 + \beta_6 LAT + \beta_7 LBUSSEG + \beta_8 INV + \beta_9 REC + \beta_{10} INCOME + \beta_{11} LOSS + \beta_{12} AUDOPIN + \beta_{13} NOL + \beta_{14} LEV + \beta_{15} ROA + \beta_{16} RDI + \sum \lambda_k IND + \sum \delta_t YEAR + \varepsilon$$

**Model 2**

$$LAF = \alpha + \beta_1 NBTD \text{ or } PBTD + \beta_2 LABSACC + \beta_3 SOX + \beta_4 NBTD \text{ or } PBTD * SOX + Control\ Variables + \varepsilon$$

In Model 1, the dependent variable is the log of audit fee, and the independent variables are log of the absolute value of book-tax difference and control variables, which we include the *SOX* variable and interaction term *LABSBTD*SOX*. We also include *LABSACC*, which is the log of the absolute value of accruals. Model 2 is the regression to analyze the impact of negative and positive book-tax differences on audit fees before and after SOX implementation. We expect *LABSBTD* and *LABSACC* to be positively related to audit fees. The log of the number of business segments in the firm (*LBUSSEG*) is included as a proxy for the complexity of the firm. The inventory (*INV*) and receivables (*REC*) are scaled by total assets to control for the loss from auditing difficulties (Hanlon et al., 2012). The coefficient on *LBUSSEG, INV,* and *REC* should be positive because they can reflect the complexity and risk of the client. We control for the size of the audit firm (*BIG4*) and the size of the client firm's total asset (*LAT*). The coefficient on *LAT* should be positive because larger firms are more likely to have higher audit fees because of their complexity. Prior studies indicate that large audit firms such as Big 4 are always used as a proxy for audit quality since they treat their reputation as a valuable asset, suggesting that they are more likely to provide high-quality audits (Chen et al., 2016). Big 4 audit firms should have a positive relationship with the audit fee because of their high-quality services, so we expect *BIG4* to be positive. Following Simunic (1980) and Hanlon et al. (2012), we also included three financial proxies in the models: First, the ratio of income to assets (*INCOME*) as a proxy for profitability, we expect it to be negatively associated with audit fees; Second, a dummy variable equals to 1 if the income is negative in the current year (*LOSS*), and zero otherwise, which should have a positive relationship with the audit fees; Third, a dummy variable equals to 1 if the firm received an unqualified opinion in the current year (*AUDOPIN*), and zero otherwise, and we expect a negative relationship because anything other than an unqualified opinion should increase the audit fee. *NOL* is a binary variable if there is tax-loss carryforward in the firm during the current year, and the coefficient should be positive. Also, we expect leverage (*LEV*) to be positively related to audit fees. The R&D intensity (*RDI*) is included to evaluate the risky investment. Return on assets (*ROA*) should have a negative coefficient, because a higher return on assets indicates a healthier financial position, thus leading to a lower audit fee. The definitions of the variables are provided after the tables.



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## SAMPLE, DESCRIPTIVE STATISTICS, AND EMPIRICAL RESULTS

### Sample and Descriptive Statistics

Table 1 is the sample selection process. The sample of my study is collected from Compustat and Audit Analytics. The initial data consists of 526,969 observations from 2000-2017. We deleted 243,946 observations with missing business segments. We also deleted 37,281 observations in the financial services and utilities industries (SIC codes 4900–4999 and 6000–6999) because their capital structures (e.g., debt maturities, inventories, and receivables) differ from those of the industrial firms. Next, 81,585 firm-year observations with missing audit fees data are deleted from the sample. Last, we delete 117,621 observations with insufficient data to calculate variables. The final sample includes 46,599 firm-year observations.

