The Financial Impact of the Sarbanes-Oxley Act on Small vs. Large US Public Companies

Stephen Primack
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Economics Department
University of California, Berkeley
Thesis Advisor: Professor Konstantin Magin

Abstract:

In the early 2000's there were several large-scale accounting scandals involving auditing fraud and dishonesty from corporate board members. In a response to these illegal events and to restore confidence in the markets, Senator Paul Sarbanes and Representative Michael Oxley both created legislation to reform and enhance rules regarding corporate and auditing standards and accountability. This paper examines the effects of the Sarbanes-Oxley Act of 2002 (SOX) on small vs. large public US companies. It considers two major complaints: fees paid to auditors by publically traded companies were significantly higher due to the bill, and the impact of the bill was significantly more harmful to smaller companies than it was to larger companies. The impact of this bill is analyzed using panel data on fees, earnings, and size for publically traded companies over the years 2000-2010. My results show that the auditing fees paid by companies increase significantly following Sarbanes-Oxley, however, smaller companies pay a greater share of those fees and are disproportionately impacted by SOX. SOX raised average auditor fees as a percent of assets by 43% for a 15th percentile firm and 23% for an 85th percentile firm by market cap, versus their pre-SOX levels.

[1] **Acknowledgements:** I would like to thank Professor Magin for choosing this topic, and for all the support and inspiration he has provided for me over the last two years. I would also like to thank PhD Candidates Matt Botsch and Pedro Castro for providing an extraordinary amount of help and feedback with the research process, strengthening my knowledge of econometrics, and teaching me how to use STATA. Lastly, I would like to thank my friends and family for all their continued love and support.

1. Introduction

1.1 Background

In the early 2000's there were several large-scale accounting scandals involving auditing fraud and dishonesty from corporate board members.[2] These events shook the public's confidence in the markets, as the investors in the affected companies had lost billions of dollars as share prices collapsed. In a response to the illegal behaviors that created these events and to restore confidence in the markets, Senator Paul Sarbanes and Representative Michael Oxley both created legislation to reform and enhance rules regarding corporate and auditing standards and accountability. Their combined efforts resulted in the passing of the Sarbanes-Oxley Act of 2002. Sarbanes-Oxley is comprised of 11 sections, which include criminal penalties, additional corporate board responsibilities, additional internal control assessments and oversight, auditor independence, corporate governance, enhanced financial disclosure, and the creation of the Public Company Accounting Oversight Board (PCAOB).

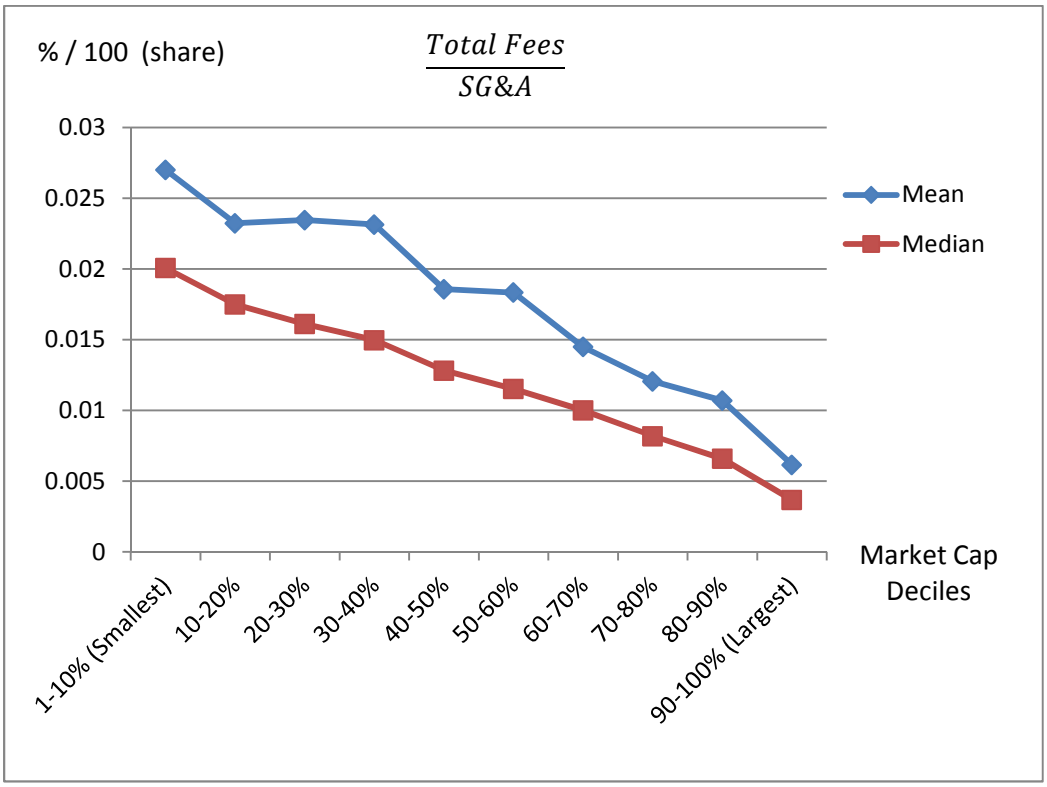
While Sarbanes-Oxley (SOX) may have helped restore investor confidence in the markets in the short run, the costs to public companies have been more burdensome than intended. Many firms complained that both the upfront costs of compliance would be extreme and that continued compliance would also be costly. One aspect of the bill companies frequently cite as burdensome is in regards to section 404 of SOX, which imposes stricter oversight of internal controls by the corporate board and CEO. [3] This means that corporate boards now have to spend more time and money reviewing the internal controls. D'Aquila (2004) finds that these

[2] Enron, WorldCom, Tyco International, etc.
[3] Internal controls are the processes used to provide reasonable assurance of the reliability of financial reports

costs include more fees paid to auditors, the need for new personnel, new documentation, updating documentation, hiring additional lawyers and consultants, staff training, certifications, technology, and many others. Additionally, the internal control procedures had to be review by an external auditor, meaning that new contracts and more hours had to be paid to auditing companies.

