Sarbanes-Oxley and economies of scale in the costs of raising equity

TeWhan Hahn
Auburn University at Montgomery

Mario Reyes
Washington State University

ABSTRACT

This study used IPO and SEO data over the period 1980-2015 to investigate whether economies of scale exist in the costs of raising equity, and how the Sarbanes and Oxley (SOX) Act of 2002 affected the degree of economies of scale. Average underwriting spreads, other expenses, and total direct costs separately across nine different offer size categories were analyzed. The results show economies of scale for both IPOs and SEOs. Overall SOX appears to have equalized underwriting spreads, other expenses, and total direct costs across nine different offer size categories. However, the results also suggest that SOX increased the costs of raising equity so much especially for the issues in the smallest offer size category disproportionately. In addition, significantly lower R-squares in post-SOX regressions in other expenses regression and significantly different coefficients of offer size categories between pre- and post-SOX regressions suggest a structural break in the data around the passage of Sarbanes Oxley Act in 2002 that changed equity offering environments significantly.

Keywords: Sarbanes and Oxley, economies of scale, cost of raising capital, underwriting spread

INTRODUCTION

Companies need capital to run their businesses but raising capital from the outside is especially costly. For example, Facebook raised $16 billion in 2012 through initial public offering (IPO) of its shares and paid underwriting banks $176 million in fees. A significant portion of the services underwriters provide to issuing firms requires similar amounts of efforts and time across different issues. This suggests that economies of scale might exist in the costs of raising capital, i.e., as issue amounts or proceeds from the issues increase, the costs of raising capital will decrease.

Early studies of equity offerings document that underwriting spreads[1] are narrow for larger offerings, confirming the existence of significant economies of scale in equity issuance costs (Smith (1977), Hansen and Pinkerton (1982), Bhagat and Frost (1986), Booth and Smith (1986), and Hansen (1988)). More recently, Lee, Lochead, Ritter, and Zhao (1996), Chen and Mohan (2002), and Kim, Palia, and Saunders (2008) also find economies of scale in underwriting spreads of equities, i.e., decreasing underwriting spreads as the size of the offering increases.

In a sharp contrast to the findings above, Bhagat and Frost (1986), Hansen and Torregrosa (1992) report diseconomies of scale in underwriting spreads for seasoned equity offerings (SEOs) of more than $100 million. Hansen and Torregrosa (1992) point out that early studies do not hold company size fixed and fail to examine if underwriting spreads of seasoned equity offerings are "U-shaped" in proceeds (offer size). Altinkilic and Hansen (2000) offer results that show a U-shaped curve for SEO underwriting spreads. According to them economies of scale becomes possible due to the fixed costs in the issues of relatively small proceeds, but as proceeds increase diseconomies of scale appear in underwriting spreads due to increasing placement costs. The existence of significant "U-shape" of underwriting spreads in proceeds would suggest scale diseconomies for larger offerings. While the functional form to be used in the empirical regression analysis could be controversial especially depending on how well the linear model approximates the curvilinear pattern, the results of Hansen and Torregrosa (1992) and Altinkilic and Hansen (2000) suggest that at least size should be better controlled in the study of costs of raising capital.

All the empirical studies except Kim, Palia, and Saunders (2008) noted above were conducted using data spanning relatively short period of time before the passage of the Sarbanes-Oxley Act in 2002 (SOX). SOX was passed to protect investors by improving transparency, accuracy, and reliability of corporate disclosures, and accountability in publicly-traded firms in the US. It was designed to ensure high quality financial reporting by publicly-traded firms. But SOX provisions impose substantial new requirements for publicly-traded companies and for firms going public in the U.S. and these additional regulatory requirements entail additional costs to comply. In fact, SOX is often criticized as a costly regulatory overreaction to the financial scandals and bankruptcies in the early 2000s. On the other hand, by mandating increased accuracy, reliability, transparency, and higher quality financial reporting, SOX is argued to lessen the asymmetry of information between the firm and investors and this, in turn, might result in reduced cost of raising funds.

---

[1] In security issuance, underwriting or gross spreads are the commissions paid to underwriters when securities are issued and includes management fees, underwriting fee, and selling concession.