**Table 1**
**SAMPLE SELECTION**

| Criteria | No. of Obs |
|---|---|
| Firm-year observations available on Compustat and Audit Analytics for the years 2000-2017 | 526,969 |
| Less: Firm-year observations with missing business segments | 243,946 |
| Less: Firm-year observations in financial services and utilities industries | 37,281 |
| Less: Firm-year observations with missing audit fees | 81,585 |
| Less: Firm-year observations without sufficient data to calculate variables in the models | 117,621 |
| **Final sample** | 46,599 |

Table 2 shows the descriptive statistics for regression variables. The unlogged audit fee in the sample has a mean (median) of $1,535,852 ($565,500). Hanlon et al. (2012) reported a median audit fee of $337,000 from the period 2000-2006. Our sample is larger as it includes a much longer period of years from 2000 to 2017, and most of the observations are after the Sarbanes-Oxley Act (SOX), which leads to an increase in audit fees. Therefore, it is normal to have a larger average audit fee over the period in our sample. The mean of absolute value book-tax differences is 0.87 ($27/$3,097) percent of average total assets. The mean of accruals is 3.5 ($109 / $3,097) percent of average total assets. Similar to Hanlon et al. (2017), our sample shows the median of log of book-tax difference is 3.015, and the median of log of accrual is 2.486, which is consistent with the notion that differences between book and taxable income are not the same as financial accounting income and cash flows differences. The firms in our sample have a mean (median) total asset of $3.1 ($0.3) million. 67.2 percent of firms in our sample are using Big 4 to audit their work.

Table 3 shows the Pearson correlation coefficients. The results show that the log of audit fee is strongly correlated with the log of book-tax differences (ρ=0.581), with the log of total asset (ρ=0.843), and with the log of accrual (ρ=0.725). In addition, *BIG4* (ρ=0.563), *SOX* (ρ=0.162), and *LABSBTD*SOX* (ρ=0.613) are also significantly correlated with the log of audit fees. The correlation indicates that firm size (asset) plays a significant role in many aspects. For instance, larger firms have larger audit fees, accruals (ρ=0.827), and book-tax difference (ρ=0.646) and are more likely to use Big 4 audit firms. Moreover, when industries such as wholesale and retail, have higher inventory (ρ=-0.159) and receivables (ρ=-0.150), the book-tax difference is lower. Hanlon et al. (2017) suggest that higher proportions of inventory and receivables make it harder for firms to generate book-tax differences Appendix.



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**Table 2**
**DESCRIPTIVE STATISTICS**

| | Mean | 25% | Median | 75% | Maximum | Std Dev |
|---|---|---|---|---|---|---|
| *Audit Fees* | $1,535,852 | $165,000 | $565,500 | $1,556,000 | $18,900,000 | $2,839,060 |
| *Book Tax Diff* | $ 27 | $ (15) | $ 0 | $ 28 | $ 2,490 | $ 425 |
| *Total Asset* | $ 3,097 | $ 47 | $ 286 | $ 1,492 | $ 68,770 | $ 9,456 |
| *Absolute Accruals* | $ 109 | $ 3 | $ 12 | $ 53 | $ 2,544 | $ 340 |
| *LAF* | 13.129 | 12.014 | 13.245 | 14.258 | 16.755 | 1.615 |
| *z* | 2.928 | 1.386 | 3.015 | 4.562 | 8.335 | 2.391 |
| *LAT* | 5.484 | 3.850 | 5.655 | 7.308 | 11.139 | 2.649 |
| *LABSACC* | 2.445 | 0.923 | 2.486 | 3.973 | 7.841 | 2.281 |
| *INV* | 0.103 | 0.000 | 0.056 | 0.159 | 0.589 | 0.128 |
| *REC* | 0.149 | 0.056 | 0.122 | 0.205 | 1.000 | 0.129 |
| *LBUSSEG* | 2.699 | 1.946 | 2.773 | 3.526 | 6.140 | 1.204 |
| *INCOME* | -0.856 | -0.074 | 0.049 | 0.106 | 17.111 | 26.148 |
| *ROA* | -0.378 | -0.126 | 0.019 | 0.068 | 0.366 | 1.845 |
| *LEV* | 0.234 | 0.000 | 0.099 | 0.285 | 432.727 | 2.296 |
| *RDI* | 0.636 | 0.010 | 0.061 | 0.192 | 16.218 | 2.516 |
| *BIG4* | 0.672 | 0.000 | 1.000 | 1.000 | 1.000 | 0.470 |
| *LOSS* | 0.423 | 0.000 | 0.000 | 1.000 | 1.000 | 0.494 |
| *AUDOPIN* | 0.657 | 0.000 | 1.000 | 1.000 | 1.000 | 0.475 |
| *NOL* | 0.771 | 1.000 | 1.000 | 1.000 | 1.000 | 0.420 |
| *SOX* | 0.920 | 1.000 | 1.000 | 1.000 | 1.000 | 0.271 |
| *LABSBTD*SOX* | 2.654 | 0.781 | 2.708 | 4.371 | 8.246 | 2.426 |