Many smaller companies felt that they were disproportionately impacted by fee increases. This is mainly because larger companies may have economies of scale in audit fees relative to smaller companies. Furthermore, smaller companies are more sensitive to changes in audit fees, as these fees comprise a larger percentage of the SG&A expenses in smaller companies than larger companies.[4] The percentage of $\frac{Total\ Fees}{SG\&A}$ is nearly 4.5 times larger for the smallest 10% of companies than the largest 10% of companies.

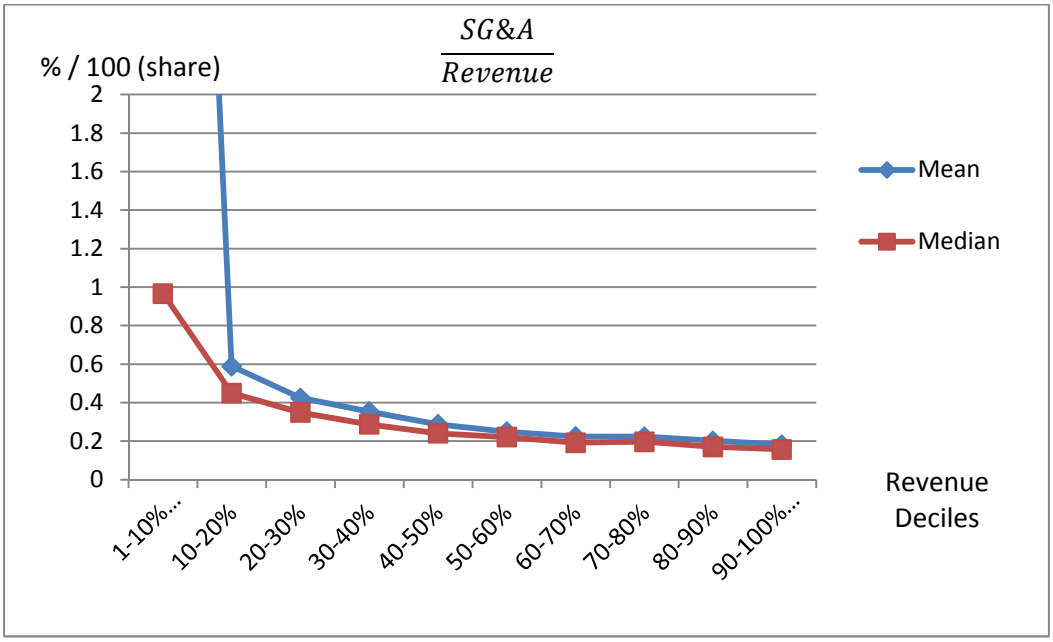
Chart 1:



[4] Selling, general, and administrative (SG&A) costs include consulting, legal, general administrative, and audit fees, and are deducted from revenue when calculating profitability

Using $\frac{Total\ Fees}{SG\&A}$ averaged across all firm-years in each market cap decile over the years 2000-2010, chart 1 shows that auditor fees decrease as market cap increases. Smaller companies' auditing fees comprise a higher percentage of SG&A than larger companies.

Chart 2:



Using $\frac{SG\&A}{Revenue}$ averaged across all firm-years in each revenue decile over the years 2000-2010, the above chart show that SG&A fees are greater for companies with smaller revenues. Although I primarily use market cap for size in the main analysis, I compare SG&A to revenue here to provide a better sense of the relative impact of these expenses. The market cap is the equity value of the company, whereas the revenue is the actual yearly earnings. Since SG&A expenses are deducted from revenue as a first step in calculating profitability, this graph shows that smaller companies already face larger SG&A expenses relative to revenue, and are thus more sensitive to increases in auditor fees. The smallest 10-20% of companies has a median of 44.9% and a mean of 58.9%, and the largest 10% have a median of 15.7% and a mean of 18.2%. Comparing the largest 10% to even smallest 10-20%, we see that $\frac{SG\&A}{Revenue}$ is greater for companies with lower revenue.

In addition to the expenses and increased fees, other parts of SOX were also cited as potential extra costs from the bill. Two sections of the bill that are cited involve the mandatory rotation of the principal auditor after a certain number of years, and limiting the services provided by each audit company. The costs that are associated from these segments are harder to quantify, as GAO (2003) finds that the primary concerns involve the costs of time and money in the business-relations and processes of switching, rotating, and adding auditing/consulting firms. Section 109 of Sarbanes-Oxley establishes that the PCAOB is to be funded directly through fees that are collected directly from companies. Section 109 does not establish a constant, consistent amount to charge companies; this fee depends on the budget set each year by the PCAOB. This is effectively a tax from companies to the PCAOB, which is collected each year from each company.

1.2 Theory and Literature Review

This paper hopes to add to the numerous papers on the impacts of the Sarbanes-Oxley Act of 2002. There are several papers that consider the effects of SOX on private vs. public decisions, including Morgenstern & Nealis (2004), Engel, Hayes, & Wang (2005), and Carney (2004). Engel, Hayes, & Wang find that in many cases the costs of compliance outweigh the benefits to shareholders. Specifically, there is a higher incidence of smaller companies going private, especially when there is a high percentage of inside ownership. There are also a plethora of papers that consider the impacts of the internal control policies on fees and corporate management, including Holmstrom & Kaplan (2003), Zhang (2007), Griffin & Lont (2005), and Syron (2011). This paper seeks to focus specifically on how SOX impacts companies' costs, and whether or not the effects are different between larger and smaller firms. In addition to looking at