Several studies have looked at the capital market impact of the Sarbanes-Oxley Act (see, e.g., Chhaochharia and Grinstein [2007], Coates [2007], Jain and Rezaee [2006], Johnston and Madura [2009, Leuz [2007], Li, Pincus, and Rego [2008], Litvak [2007], Wintoki [2007], and Zang [2007]). But to the best of our knowledge, only Kaserer, Mettler, and Obernberger (2011) have examined the impact of SOX on the cost of raising funds. This study seeks to fill in this gap.

The current study contributes to the literature by comparing pre- and post-SOX underwriting spreads, other costs, and total direct costs across nine different offer size categories both Initial Public Offerings (IPOs) and Seasoned Equity Offerings (SEOs). The current study uses a more comprehensive time period sample spanning the period 1980 – 2015 to document economies of scale in the costs of raising equity.

The regression analyses using eight offer size categorical dummy variables (i.e., nine offer size categories) reveal economies of scale for both IPOs and SEOs: underwriting spread declines as offer size increases with minor exceptions depending on the models used (model 1 in table 1). However, when Sarbanes Oxley enactment dummy variable (SOX) is added to the regression model (model 2 in table 1), SEOs continue to exhibit economies of scale in underwriting spreads, but IPOs do not. In the next section, a brief review of the literature on the Sarbanes-Oxley Act, and the costs of raising equity are presented.

LITERATURE REVIEW

The Sarbanes-Oxley Act was passed in 2002 in response to highly publicized financial scandals and bankruptcies. The main intention of SOX is to improve transparency in publicly-traded companies. This is accomplished by defining relationships between independent auditors and the companies being audited, specifying appropriate corporate governance practices and inappropriate corporate activities, stipulating provisions with respect to corporate fraud and accountability, and establishing requirements that companies implement and documenting internal control systems to help ensure the integrity of financial reporting to the public (Stephens and Schwartz [2006]). These new requirements entail additional compliance costs, and that is why SOX is often criticized as a costly regulatory overreaction. Of the SOX provisions, implementing and documenting internal controls systems is the most costly to comply.

But the benefits of SOX might outweigh the additional costs of compliance. Jain and Rezaee [2006] report improved market liquidity after the enactment of SOX in 2002. They, along with Li, Pincus, and Rego [2008] and Chhaochharia and Grinstein [2007], find increased firm valuation in response to the enactment of SOX. Johnston and Madura [2009] report that initial returns of IPOs have declined and the after-IPO market performance is significantly higher after Sarbanes-Oxley. This suggests that the improved transparency, accuracy, and reliability of corporate disclosures, and accountability in publicly-traded firms in the US has decreased the asymmetry of information between underwriter and investors and this, in turn, has led to proper valuation of equity offerings, most especially IPOs.

That SOX has resulted in the proper valuation of equity offerings has implications for the costs of issuing equity. Lee, Ritter, and Zhao [1996] separated the total costs of issuing equity into direct costs and indirect costs. Direct costs include underwriting fee, legal, accounting, and other fees related to the offering, whereas indirect costs pertain primarily to underpricing. Kaserer, Mettler, and Obernberger [2011] document evidence of the reduction in IPO underpricing post-SOX. They also report an increase in direct flotation costs by a highly

significant 90 basis points of gross proceeds. They find that this increase is almost entirely due to higher accounting and legal fees, and the higher fixed flotation costs affect smaller firms far more than larger firms.

With the exception of Johnston and Madura [2009] (who report that lower initial IPO returns and better after-market performance post Sarbanes-Oxley) and Kaserer, Mettler, and Obernberger [2011] noted above, there is paucity of studies focusing on the impact of SOX on costs of raising equity. This study fills this gap by examining the impact of SOX on economies of scale in equity issuance costs over an extended period of time (1980-2015) after controlling size as suggested Altinkilic and Hansen (2000). In the following sections, dataset, empirical model, and then the empirical results are presented.

DATA AND MODEL

Securities Data Company (SDC)'s New Issues database is the primary source of samples used in this study. The New Issues database contains firm commitment offerings of public placements. ADRs and unit offerings were excluded in the sample. Also excluded were closed-end fund, real estate investment trust (REIT) offerings, right offerings and shelf registrations. As Hansen (1988) reported, rights offerings were extremely rare and excluded from the sample. Only issues by U.S. firms with greater than $5 offer price were considered. Issues with less than $5 offer price are often considered different from the other issues and excluded in most equity issuance studies.