**Note:** Absolute book tax difference, total asset and accruals are in $ millions. Audit fees are in $.

**Table 3**
**PEARSON CORRELATION MATRIX (1)**

| | *LAF* | *LABSBTD* | *LAT* | *LABSACC* | *INV* | *REC* | *LBUSSEG* | *INCOME* | *ROA* |
|---|---|---|---|---|---|---|---|---|---|
| *LAF* | 1.000 | | | | | | | | |
| *LABSBTD* | **0.581** | 1.000 | | | | | | | |
| *LAT* | **0.843** | **0.646** | 1.000 | | | | | | |
| *LABSACC* | **0.725** | **0.622** | **0.827** | 1.000 | | | | | |
| *INV* | **-0.061** | **-0.159** | **-0.061** | **-0.072** | 1.000 | | | | |
| *REC* | **-0.049** | **-0.150** | **-0.109** | **-0.116** | **0.133** | 1.000 | | | |
| *LBUSSEG* | **0.300** | **0.124** | **0.298** | **0.204** | **0.127** | **0.121** | 1.000 | | |
| *INCOME* | **0.058** | **0.022** | **0.096** | **0.035** | **0.020** | **0.025** | **0.042** | 1.000 | |
| *ROA* | **0.315** | **0.146** | **0.474** | **0.245** | **0.065** | **0.053** | **0.208** | **0.249** | 1.000 |
| *LEV* | *-0.014* | 0.002 | **-0.038** | *-0.009* | *-0.013* | **-0.021** | **-0.025** | **-0.114** | **-0.134** |
| *RDI* | **-0.153** | *-0.022* | **-0.195** | **-0.106** | **-0.167** | **-0.228** | **-0.196** | **-0.169** | **-0.241** |
| *BIG4* | **0.563** | **0.416** | **0.589** | **0.491** | **-0.086** | **-0.103** | **0.157** | **0.047** | **0.247** |
| *LOSS* | **-0.284** | **-0.121** | **-0.386** | **-0.255** | **-0.086** | **-0.068** | **-0.192** | **-0.030** | **-0.218** |
| *AUDOPIN* | **-0.039** | -0.004 | **0.114** | **0.037** | **0.026** | 0.006 | **0.081** | **0.044** | **0.218** |
| *NOL* | **0.090** | **0.070** | **-0.068** | **-0.019** | **-0.089** | **-0.046** | **0.023** | *-0.013* | **-0.089** |
| *SOX* | **0.162** | **-0.062** | **0.038** | **0.030** | **-0.040** | **-0.048** | **0.064** | *-0.008* | **-0.025** |
| *LABSBTD *SOX* | **0.613** | **0.891** | **0.627** | **0.599** | **-0.163** | **-0.160** | **0.143** | **0.018** | **0.134** |



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**Table 3**
**PEARSON CORRELATION MATRIX (2)**

| | *LEV* | *RDI* | *BIG4* | *LOSS* | *AUDOPIN* | *NOL* | *SOX* | *ABSBTD*SOX* |
|---|---|---|---|---|---|---|---|---|
| *LEV* | 1.000 | | | | | | | |
| *RDI* | **0.024** | 1.000 | | | | | | |
| *BIG4* | **-0.020** | **-0.058** | 1.000 | | | | | |
| *LOSS* | **0.024** | **0.213** | **-0.199** | 1.000 | | | | |
| *AUDOPIN* | **-0.034** | **-0.029** | **0.029** | **-0.095** | 1.000 | | | |
| *NOL* | *0.014* | **0.092** | *-0.010* | **0.245** | **-0.058** | 1.000 | | |
| *SOX* | 0.007 | 0.006 | -0.006 | **-0.018** | **-0.091** | **0.115** | 1.000 | |
| *LABSBTD *SOX* | 0.004 | *-0.020* | **0.399** | **-0.130** | **-0.036** | **0.108** | **0.322** | 1.000 |