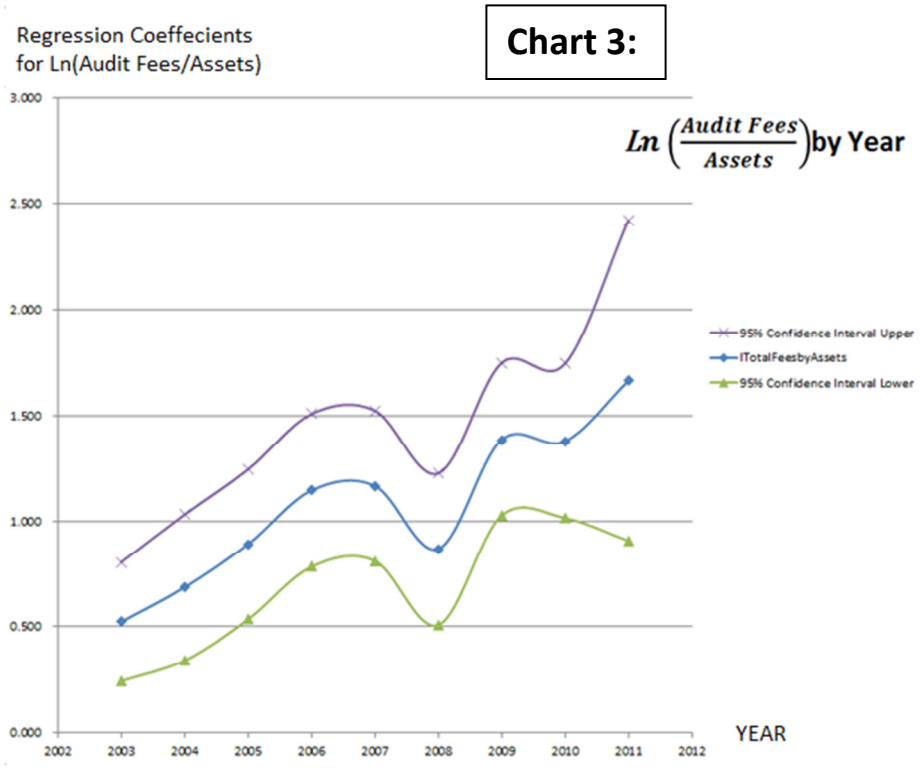
differences in fees for different firms' sizes, I also examine whether the costs significantly increased from SOX.

The timing of Sarbanes-Oxley is very important in understanding how it affects costs. Sarbanes-Oxley was passed in 2002, with an effective start date of 2004. In early 2004, the SEC conducted a study to determine the impact SOX had on costs. At that time, the SEC (2011) found that the costs for companies' compliance had been significant and that there was still much confusion regarding compliance. This led to several extensions of compliance deadlines and more studies on the impacts of the costs of compliance. What I expect to see from this is that companies' fees and expenses would experience large, significant increases between 2002 and 2004, as they assumed that compliance was mandatory by 2004. Following the implied compliance deadlines, I expect to see a significant increase in fees each year, although the increases should not be as drastic after the initial years of compliance.

When comparing the effects of costs across different firm sizes, I expect the negative impact to be greater on smaller companies than on larger companies. This is because some of these compliance costs are fixed, and some are variable. I expect fee increases from new regulations to add fixed-cost auditor fees. Sarbanes-Oxley introduces new regulations and requirements for auditors, which means that a wider array of audit services is required. I also expect there to be variable-cost fees that differ by company size, as a larger company should have more information for the auditors to process. I believe that this is because larger companies benefit from having economies of scale in auditor fees; as firm size increases, the average cost of additional fees that a company pays to its auditor is less. Since I expect SOX to increase fees for all companies, I believe that the overall percentage of audit fees that companies pay will be even less than it was before SOX for larger companies than for smaller companies.

1.3 Summary of Findings

My research revealed that following Sarbanes-Oxley there was a large increase in audit fees for all companies.



The above chart shows a 95% confidence interval of the regression coefficients for market cap interactions with each year from one of my main regressions (Regression 4), which shows percentage increases in $\frac{Total\ Fees}{Assets}$ each year relative to the year 2000 (1 means $\frac{Total\ Fees}{Assets}$ increases 100%, or doubles). However, the increase in fees was less for larger companies than smaller companies; larger companies paid lower audit fees as a percentage of total assets to auditors than smaller companies. (Regression 2) This means that the impact of Sarbanes-Oxley disproportionately affected smaller companies.

Additionally, the observations show that the changes in fees for all companies increase over time, with the largest increases occurring the year SOX was passed and the year after (2002

and 2003). This is consistent with the complaints filed by companies that the upfront costs of compliance were a large burden. Furthermore, the lesser disadvantage that a larger company has over a smaller company increases after the passing of Sarbanes-Oxley.

2. Data

The data I use for this project comes from two databases, Compustat and AuditAnalytics (accessed via the WRDS Server). [5] I collect data for each company for the years 2000-2010 on revenues, assets, market capitalization, SG&A, industry, audit fees, the exchange the stock's listed on, and the ticker symbols. Then, I remove financial firms, regulated utility firms, and companies that are in the dataset that aren't listed on major public US exchanges.[6]

My next step is to merge the Compustat database into the AuditAnalytics database by company and fiscal year. Because the two datasets are different, I ensure that the data merges properly, as the listings in the two data sets are sometimes different. There is also an issue with companies having multiple auditors for the same fiscal year. Fortunately, there is a variable in the AuditAnalytics database that contains the summed total fees, audit fees, and audit related fees for each year. Because this variable is the same for each year, and all other variables (except for the auditor name) are the same, I keep only the first entry every time there is more than one data point for the same ticker-year.