The sample period is from 1980 to 2015 for both Initial Public Offerings (IPOs) and Seasoned Equity Offering (SEOs). Since this sample period is more than three decades, proceeds were converted to 1994 constant dollars using Consumer Price Index (CPI) to avoid any impact from the inflation. This study focuses on the underwriting spreads, other direct expenses and total direct costs of raising equity in the U.S. market only because the other component cost of raising equity—initial returns—has been explored by prior studies extensively. In addition, initial returns tend to be influenced by market participants' psychology to a large degree, and is out of the control of equity issuers.

The current study uses the dummy variable regression to investigate whether there have been economies of scales in underwriting spreads, other direct expenses and total direct costs of raising equity. The base model is formulated as follows:

$$Cost_i = \beta_1 + \beta_i \sum_{i=2}^{9} Cat_i + e_i \qquad\qquad (1)$$

where *Cost_i* denote underwriting spread (i.e., gross spread), or other direct expenses, or total direct costs of an IPO or a SEO *i*. It is calculated as a percentage of total proceeds. The spread includes management fees, underwriting fee, and selling concessions, if any. Other direct expenses includes registration fee and printing, legal, and auditing costs. Total direct costs (TDC) will be then sum of gross spreads and other direct expenses. *Cat* are categories of offer size (proceeds) in million dollars. Nine offer size categories are used, namely: *Cat 1* covers the range $2-$9.99 million, *Cat 2* covers the range $10-$19.99 million, *Cat 3* represents the range $20-$39.99 million, *Cat 4* represents $40-$59.99 million, *Cat 5* represents $60-$79.99 million range, *Cat 6* covers the range $80-$99.99 million, *Cat 7* represents the $100-$199.99 million range, *Cat 8* covers the $200-$499.99 million range, and *Cat 9* represents offerings of $500 million & higher.

In equation (1), β_1 captures average issue costs for the IPOs or SEOs of category 1 with less than 10 million dollars of offer size. Therefore, β_2 captures the difference in average issue cost between issues of category 2 and category 1. Likewise, β_9 captures the difference in average issue cost between IPOs or SEOs of category 9 and category 1. The existence of economies of scale in issue costs means that signs of $\beta_2 \sim \beta_9$ are all negative and $|\beta_2| \leq |\beta_3| \leq |\beta_4| \leq |\beta_5| \leq |\beta_6| \leq |\beta_7| \leq |\beta_8| \leq |\beta_9|$.

A variation to equation (1) includes a Sarbanes Oxley (SOX) dummy variable to test whether issue costs of IPOs and SEOs were affected by Sarbanes Oxley Act of 2002. The SOX dummy variable takes on a value of 1 for issues after 2002, and zero otherwise. The current study also expanded equation (1) by adding the Sarbanes Oxley (SOX) dummy variable along with a set of control variables, namely:

1. *Size* (Proceeds) to better control the effect of size as suggested by Altinkilic and Hansen (2000),
2. *CEFD* (Closed End Fund Discount) as investor sentiment proxy,
3. *Recession* dummy (having value of 1 if the issue year belongs to recession period defined by NBER (National Bureau of Economic Research), otherwise 0),
4. *Initial Return* (average first day return of the IPO or SEO issues in the same month) as proxy of investor interests,
5. *Number of Issues* (number of IPO or SEO issues in the same month) as proxy of investor interests,
6. *Securities Litigation Legislation* dummy variable (having 1 for issues between 1995 and 1998 when the law was passed to make litigation more difficult from investors, otherwise 0),
7. *Internet Bubble* dummy (having value of 1 if the issue year is either 1999 or 2000, otherwise 0), and
8. *Economic Crisis* dummy (having value of 1 if the year is 2007 or 2008, otherwise 0).

EMPIRICAL RESULTS

Table 1 reports the results of equation (1) and its variants.
Initial Public Offerings (IPOs):
The results of model 1 for IPOs show that issues with less than 10 million dollars (Category 1) paid an average of 7.8% of the proceeds as underwriting spread. On the other hand, IPO issuers of greater than $500 million (category 9) paid 3.27% lower underwriting spreads than Category 1 IPO issuers. Model 1 in table 1 also shows that the coefficients are monotonically decreasing over the offer size categories. . This suggests that underwriting spread decreases as issue size increases.