## Empirical Results

Table 4 provides the information on audit fees, book-tax differences, and accruals changes for both pre- and post-SOX periods. The increase of mean (median) of audit fees from pre-SOX and post-SOX is 234 (247) percent. The decrease in the mean (median) of book-tax difference from pre-SOX to post-SOX is 63 (94) percent over the period. The results suggest that the post-SOX audit fee increased significantly because according to the guidance of SOX, auditors need to do more attestations and the audit fee will increase. The post-SOX book-tax difference significantly decreased, indicating the SOX has a mitigation effect on the gap of book and taxable income and financial statement manipulation. It might also be due to (1) the SOX being more stringent than any other rules; (2) SEC reviews becoming stricter and requiring more financial statement reviews and a higher level of detailed disclosure.

**Table 4**
**AUDIT FEES AND BOOK-TAX DIFFERENCES CHANGES FROM PRE-SOX TO POST-SOX PERIODS**

| | **Mean** | **Median** |
|---|---|---|
| Pre-SOX audit fees | $ 487,629 | $183,100 |
| Post-SOX audit fees | $1,626,659 | $635,950 |
| Percentage increase of audit fees | 234% | 247% |
| Pre-SOX absolute book-tax difference | $ 103.95 | $ 7.35 |
| Post-SOX absolute book-tax difference | $ 38.27 | $ 0.41 |
| Percentage decrease of absolute book-tax difference | 63% | 94% |

**Note:** [a] We define the pre-SOX as the year 2000-2001, and the post-SOX as the years 2002-2017. We calculate percentage change as (post-period minus pre-period) / pre-period. [b] Audit fees are in $, book-tax differences andaccruals are in $ millions.

Table 5 provides the results for Model 1 using industry and year fixed effects in panel data regression. In the pre-SOX columns, the log of book-tax difference is statistically significant with a coefficient of 0.0252. This variable is also economically significant, which suggests firms with large book-tax differences have 2.6 percent higher audit fees ($e^{0.0252}$ - 1). The coefficient on *BIG4* is 0.3893, which is statistically significant at 1 percent level, and is equivalent to an audit premium of 46.2 ($e^{0.3893}$ - 1) percent. Log of total asset is also statistically significant with a coefficient of 0.5002 at 5 percent level, which means the greater the firm size, the higher the audit fee. In the post-SOX columns, after adding the interaction term *LABSBTD*SOX*, all other variables remained at the same significance level. However, the stand-alone *LABSBTD* is no longer



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significant. Instead, the interaction term becomes statistically significant with a coefficient of 0.0205 at 1 percent level, indicating the book-tax difference in the post-SOX period is significant and positive. The coefficient on SOX is significant at 1 percent level, indicating the implementation of SOX is a key factor for audit fees. Therefore, the results of Model 1 support Hypothesis 1. This suggests that auditors require higher fees following the implementation of the SOX, and this might be due to the scandal in 2002 that increased the clients' inherent risk. In addition, according to the SOX guidance, auditors are required to do more attestation and put more effort into the audit work. Further, the Enron and World.com scandal leads the auditor to a higher risk environment, for example, they are facing potential litigation risk and reputation damage. I provide additional support for the significance of the book-tax difference variable by using the F-test to examine the joint significance of *LABSBTD* and *LABSBTD*SOX*. The results show that the F-statistic of $\beta_1+\beta_4>0$ is significant (P-value<.0001), indicating that book-tax difference leads to a higher audit fee in the post-SOX period, while controlling for other variables.