After performing these steps, the two databases are able to merge uniquely without any error and my dataset is complete with over 25,000 observations. With my finalized dataset, I use

[5] WRDS – Wharton Research Data Services, accessible via http://wrds-web.wharton.upenn.edu/wrds/

[6] Companies not listed on major exchanges (such as over the counter) were not included, as they were not affected by SOX. By nature, major financial firms have very different capital structures, and their auditing is already more complex. Regulated utility firms are special cases, as their management teams are already bound by stricter regulations

the revenue, assets, total fees, audit fees, audit related fees, and market capitalization from AuditAnalytics, and SG&A and NAICS (sector/industry) codes from Compustat.[7]

Table 1:

Descriptive Statistics

Variable	Mean ($)	Standard Error ($)	Min ($)	Median ($)	Max ($)	Obs
Total Fees (Mean, SE, Median, Max in Million $)						
2000	2.52	7.61	0	0.534	92.1	1172
2001	2.16	6.31	11000	0.514	86.5	1883
2002	1.83	5.44	3500	0.492	92.9	2043
2003	1.77	4.79	4500	0.528	91.6	2168
2004	2.35	5.75	2000	0.856	103	2268
2005	2.47	5.45	3500	1.03	109	2389
2006	2.52	5.36	5737	1.08	115	2503
2007	2.58	5.23	2400	1.16	123	2557
2008	2.58	5.44	11235	1.14	133	2618
2009	2.37	5.1	2500	1.04	110	2704
2010	2.39	5.09	2702	1.03	109	2702
Assets (Mean, SE, Median, Max in Billion $)						
2000	3.23	18	1677484	0.336	437	1165
2001	2.93	16.4	54037	0.341	495	1883
2002	2.93	17.1	81	0.308	575	2040
2003	3.04	18.4	33	0.322	647	2158
2004	3.16	19.9	21	0.354	751	2261
2005	3.22	18.5	27050	0.37	673	2374
2006	3.49	19.6	15274	0.403	697	2496
2007	3.75	21.2	29340	0.446	795	2550
2008	3.72	20.7	0	0.458	798	2624
2009	3.74	20.6	10	0.421	782	2715
2010	3.99	20.8	644187	0.467	751	2714
Market Cap (Mean, SE, Median, Max in Billion $)						
2000	4.78	24.5	0	0.357	476	1140
2001	3.95	21.1	0	0.372	398	1854
2002	3.09	15.8	0	0.267	293	2010
2003	3.48	17.2	0	0.376	312	2134
2004	3.85	18.3	0	0.468	386	2237
2005	3.94	17.7	0	0.497	367	2332
2006	4.15	18.8	0	0.523	439	2468
2007	4.53	20.6	0	0.546	504	2551
2008	3.08	15.3	0	0.317	397	2626
2009	3.4	15.4	0	0.362	322	2697
2010	4.09	17.1	0	0.526	364	2713

Table 1 includes information on the variables used in my main regressions across each year. Metrics for total fees are reported in millions of dollars, while assets and market cap are reported in billions of dollars.

3. Methodology

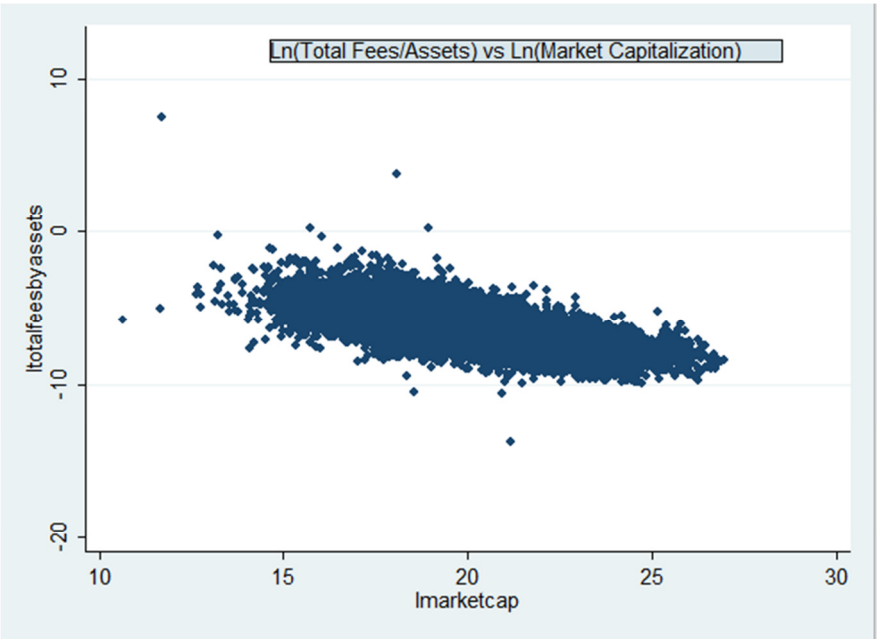
3.1 Hypothesis

The overall goal of this paper seeks to test whether the Sarbanes-Oxley Act of 2002 impacted smaller companies disproportionately. My hypothesis is that the fees companies pay to auditors are significantly greater following SOX, and that smaller companies are at a

[7] SG&A fees from Compustat were scaled by $1M to match data from AuditAnalytics

disadvantage in handling these fees compared to larger companies. I believe that the lesser disadvantage that larger companies have comes from economies of scale in audit fees. I look at fees standardized by assets because it makes more sense to standardize the audit fees as a percentage of everything that companies own. By using this percentage, the interpretation is more intuitive than looking at just the audit fees across companies.

Although there is no direct way to see how each part of the bill affects fees, the best measure that can be used is the fees paid to auditors. Located in companies' annual 10K statements and 14A proxy statements, there is a line on total fees paid to auditors. The breakdown of the total fees includes audit fees, audit related fees, other fees, and tax fees. It seems like the majority of the additional costs are broken down into the audit fees and audit related fees, although different companies state the effects of SOX on those lines differently (or not at all), so there appears to be a lack of standardization for how these fees are divided and reported. I use total fees for the main analysis, as that includes the additional fees required for the same services rendered prior to SOX and the new fees for new services for SOX compliance.