Model 2 in table 1 also shows that the estimated coefficient of the Sarbanes-Oxley dummy variable is negative and statistically significant at the usual levels. On average, the underwriting spread of IPOs of less than $10 million paid 0.91% (coefficient of SOX dummy) lower after the enactment of the Sarbanes Oxley Act. On the whole, the coefficients of size categories indicates a pattern of decreasing underwriting spread as issue size increases with the exception of Cat 4. Expanding equation 1 to include other control variables beyond the SOX dummy variable does not lead to dramatic improvement in R-squared, even though some of the added control variables are statistically significant.

Seasoned Equity Offerings (SEOs):

Table 1 also reports results of equation (1) and its two variants for SEOs. Model 1 results mirror the pattern exhibited for IPOs. The SEO issues with less than 10 million dollars (category 1) paid an average of 5.8% of the proceeds as underwriting spread before the 2002 SOX enactment, and 0.82% (coefficient of SOX dummy of model 2) less after. For the SEO issues with issue size greater than 500 million dollars (category 9) paid 3.18% lower in underwriting spread than what category 1 SEO issuers paid. The coefficients of the different offer size categories reveal the same monotonic decrease in underwriting spread as issue size increases. On the whole, table 1 suggests that underwriting spreads across 9 issue size categories exhibit economies of scales for both IPOs and SEOs.

Sarbanes and Oxley and Underwriting Spread

Motivated by the results in table 1, this study investigated whether economies of scale in underwriting spread of equities change significantly pre- and post-Sarbanes Oxley Act. Sub-period analysis was performed, with the first sub-period defined as pre-2002 and the second sub-period defined as post 2002 (i.e., 2003-2015). Then Chow tests were performed on the sub-period estimated coefficients. The results are presented in table 2, and a visual representation depicted in figure 1 and figure 2.

Before the Sarbanes Oxley Act of 2002, economies of scale in underwriting spread for IPOs is clearly present, as shown in the blue shaded curve in figure 1. In the Post-Sox sub-period, however, the results in table 2 are suggestive of diseconomies of scale in underwriting spread: for issue size categories 3, 4, 5, and 6, underwriting spread is higher than that of issue size category 1 as witnessed by the positive coefficients of Cat 3, Cat 4, Cat 5 and Cat 6. The Difference column for IPOs in table 2 (the difference in coefficients, i.e., after SOX – before SOX) reveals that, other than issue size category 1, all issue size categories show positive and significant difference in coefficients. These results suggest that in the post-Sarbanes Oxley era, decreases in average underwriting spread of the other offer size categories from that of Cat 1 were less or there were even increases in average underwriting spread as issue size increases. This indicates that Sarbanes Oxley Act changed equity issuance environments significantly. In addition, the dramatic drop in r-square from 51.02% in pre-Sarbanes Oxley sample to 13.38% in post-Sarbanes Oxley sample reveals a structural break in IPO spreads.

In table 2, a similar pattern shows up in SEOs: before the Sarbanes Oxley, economies of scale in underwriting spread is clearly present even with size variable and other control variables but after the Sarbanes Oxley Act, the results indicate a clear presence of diseconomies of scale in underwriting spread. Economies of scale in underwriting spread for SEOs before SOX is also shown in the red shaded curve in figure 2. In table 2, in post-Sarbanes Oxley Act period, Cat 2 and Cat 3 have positive coefficients indicating higher underwriting spread for Cat 2 or Cat 3 than for Cat 1. Difference column for SEOs reports the difference in coefficients (i.e., after – before) between two sub-periods. The issue size category 1 has a negative coefficient indicating lower underwriting spread post Sarbanes Oxley Act era. All other issue size categories show positive difference in coefficients and their absolute values are smaller than those in the pre-SOX period, indicating SOX narrowed the underwritings spreads across different offer sizes. This also reflects the fact that in the post-Sarbanes Oxley era, decreases in average underwriting spread of the other offer size categories from that of Cat 1 were less or there were even increases in average underwriting spread as issue size increases. A significant drop (about 25.21% drop) in r-square

from 40.49% in pre-Sarbanes Oxley sample to 15.28% in post-Sarbanes Oxley sample again strongly suggests a structural break in SEO spreads.