**Table 5**
**REGRESSION OF LOG OF AUDIT FEES ON LOG OF BOOK-TAX DIFFERENCES**

| **Dependent Variable: *LAF*** | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | **Model 1 (Pre-SOX)** | | | **Model 1 (Post-SOX)** | | |
| **Independent** | | **Standard** | | | **Standard** | | |
| **Variables** | | **Coefficient** | **Errors** | | **Coefficient** | **Errors** | |
| Intercept | ? | 9.9508 | (0.0842) | *** | 9.1803 | (0.0664) | *** |
| *LABSBTD* | + | 0.0252 | (0.0037) | *** | 0.0070 | (0.0092) | |
| *LABSACC* | + | 0.0070 | (0.0106) | | 0.0069 | (0.0106) | |
| *SOX* | + | | | | 0.7658 | (0.0781) | *** |
| *LABSBTD*SOX* | + | | | | 0.0205 | (0.0084) | ** |
| *BIG4* | + | 0.3893 | (0.0355) | *** | 0.3872 | (0.0359) | *** |
| *LAT* | + | 0.5002 | (0.0140) | *** | 0.4996 | (0.0140) | *** |
| *LBUSSEG* | + | 0.0268 | (0.0110) | ** | 0.0271 | (0.0110) | ** |
| *INV* | + | 0.3957 | (0.1272) | ** | 0.3950 | (0.1267) | ** |
| *REC* | + | 0.7714 | (0.0822) | *** | 0.7700 | (0.0825) | *** |
| *INCOME* | - | -0.0021 | (0.0013) | * | -0.0018 | (0.0012) | |
| *LOSS* | + | 0.0616 | (0.0147) | *** | 0.0620 | (0.0148) | *** |
| *AUDOPIN* | - | -0.1575 | (0.0132) | *** | -0.1574 | (0.0133) | *** |
| *NOL* | + | 0.3089 | (0.0290) | *** | 0.3083 | (0.0291) | *** |
| *LEV* | + | 0.0198 | (0.0154) | | 0.0194 | (0.0154) | |
| *ROA* | - | -0.1002 | (0.0097) | *** | -0.1001 | (0.0096) | *** |
| *RDI* | + | -0.0066 | (0.0021) | ** | -0.0066 | (0.0021) | ** |
| Industry dummies | | Yes | | | Yes | | |
| Year dummies | | Yes | | | Yes | | |
| F test for ($\beta_1+\beta_4$) | | (<.0001) | | | (<.0001) | | |
| N | | 24587 | | | 24587 | | |
| R-Square | | 0.80 | | | 0.80 | | |

**Note:** *, **, *** represent 10 percent, 5 percent, and 1 percent significance levels, respectively. Industry and year fixed effects are included. Industry dummies are the industry indicator variables for industries based on two-digitSIC code. The standard errors in parentheses are clustered within industry level. For the joint test of coefficients of *LABSBTD* and *LABSBTD*SOX* ($\beta_1+\beta_4$), F-statistics are shown in parentheses.



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In Table 6, we partitioned our sample into the large size and small size subsamples using the median of log of total asset (5.655) as a cutoff point. Although the log of total assets is already used as a control variable in the models, we intend to investigate the size effect in a more detailed way. We re-estimate Model 1 using the two subsamples. *LABSBTD* is significant in both subsamples. The *LABSBTD* coefficients are equal to 0.1715 and 0.0205 for large firms and small firms, respectively, suggesting that 18.71 ($e^{0.1715}$-1) percent of the audit premium is related to book-tax difference issues in large firms, and only 2.07 percent in small firms that is less more than 9 times compared to the large size firms. However, the coefficient of 0.0581 on *LABSBTD*SOX* for small firms remains at 1 percent significance level but large firms are no longer significant (coefficient=0.0074). One possible explanation is that big firms mostly use Big 4 auditors, and Big 4 auditors have better skills and advanced technologies to deal with multidirectional risks. On the other hand, non-Big 4 firms have less developed programs and skills to help them better understand clients' situation. Thus, for clients of non-Big 4, they are more likely to have greater book-tax differences after the SOX than those audited by Big 4 auditors. Another explanation is that the Sarbanes-Oxley Act has a greater impact on large-size firms, indicating the firms put more effort to fix the book-tax difference problem to prevent reputation damage and big financial problems. Further, we find that the coefficient on *SOX* (1.2027) for large firms is higher than the coefficient on *SOX* (0.8674) for small firms, this is consistent with the notion that SOX has a more pronounced impact on larger firms. Therefore, we conclude that the small size firms are the driving factor for having a large book-tax difference in the post-SOX period. In conclusion, the results are partially consistent with our expectation of Hypothesis 2. The coefficients on accruals are 0.205 and 0.2123 for large and small firms, respectively, and are positively significant at 1 percent level. This is consistent with the notion that a company with high accruals will have a significantly positive relationship between book-tax differences and higher audit fees (Hanlon et al., 2012). The coefficient on *AUDOPIN* is -0.1665 at 1 percent significance level and is -0.0207 not significant in large firms and small firms, respectively. This indicates that in large firms, audit fees depend more on audit opinion compared to those in smaller firms. Moreover, leverage is more important in determining audit fees in large firms than in small firms. Further, the impact of higher research and development intensity on audit fees is more pronounced in large firms.