The above chart shows that $\frac{Total\ Fees}{Assets}$ is bigger for smaller companies than for larger companies. In my main analyses, I use market cap as my main regressor and as a measure for size. Market cap is a measure for how the market views the net worth of a company and is frequently used as a proxy for size by investors. I also use assets and revenue as other measures of size for robustness checks.

I also expect to see that companies' fees and expenses would experience large, significant increases around 2002-2004, as companies assumed that they had to be in compliance with SOX by 2004. Following the implied compliance deadlines, I expect to see a significant increase in fees each year, although the increases should not be as drastic after the initial years of compliance.

3.2 Main Formulae/Regressions

The main goal of the paper is to examine whether or not smaller companies were disproportionately affected by Sarbanes-Oxley. In my primary analysis, I was interested in how the auditing fees as a percentage of total assets compared across firms of different sizes, using market cap as a measure for size. Additionally, I wanted to see how the fees changed for all companies in the market following Sarbanes-Oxley, as well as the interaction of the change in fees with market cap size following SOX. When looking at the dependent variable $\frac{Total\ Fees}{Assets}$ and the independent variable (Market Cap), I use logarithms to look at percentage changes and control for outliers.

The first model I use to examine this is an Ordinary Least Squares regression (OLS), using industry-based cluster robust standard errors. I start with an OLS estimate, as it is the dominant econometric method used for estimating the slope coefficients in regression analyses.

The coefficients show how the left hand side (LHS), dependent variable changes in response to changes in right hand side (RHS), independent variables. To group industries together, I use information from Compustat (NAICS codes) to group 18 sectors together. The cluster robust standard errors relax the independence constraint of the regression to account for correlation (of the error terms) within each sector.[8] I start with this simple regression to get an idea of how these independent variables interact with $\frac{Total\ Fees}{Assets}$. The equation for the first regression is given by:

OLS:

Regression 1

$$Ln\left(\frac{Total\ Fees}{Assets}\right)_{it} = \alpha_0 + \beta_{\ln(Market\ Cap)} Ln(Market\ Cap)_{it} + \beta_{PostSOXdummy} PostSoxdummy + \beta_{PostSox} * Ln(Market\ Cap)_{it} + \epsilon_{it}$$, where

α_0 is the intercept

$\beta_{ln(Market\ Cap)}$ - the coefficient for the log of the Market Cap

$\beta_{PostSOXDummy}$ - a dummy variable indicating the year is on or after 2004 (initial SOX compliance date)

$\beta_{PostSox}$*Ln(Market Cap) - the effect of Market Cap after SOX

ε - the error term

i- firms

t- years

Linear regression

Number of obs	24287
F(3, 17)	1341.28
Prob > F	0.0000
R-squared	0.4930
Root MSE	.82086

(Std. Err. adjusted for 18 clusters in sector)

$Ln\left(\frac{Total\ Fees}{Assets}\right)$	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
lmarketcap	-.3435514	.0167329	-20.53	0.000	-.3788547	-.3082481
postsoxdummy	1.790343	.1586641	11.28	0.000	1.45559	2.125095
postlmarkcap	-.0688752	.0081307	-8.47	0.000	-.0860294	-.051721
_cons	.4530911	.3019907	1.50	0.152	-.1840536	1.090236

This basic regression confirms my hypothesis and provides an intuition for what is happening. The relationship between $Ln(\frac{Total\ Fees}{Assets})$ and $Ln(Market\ Cap)$ is negative, which

[8] This method was created by Arellano, M. (1987) and Rogers, W. (1993)

indicates that larger firms pay less fees as a percentage of their assets than smaller companies do. Specifically, this regression shows that a 1% increase in market cap leads to a .34% decrease in $\frac{Total\ Fees}{Assets}$. Following Sarbanes-Oxley, all companies pay a larger amount of fees as a percentage of their assets, shown by PostSOXdummy. This coefficient means that on average, $\frac{Total\ Fees}{Assets}$ are increased by 179% of what they were before. Finally, the interaction term of $Ln(Market\ Cap)$ post-SOX shows that after SOX, the additional percentage of $\frac{Total\ Fees}{Assets}$ that larger companies face is less than that of smaller companies by .069% (per a 1% increase in market cap); smaller companies pay a higher percentage of fees following Sarbanes-Oxley.

Since I have data for multiple firm-years (panel data), I ran the same regression using a fixed effects model (FE1). The fixed effects model controls for firm-specific factors that affect $\frac{Total\ Fees}{Assets}$ that are invariant over time. I use this model because observing changes in the dependent variable over time with panel data allows me to eliminate the effect of omitted variables that differ across firms but are constant over time. Omitted variable bias arises when a regressor is correlated with a variable that is not included in the analysis, but partially determines the dependent variable. This model helps take away some ambiguity from omitted variables by concentrating on what happens following SOX.

FE1:

Regression 2 (Main Result 1)

$$Ln\left(\frac{Total\ Fees}{Assets}\right)_{it} = \alpha_i + \beta_{Ln(Market\ Cap)} Ln(Market\ Cap)_{it} + \beta_{PostSoxDummy} PostSoxDummy + \beta_{PostSox*Ln(Market\ Cap)} PostSox * Ln(Market\ Cap)_{it} + \epsilon_{it}$$

Fixed-effects (within) regression — Number of obs = 24287
Group variable: tic — Number of groups = 2714

R-sq: within = 0.1429 — Obs per group: min = 1
between = 0.5590 — avg = 8.9
overall = 0.4907 — max = 11

F(3,17) = 261.46
corr(u_i, Xb) = 0.4202 — Prob > F = 0.0000

(Std. Err. adjusted for 18 clusters in sector)

$Ln\left(\frac{Total\ Fees}{Assets}\right)$	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
lmarketcap	-.1986897	.0147936	-13.43	0.000	-.2299015	-.167478
postsoxdummy	1.269618	.0970594	13.08	0.000	1.06484	1.474395
postlmarkcap	-.0476694	.0046775	-10.19	0.000	-.057538	-.0378008
_cons	-2.358405	.2888654	-8.16	0.000	-2.967858	-1.748952
sigma_u	.79206152					
sigma_e	.46916064					
rho	.74027295	(fraction of variance due to u_i)				