Sarbanes Oxley and Other Direct Expenses

In addition to underwriting spread, other expenses comprise the direct costs of issuing equity. In figure 3, other expenses of IPOs are lower for larger issues regardless of the time periods, indicating the existence of economies of scale in other expenses. However, for all offer size categories, other expenses were higher in the post SOX period. This is consistent with Kaserer, Mettler, and Obernberger [2011].

The result is similar in table 3: All the coefficients of offer size categories exhibit negative sign and absolute values of those coefficients are nicely increasing with the exception of Cat 9 in the pre-Sox period. It is interesting that consistent with underwriting spread regression in table 2, the r-square of the regression for the post-SOX period is significantly lower (47.12% pre-SOX vs. 16.62% post-SOX). In addition, as shown in the difference column of IPO results in table 3, for categories 2, 8, and 9, the decrease of other expenses from that of the smallest issue category is not statistically different between pre- and post-SOX periods. It is notable that in the difference column, absolute difference of coefficients of Cat 1 (intercept), and categories of 3 and 4 between pre- and post-SOX is very big (range of 1.05 – 1.12%), indicating the impact of SOX was asymmetric across different offer sizes.

In figure 4, where other expenses across offer sizes of SEOs are reported, a huge spike in other expenses of Cat 1 is notable. Overall, other expenses are lower for larger issues in general regardless of the time periods looked at. However, in contrast to the results of IPOs, other expenses were lower for offer size categories of 2, 5, and 6 in the post-SOX period while they were higher for offer size categories of 1, 3, 4, 7, 8, and 9.

A similar result is reported in table 3: All the coefficients of different offer size categories exhibit negative sign and absolute values of those coefficients are nicely increasing with the exception of the coefficient of Cat 9 in the pre-SOX regression. It is interesting that consistent with underwriting spread regression in table 2, the r-square of the regression for the post-SOX period is significantly lower (5.21% pre-SOX vs. 0.64% post-SOX). In addition, as shown in the difference column of SEO results in table 3, for category 9, the decrease of other expenses from that of the smallest issue category is not statistically different between pre- and post-SOX periods. In the difference column, absolute difference of coefficients of Cat 1 (intercept), and categories of 2 to 8 is big (range of 7.78 – 8.46%), indicating the impact of SOX was across the offer sizes.

Sarbanes Oxley and Total Direct Costs

So far underwriting spread and other expenses have been analyzed separately in order to avoid obscuring the results as a result of aggregation. Now this study analyzes the *total direct costs* of equity offering and the impact of SOX on them to check whether it can be said there has been economies of scale in the total direct costs of equity issuance. This is important because aggregation of component costs of equity issuance may generate results different from those for component costs.

In figure 5, total direct costs of IPOs are lower for larger issues regardless of the time periods, indicating the existence of economies of scale in total direct costs of IPOs. The only

exception is Cat 3 in post-SOX period. However, while for offer size categories of 3, 4, 5, 6, and 7, total direct costs were higher in the post-SOX period, for offer size categories 1, 2, 8, and 9, total direct costs were lower in the post SOX period.

The result in table 4 clearly exhibits the economies of scale in total direct costs: All the coefficients of offer size categories exhibit negative sign and absolute values of those coefficients are nicely increasing. Again the only exception is Cat 3 in post-SOX period. It is interesting that consistent with other expenses regression in table 3, the r-square of the regression for the post SOX period is significantly lower (57.21% pre-SOX vs. 14.41% post-SOX). In addition, as shown in the difference column of IPO results in table 4, decrease of total direct costs of Cat 2 – Cat 9 from that of the smallest issue category is less in post-SOX period as indicated by positive coefficients.

In figure 6, where total direct costs across offer sizes of SEOs are reported, total direct costs of smallest offer size category is standing out probably driven by a spike of other expenses of the same offer size category. Overall, total direct costs are lower for larger issues regardless of the time periods. In contrast to the results of IPOs, though, total direct costs were higher in the post-SOX period for smallest issue category, whereas they were higher post-SOX for issue Category 8.