**Table 6**
**REGRESSION OF LOG OF AUDIT FEES USING LARGE-SZE FIRMS AND SMALL-SIZE FIRM**

| **Dependent Variable: *LAF*** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Independent Variables** | | **Large Firms** | | | **Small Firms** | | |
| | | **Coefficient** | **Standard Errors** | | **Coefficient** | **Standard Errors** | |
| Intercept | ? | 9.9508 | (0.0842) | *** | 10.5149 | (0.0357) | *** |
| *LABSBTD* | + | 0.0252 | (0.0037) | *** | 0.0205 | (0.0099) | |
| *LABSACC* | + | 0.0070 | (0.0106) | | 0.2123 | (0.0156) | |
| *SOX* | + | | | | 0.8674 | (0.0688) | *** |
| *LABSBTD*SOX* | + | | | | 0.0581 | (0.0134) | ** |
| *BIG4* | + | 0.3893 | (0.0355) | *** | 0.7038 | (0.0472) | *** |
| *LBUSSEG* | + | 0.5002 | (0.0140) | *** | 0.0711 | (0.0153) | *** |
| *INV* | + | 0.0268 | (0.0110) | ** | -0.3295 | (0.0844) | ** |
| *REC* | + | 0.3957 | (0.1272) | ** | 0.1261 | (0.1105) | ** |
| *INCOME* | - | 0.7714 | (0.0822) | *** | -0.0009 | (0.0011) | *** |
| *LOSS* | + | -0.0021 | (0.0013) | * | -0.0861 | (0.0207) | |
| *AUDOPIN* | - | 0.0616 | (0.0147) | *** | -0.0207 | (0.0234) | *** |
| *NOL* | + | -0.1575 | (0.0132) | *** | 0.1841 | (0.0301) | *** |



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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *LEV* | + | 0.3089 | (0.0290) | *** | -0.0038 | (0.0139) | *** |
| *ROA* | - | 0.0198 | (0.0154) | | 0.0841 | (0.0059) | |
| *RDI* | + | -0.1002 | (0.0097) | *** | -0.0132 | (0.0074) | |
| Industry dummies | | Yes | | | Yes | | |
| Year dummies | | Yes | | | Yes | | |
| F test for ($\beta_1$+$\beta_4$) | | (<.0001) | | | (<.0001) | | |
| N | | 24587 | | | 24587 | | |
| R-Square | | 0.80 | | | 0.80 | | |

**Note:** *, **, *** represent 10 percent, 5 percent, and 1 percent significance levels, respectively. Industry and year fixed effects are included. Industry dummies are the industry indicator variables for industries based on two-digit SIC code. The standard errors in parentheses are clustered within industry level. The cutoff point splitting the subsamples is based on the median of total asset. For the joint test of coefficients of *LABSBTD* and *LABSBTD*SOX* ($\beta_1$+$\beta_4$), F-statistics are shown in parentheses.

To further investigate whether our results are driven by either negative or positive book-tax differences, we partitioned our sample into two groups, which are *NBTD* (negative book-tax difference) and *PBTD* (positive book-tax difference). The interaction terms *NBTD*SOX* and *PBTD*SOX* capture whether SOX has an effect on either or both categories. Table 6 shows that before SOX implementation, the coefficient of 0.0402 on positive book-tax difference is positive and significant, and the coefficient on *NBTD* group (coefficient=0.0091) is not significant, indicating as book-tax difference become more positive, audit fees increase. Therefore, consistent with the notion of Halon et al. (2012), negative book-tax differences do not increase audit fees as much as do positive book-tax differences. This implies that more book income over taxable incomecauses greater audit risk before SOX. After SOX implementation, the positive book-tax difference is only significant at the marginal level, but negative book-tax difference is significant at 1 percent level, indicating that the negative book-tax difference becomes the dominant factor that leads to a higher audit fee. This suggests that SOX has a greater impact on mitigating the issues when earnings are overstated rather than when understated.