This regression has the same significance and general interpretation as the prior regression, although I prefer these estimates from the fixed effects model as they account for firm-specific effects that the OLS model does not. This model shows that a 1% increase in market cap corresponds to a .199% drop in the $\frac{Total\ Fees}{Assets}$. After Sarbanes-Oxley, $\frac{Total\ Fees}{Assets}$ are on average 127% of what they were prior to SOX for all companies. However, after Sarbanes-Oxley a 1% increase in market cap further lowers the percentage of $\frac{Total\ Fees}{Assets}$ by an additional .048%, for a net decrease of .247%. The .199% drop is just a difference in the structure of $\frac{Total\ Fees}{Assets}$ for large and small companies, while the .048% drop signifies that larger companies are less disadvantaged by these fees than smaller companies. This means that a smaller company whose market cap is half that of another company will face an additional 5% increase in $\frac{Total\ Fees}{Assets}$ over the larger company.

Before I started examining the differences in years, I wanted to explore why larger companies seemed to be less disadvantaged by Sarbanes-Oxley. It seems likely that larger companies have economies of scale in fees, so I ran the same regression, but changed $\frac{Total\ Fees}{Assets}$

to just Total Fees. This shows how the percentage change in Total Fees is impacted by the size of the company. I used the same equation as my last fixed effects model, but replaced the dependent variable with $Ln(Total\ Fees)$.

Regression 3

FE Economy of Scale:

```
Fixed-effects (within) regression               Number of obs      =     24298
Group variable: tic                             Number of groups   =      2714

R-sq:  within  = 0.3561                         Obs per group: min =         1
       between = 0.6053                                        avg =       9.0
       overall = 0.4049                                        max =        11

                                                F(3,17)            =   1298.54
corr(u_i, Xb)  = 0.4430                         Prob > F           =    0.0000

                                        (Std. Err. adjusted for 18 clusters in sector)
------------------------------------------------------------------------------
             |               Robust
Ln(Total Fees)|      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  lmarketcap |   .1322246   .011409    11.59   0.000     .1081537    .1562956
postsoxdummy |   .9173092   .1136349    8.07   0.000     .6775604    1.157058
postlmarkcap |  -.0158218   .0056542   -2.80   0.012    -.0277512   -.0038924
       _cons |   10.64395   .2354976   45.20   0.000      10.1471    11.14081
-------------+----------------------------------------------------------------
     sigma_u |  1.0643364
     sigma_e |   .43536229
         rho |   .85666428   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

This regression shows that a 1% increase in market cap corresponds to a .13% increase in total fees. This means that larger companies pay higher total fees, but the rate at which the fees increase is less than the rate of change in company size. Following Sarbanes-Oxley, a 1% increase in market cap lowers the percentage change in total fees by .016%. This elasticity shows that larger companies have economies of scale in audit fees.

For my last model, I was interested in looking at the changes in $\frac{Total\ Fees}{Assets}$ each year, as well as the changes in $\frac{Total\ Fees}{Assets}$ by the market cap each year (FE2). I again used a fixed effects model with industry-clustered robust standard errors. There is no coefficient for the year 2000, as

one year had to be left out to avoid multicollinearity (one regressor is a perfect linear function of the other regressors).

FE2:

Regression 4 (Main Result 2)

$$Ln\left(\frac{Total\ Fees}{Assets}\right)_{it} = \alpha_i + \beta_{Ln(Market\ Cap)}Ln(Market\ Cap)_{it} + \sum\beta_{YR_T}YR_T + \sum\beta_{Ln(Market\ Cap)}YR_T + \epsilon_{it}$$

, where

α_0 is the intercept

β_{YRt} - the coefficient for the change in $\frac{Total\ Fees}{Assets}$ for year

$\beta_{PostSoxLn(Market\ Cap)}$ - the effect of Market Cap after SOX

ε - the error term

```
Fixed-effects (within) regression               Number of obs      =     24288
Group variable: tic                             Number of groups   =      2714

R-sq:  within  = 0.1851                         Obs per group: min =         1
       between = 0.5527                                        avg =       8.9
       overall = 0.5004                                        max =        11

                                                F(17,17)           =         .
corr(u_i, Xb)  = 0.3691                         Prob > F           =         .