**Table 7**
**REGRESSION OF LOG OF AUDIT FEES USING NEGATIVE BTD AND POSITIVE BTD**

**LAF = $\alpha$ + $\beta_1$NBTD (or PBTD) + $\beta_2$LABSACC + $\beta_3$SOX + $\beta_4$NBTD (or PBTD)*SOX + Control Variables + $\varepsilon$**

**Dependent Variable: *LAF***

| | | **Negative BTD** | | | **Positive BTD** | | |
|---|---|---|---|---|---|---|---|
| **Independent** | | **Coefficient** | **Standard** | | **Coefficient** | **Standard** | |
| **Variables** | | | **Errors** | | | **Errors** | |
| Intercept | ? | 9.2446 | (0.0072) | *** | 9.0120 | (0.0835) | *** |
| *NBTD* | + | 0.0091 | (0.0095) | | | | |
| *NBTD*SOX* | + | 0.0415 | (0.0105) | *** | | | |
| *PBTD* | + | | | | 0.0402 | (0.0124) | *** |
| *PBTD*SOX* | + | | | | 0.0203 | (0.0115) | * |
| *LABSACC* | + | 0.0044 | (0.0102) | | 0.0068 | (0.0117) | |
| *SOX* | + | 0.8110 | (0.0622) | *** | 0.7781 | (0.1061) | *** |
| *BIG4* | + | 0.3933 | (0.0353) | *** | 0.3737 | (0.0515) | *** |
| *LAT* | + | 0.4921 | (0.0143) | *** | 0.5166 | (0.0142) | *** |
| *LBUSSEG* | + | 0.0362 | (0.0111) | *** | 0.0197 | (0.0152) | *** |
| *INV* | + | 0.3378 | (0.1158) | *** | 0.4590 | (0.1534) | *** |
| *REC* | + | 0.7415 | (0.0827) | *** | 0.8094 | (0.1074) | ** |
| *INCOME* | - | -0.0029 | (0.0016) | * | -0.0002 | (0.0010) | |



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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *LOSS* | + | 0.0232 | (0.0144) | | 0.1436 | (0.0302) | *** |
| *AUDOPIN* | - | -0.1667 | (0.0168) | *** | -0.1450 | (0.0180) | *** |
| *NOL* | + | 0.2649 | (0.0340) | *** | 0.3314 | (0.0303) | *** |
| *LEV* | + | 0.0165 | (0.0203) | | 0.0194 | (0.0118) | |
| *ROA* | - | -0.0887 | (0.0103) | *** | -0.1222 | (0.0143) | *** |
| *RDI* | + | -0.0079 | (0.0029) | *** | -0.0080 | (0.0021) | *** |
| Industry dummies | | Yes | | | Yes | | |
| Year dummies | | Yes | | | Yes | | |
| F test for ($\beta_1$+$\beta_4$) | | (<.0001) | | | (<.0001) | | |
| N | | 11684 | | | 12900 | | |
| R-Square | | 0.67 | | | 0.72 | | |

**Note:** *, **, *** represent 10 percent, 5 percent, and 1 percent significance levels, respectively. Industry and year fixed effects are included. Industry dummies are the industry indicator variables for industries based on two-digit SIC code. The standard errors in parentheses are clustered within industry level. For the joint test of coefficients of LABSBTD and LABSBTD*SOX ($\beta_1$+$\beta_4$), F-statistics are shown in parentheses.

## Model Selection

Next, we investigated whether the fixed effects or random effects model best suits my analysis. Intuitively, we would choose fixed-effects model. The random effects assume that the unobserved variables are uncorrelated with the other explanatory variables, and we only use random effects if Hausman test fails to reject the null (Wooldridge, 2015). However, this is not true in our case since there might be other factors that would affect the dependent variable audit fees. We do not have a reason to support that there would not be any unobservable affecting the audit fees through the explanatory variables. Therefore, we would choose fixed effects model as it can estimate the time variant omitted variables. After using the Hausman test, the results (untabulated) reject the null (Pr<.0001). And that we choose fixed effects model rather than random effects. In addition, when we change the industry effects to firm effects for robustness check, we find that our results remained consistent under both conditions.