                                    (Std. Err. adjusted for 18 clusters in sector)
```

Ln(Total Fees / Assets)	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
lmarketcap	-.1613619	.0129115	-12.50	0.000	-.1886029	-.134121
yr2001	.4956484	.1795892	2.76	0.013	.1167484	.8745484
yr2002	1.554476	.1526756	10.18	0.000	1.232359	1.876593
yr2003	2.229675	.232398	9.59	0.000	1.739358	2.719992
yr2004	2.537386	.1807278	14.04	0.000	2.156084	2.918689
yr2005	2.423458	.2078308	11.66	0.000	1.984973	2.861943
yr2006	2.657741	.1893759	14.03	0.000	2.258193	3.05729
yr2007	2.597484	.195824	13.26	0.000	2.184332	3.010637
yr2008	2.270578	.1529749	14.84	0.000	1.947829	2.593327
yr2009	2.75785	.1432599	19.25	0.000	2.455598	3.060102
yr2010	2.837384	.1478933	19.19	0.000	2.525356	3.149411
lmarkcap2001	-.0240683	.009515	-2.53	0.022	-.0441432	-.0039933
lmarkcap2002	-.0782159	.0076698	-10.20	0.000	-.0943978	-.0620341
lmarkcap2003	-.1070167	.0113863	-9.40	0.000	-.1310397	-.0829938
lmarkcap2004	-.1069134	.0089214	-11.98	0.000	-.1257359	-.0880909
lmarkcap2005	-.0971981	.0101632	-9.56	0.000	-.1186406	-.0757555
lmarkcap2006	-.109542	.0093462	-11.72	0.000	-.1292608	-.0898233
lmarkcap2007	-.1090612	.0093661	-11.64	0.000	-.1288219	-.0893005
lmarkcap2008	-.1007762	.007631	-13.21	0.000	-.1168763	-.0846761
lmarkcap2009	-.1250793	.0073549	-17.01	0.000	-.1405968	-.1095618
lmarkcap2010	-.130091	.007567	-17.19	0.000	-.1460559	-.1141261
_cons	-3.142024	.2504365	-12.55	0.000	-3.670399	-2.61365
sigma_u	.77442101					
sigma_e	.45764233					
rho	.74116941	(fraction of variance due to u_i)				

The results of this regression are consistent with my primary fixed effects model, but also provide a more detailed breakdown by year. This shows that in general, larger companies pay a lower percentage of $\frac{Total\ Fees}{Assets}$ than smaller companies. Every year after Sarbanes-Oxley, the $\frac{Total\ Fees}{Assets}$ increase significantly for all companies. Looking at the variables for 2002 and 2003, we see that $\frac{Total\ Fees}{Assets}$ are 155% and 223% respectively of what they were in the year 2000. I expected to see that the increases in fees would be greater up front in the first year or two following the announcement of SOX, as companies must start paying more fees to adhere to SOX compliance. This model shows that there were large, significant increases in the fees paid to prepare for SOX. This model also shows that each year, the additional benefit that larger companies receive increases nearly every single year. This means that over time, larger companies pay an even lesser amount than smaller companies, which is consistent with larger companies having economies of scale for audit fees.

3.3 Robustness Checks

I wanted to ensure that the significance found in my prior results was maintained across different measures for my independent and dependent variables. I created a few variants of my FE1 model using different types of fees and different measures of size for robustness. The first few were done using different measures for the dependent variables, whereas the last few were done using different measures for the independent (size) variables.

Robustness Checks

All standard errors are industry-clustered robust

*** p<0.01 ** p<0.05 * p<0.1

LHS Robust Checks:

	ROBUST1		ROBUST2		ROBUST3	
VARIABLES	βlAuditRFeesbyAssets	SE Robust1	βlTotalFeesbyRev	SE Robust2	βlcSGAbyAssets	SE Robust3
lMarketCap	-0.0781***	(0.0192)	-0.0996***	(0.0055)	-0.145***	(0.0152)
PostSOXdummy	0.902***	(0.144)	0.985***	(0.0856)	0.0585	(0.1929)
PostSOXlMarkCap	-0.069***	(0.00698)	-0.0387***	(0.0042)	-0.0008	(0.0092)
Constant	-7.165***	(0.398)	-4.03***	(0.11)	1.325***	(0.307)
	Observations	14,458	Observations	23,939	Observations	22,211
	Number of tic	2,464	Number of tic	2,689	Number of tic	2,565
	R-squared	0.058	R-squared	0.039	R-squared	0.091

RHS Robust Checks:

	ROBUST4			ROBUST5	
Robust 4 Vars	β4lTotalFeesbyAssets	SE Robust4	Robust 5 Vars	β5lTotalFeesbyAssets	SE Robust5
lAssets	-0.611***	(0.0128)	lRev	-0.214***	(0.0448)
postsoxdummy	1.027***	(0.0740)	PostSOXdummy	0.839***	(0.141)
PostSOXlAssets	-0.0269***	(0.0041)	postsoxlrev	-0.026***	(0.0073)
Constant	5.662***	(0.246)	Constant	-2.133***	(0.869)
	Observations	24,889		Observations	24,493
	Number of tic	2,735		Number of tic	2,708
	R-squared	0.429		R-squared	0.113

The first robustness check (Robust1) was done by replacing the dependent variable of $\frac{Total\ Fees}{Assets}$ with $\frac{Audit\ Related\ Fees}{Assets}$. The audit related fees were mentioned in corporate documents as fees related to SOX Section 404 compliance. The general interpretation of the results is the same as the FE1 model, and the results are significant.

The second robustness check (Robust2) was done by replacing the dependent variable of $\frac{Total\ Fees}{Assets}$ with $\frac{Total\ Fees}{Revene}$. I was interested in looking at the fees as a proportion of a company's yearly revenue, as that captures another way of looking at the proportion of fees to the performance of the company. Each year, a company pays its fees out of its revenue, so this test looks at the impact of SOX on the company's profitability. The results have the same general interpretation as the FE1 model, although the percent changes are in $\frac{Total\ Fees}{Revenue}$ instead.

The third robustness check (Robust 3) was done by replacing the dependent variable of $\frac{Total\ Fees}{Assets}$ with $\frac{SG\&A}{Assets}$. Because audit fees, consulting fees, administrative fees, and legal fees that could be tied to SOX are a part of SG&A expenses, I use SG&A in place of Total Fees. The

interpretation of the regression is similar to FE1, except that the timing and interaction of post-SOX and Market Cap are not significant. This means that SG&A expenses as a percentage of assets were not impacted the same way that $\frac{Total\ Fees}{Assets}$ was. This could mean that even if SOX disproportionately affected auditor fees at small firms, this effect isn't economically large, and is small in comparison to the variation in non-auditor SG&A fees. While this regression shows the impact of size on $\frac{SG\&A}{Assets}$ is not significant, charts 1 & 2 show that smaller companies are still more sensitive to changes in auditor fees. Furthermore, this provides good intuition in understanding that Sarbanes-Oxley didn't substantially impact SG&A expenses for companies, and that auditor fees were primarily affected.

The fourth robustness check (Robust 4) was done by replacing the independent variable of market cap with assets. This model uses assets as both the proportion for fees, as well as the measure for size. I decided not to use this model as my main fixed effects model, as I wanted to use different measures for the proportion of fees and size. This model captures how $\frac{Total\ Fees}{Assets}$ changes for companies with different asset sizes. The results are significant and the interpretation is the same as the FE1 model.

The fifth robustness check (Robust 5) was done by replacing the independent variable of market cap with revenue. In this case, revenue is used as a measure for size, as the size of the revenue stream indicates the amount of business that occurs for the company. This model looks at how the percentage of $\frac{Total\ Fees}{Assets}$ changes for companies with different revenue sizes. The results are significant and the interpretation is the same as the FE1 model.

4. Conclusion

The results from my regressions confirm my original hypothesis; even though all companies face increased fees for SOX compliance, smaller companies bear a disproportionate increase in fees. I find that a 1% increase in market cap corresponds to a .199% drop in the $\frac{Total\ Fees}{Assets}$. After Sarbanes-Oxley, $\frac{Total\ Fees}{Assets}$ are on average 127% of what they were prior to SOX for all companies. However, after Sarbanes-Oxley a 1% increase in market cap further lowers the percentage of $\frac{Total\ Fees}{Assets}$ by an additional .048%, for a net decrease of .247%. The .199% drop is just a difference in the structure of $\frac{Total\ Fees}{Assets}$ for large and small companies, while the .048% drop signifies that larger companies are less disadvantaged by these fees than smaller companies. This means that a smaller company whose market cap is half that of another company will face an additional 5% increase in $\frac{Total\ Fees}{Assets}$ over the larger company. The lesser disadvantage that larger companies have is due to their size, which enables them to have economies of scale in their audit fees. According to my main estimates (Regression 2), SOX raised average auditor fees (as a percent of assets) by 43% for a 15^{th} percentile firm and 23% for an 85^{th} percentile firm by market cap, versus their pre-SOX levels.

Furthermore, I found that the upfront costs of compliance caused a drastic increase in the total fees paid to auditors the year of and the year after SOX enactment (2002 and 2003). Looking at the years 2002 and 2003, we see that $\frac{Total\ Fees}{Assets}$ are 155% and 223% respectively of what they were in the year 2000. While the percentage of fees paid increases every year, the lesser disadvantage that larger companies have from their economies of scale gets greater every year. This means that over time, larger companies pay an even lesser amount than small companies, which is consistent with larger companies having economies of scale for audit fees.

4.1 Further Research

Further research could be conducted in this topic by examining the fees and timing of Sarbanes-Oxley. This paper considers the fees over time by looking at the significance of fees across the individual years prior to and after the initial SOX compliance date. My research focused solely on how size affects the percentage change in the fees over time, which is useful for understanding the net impact of the bill, but not for understanding the intricacies of how these interactions work. One way in which this study could be enhanced is to create a more advanced model that not only looks at differences in sizes of companies, but captures the intricacies of how economies of scale, fee structures, or Sarbanes-Oxley affect these differences.

Another way in which this research could be expanded would be to use different dependent and independent variables in the regressions. My main results and robustness checks focused on Total Fees, $\frac{Total\ Fees}{Assets}$, $\frac{Audit\ Related\ Fees}{Assets}$, $\frac{SG\&A}{Assets}$, Assets, Revenue, and Market Cap, although there were other ways that I could have crossed variables to consider other, interesting effects. Further research could also include other variables and measures to consider other aspects of the effects from Sarbanes-Oxley.

This paper focused heavily on understanding the relative cost effects of Sarbanes-Oxley and quantifying the actual impact on companies. One aspect that could be expanded upon is examining the actual impacts of these cost effects on smaller companies. There are several studies on how Sarbanes-Oxley affects small companies' ability to remain public and whether SOX deters private companies from going public. It would be intriguing to consider how specific aspects of SOX affect costs in a way that ultimately forces small companies to go private. I would also be interested in understanding why some companies were able to handle SOX while others were not.

Finally it would be interesting to see a paper that focuses more on the actual policy itself. Sarbanes-Oxley was introduced to bring greater clarity and transparency in companies' accounting, to alter the incentive structure to force more oversight from corporate boards and executives, and to serve as a means to restore investor's confidence in the markets. It would be interesting to see whether the financial statements are actually more trustworthy and secure after SOX, how the additional rules and punishments have altered corporate board and executive management and practices, whether or not the markets actually needed government intervention, or if SOX actually had any ulterior motives. Additional research into possible outcomes of policy reforms would also be helpful.

4.2 Final Thoughts

Wagner & Dittmar (2006) find that by 2006, some corporate executives believe that there are enormous improvements from Sarbanes-Oxley in their control structure that wouldn't have been implemented without the issue being forced. These executives also believe that they are able to make better decisions for their businesses as a result of SOX. However, many others stated that they had already wanted to improve their internal control processes, and that SOX forced them to hold off on these implementations because of the cost and time required for SOX compliance. Similarly, Qian, Strahan, & Zhu (2009) find that SOX has positive benefits on corporate governance, but does so at the cost of markedly slower growth in companies' investments, employment, and assets.

While it seems as though Sarbanes-Oxley has improved the quality and processes of corporate management, financial statements, and auditor independence, these benefits have come at harsh costs to companies. Furthermore, these costs have inadvertently impacted smaller companies more severely than larger companies. The market conditions and events that led to

SOX brought a lot of attention to auditing practices, and as a result the bill was approved and enacted very quickly, with a nearly 100% 'yea' vote in the house and senate. This haste had several unintended consequences, several of which have been noted by studies conducted by the SEC.[9]

This paper is unique in that it brings attention to the direct relationship between the percentage changes in fees that differently sized companies face. Additionally, the cost effects across time are easily seen from my econometric models. While the long term effect of Sarbanes-Oxley has led to significantly increased costs each year, we are able to see the drastic increase in fees that companies endured upfront to try to meet the government's regulations. Certainly reform and transparency were needed, but it should be noted for future reference that quick decisions that have not been evaluated fully have costly effects that are detrimental to our public companies.

[9] The SEC found that the costs were larger than expected and that smaller companies were more heavily impacted

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