## CONCLUSIONS

This study investigates whether the relationship between book-tax difference and audit fees changes from pre- to post-SOX period. We measure whether the SOX can mitigate the gap in book and taxable income, and whether it is a determinant of audit pricing. The results show that the book-tax differences are significantly positively related to the audit fees. Further, we find a strong positive association between audit fees and book-tax difference in the post-SOX period, rather than in pre-SOX. Moreover, both small firms and large firms have a strong impact on the costs of audit work. The results show that large firms have greater book-tax differences than smaller firms during the pre-SOX period; however, smaller firms start to drive a large gap between book and taxable income in the post-SOX period. Overall, this concludes that firm size is a useful proxy for evaluating the risk that affects audit fees. The results show that the impact of *SOX* on large firms is higher than smaller firms. Also, *AUDOPIN* is more pronounced in large firms than in smaller firms. This suggests that large firms rely more heavily on audit report opinions for audit pricing than smaller firms. In addition, leverage is more important in large firms during audit work, and it has been used as a risk proxy. We find that positive book-tax groups are significantly positively related to audit fees during the pre-SOX period, indicating that overstating the earnings is much riskier. The results show that the positive book-tax difference has been minimized after the implementation of SOX. Further, in untabulated results, we find that using either firm or industry



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fixed effects leads to the same results, and our choice of fixed effects models over random effects is based on the Hausman test.

Overall, our study contributes to the literature by providing some insights into the effect of pre- and post-SOX on the relationship between book-tax differences and audit fees. The results in our study should help regulators to consider using book-tax difference as a proxy to assess inherent risks, earnings management, or even fraud activities. Also, the study would help readers to gain some knowledge of the SOX impact on tax practice issues.

## Appendix

| **Appendix**<br>**VARIABLE DEFINITION** | |
|---|---|
| *LAF* | Log of audit fee (AUDIT_FEES) |
| *LABSBTD* | Log of the absolute value of the spread between pretax book income and taxable income. Following Hanlon et al. (2012). Total book–tax differences = pre-tax book income (pi) - estimated taxable income. Taxable income = [total income tax (txt) - deferred taxes (txdi)]/ the top U.S. statutory tax rate (35%) - the change in net operating loss carryforward (tlcf). |
| *LABSACC* | Log of the absolute value of total accruals, equals to earnings (ebit) – cash flow from operations (oancf). |
| *SOX* | Sarbanes–Oxley Act equals to 1 after year 2002; zero otherwise. |
| *LABSBTD*SOX* | Interaction term of log of the absolute value of book-tax difference and Sarbanes–Oxley Act. |
| *NBTD* | Book income minus taxable income is a negative number. |
| *PBTD* | Book income minus taxable income is a positive number. |
| *NBTD*SOX* | Interaction term of negative book-tax difference and Sarbanes–Oxley Act. |
| *PBTD*SOX* | Interaction term of positive book-tax difference and Sarbanes–Oxley Act. |
| *BIG4* | An indicator variable set equal to 1 for client-observations audited by a Big 4 auditor, and0 otherwise |
| *LAT* | Log of total assets (at) |
| *LBUSSEG* | Log of the number of business segments owned by the client; |
| *INV* | Inventory (invt) to average total assets; |
| *REC* | Receivables (rect) to average total assets |
| *INCOME* | The ratio of operating income after depreciation (oiadp) to average totalassets; |
| *LOSS* | An indicator variable set equal to 1 if income before extraordinary items (ib) is negative in the current year, and 0 otherwise; |
| *AUDOPIN* | An indicator variable equals to 1 if the firm receives an unqualified audit opinion, and 0 otherwise. An unqualified opinion is coded as 1 in Compustat; |
| *NOL* | Indicator variable equal to 1 if tax-loss carryforward (tlcf) is not equal to0; 0 otherwise. |
| *LEV* | Long-term debt (dltt) scaled by total assets (at). |
| *ROA* | Net income over total assets |
| *RDI* | Research and development expense (xrd) divided by net sales (sale). |
| *IND* | Industry indicator variables based on the two-digit SIC codes |
| *YEAR* | Year of the observation |
| **Note:** The letters in the parenthesis represents the variables in Compustat and AuditAnalysis database. | |



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