The result in table 4 shows that with the exception of Cat 9 in pre-SOX period, all the coefficients of offer size categories exhibit negative sign and absolute values of those coefficients are nicely increasing in both pre- and post-SOX period. It is interesting that consistent with other expenses regression in table 3, the r-square of the regression for the post-SOX period is significantly lower (12.86% pre-SOX vs. 0.79% post-SOX).

CONCLUSION

This study uses 1980-2015 U.S. Initial Public Offerings (IPOs) data and Seasoned Equity Offerings (SEOs) data to investigate whether the degree of economies of scale in the costs of raising equity was affected as a result of the enactment of Sarbanes-Oxley in 2002. First, the averages of underwriting spreads and other direct expenses separately were estimated. Then total direct costs of raising equity across nine different offer size categories were analyzed.

The results suggest economies of scale for both IPOs and SEOs overall: averages of underwriting spreads, other direct expenses, and total direct costs of raising equity decline as offer size increases. Figures created show that while SOX overall softened the difference in costs of raising equity across different offer size categories, it disproportionately increased the costs of raising equity, especially other expenses for the issues in the smallest offer size category. This result is particularly consistent with Kaserer, Mettler, and Obernberger [2011], implying the spike of compliance costs for smallest issuers after SOX.
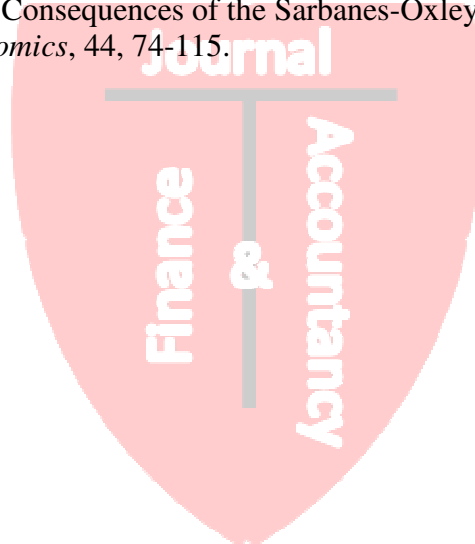
In addition, significantly lower R-squares of post-SOX regressions and significantly different coefficients of offer size categories between pre- and post-SOX regressions suggest a structural break in the data around the passage of Sarbanes Oxley Act in 2002 that changed equity offering environments significantly.
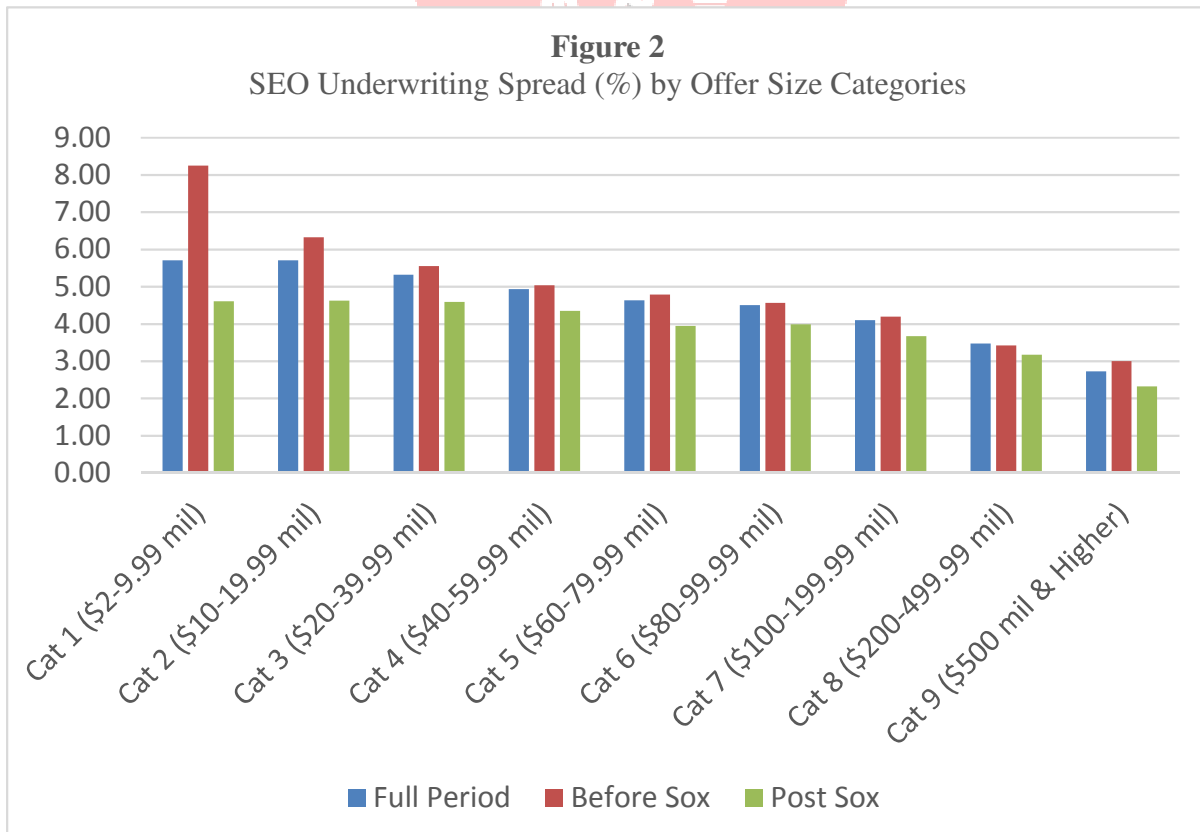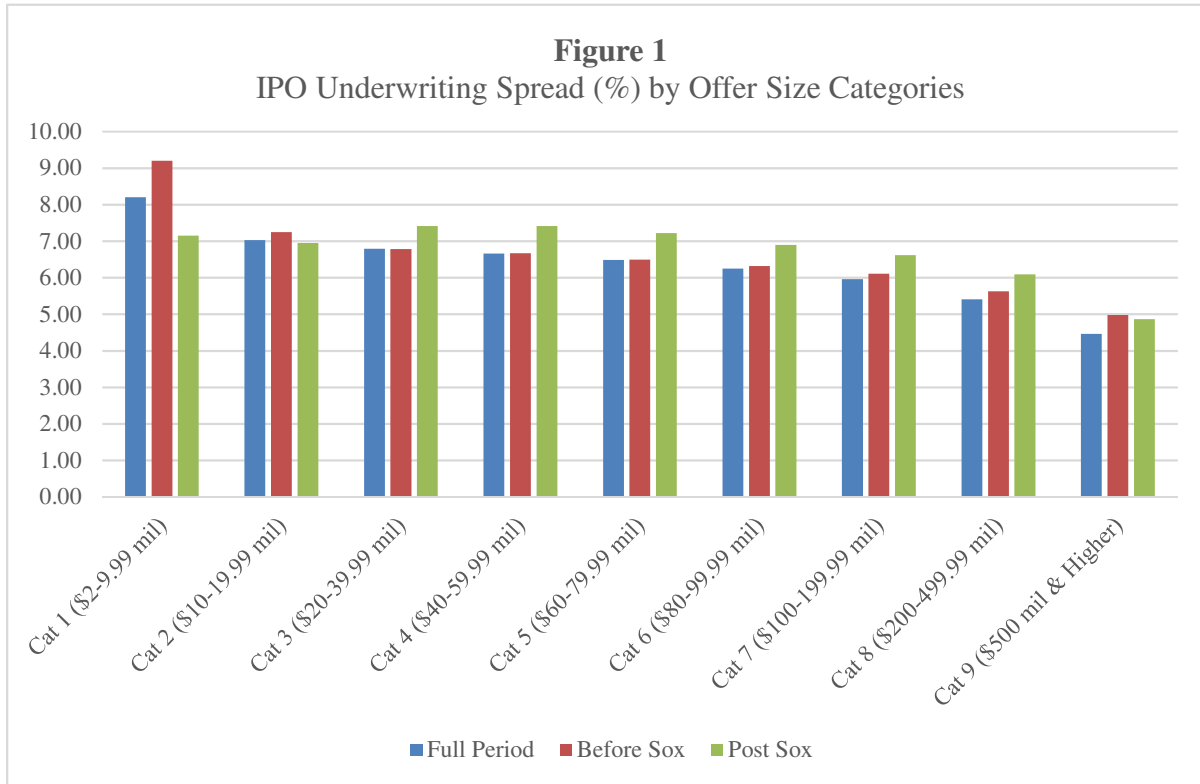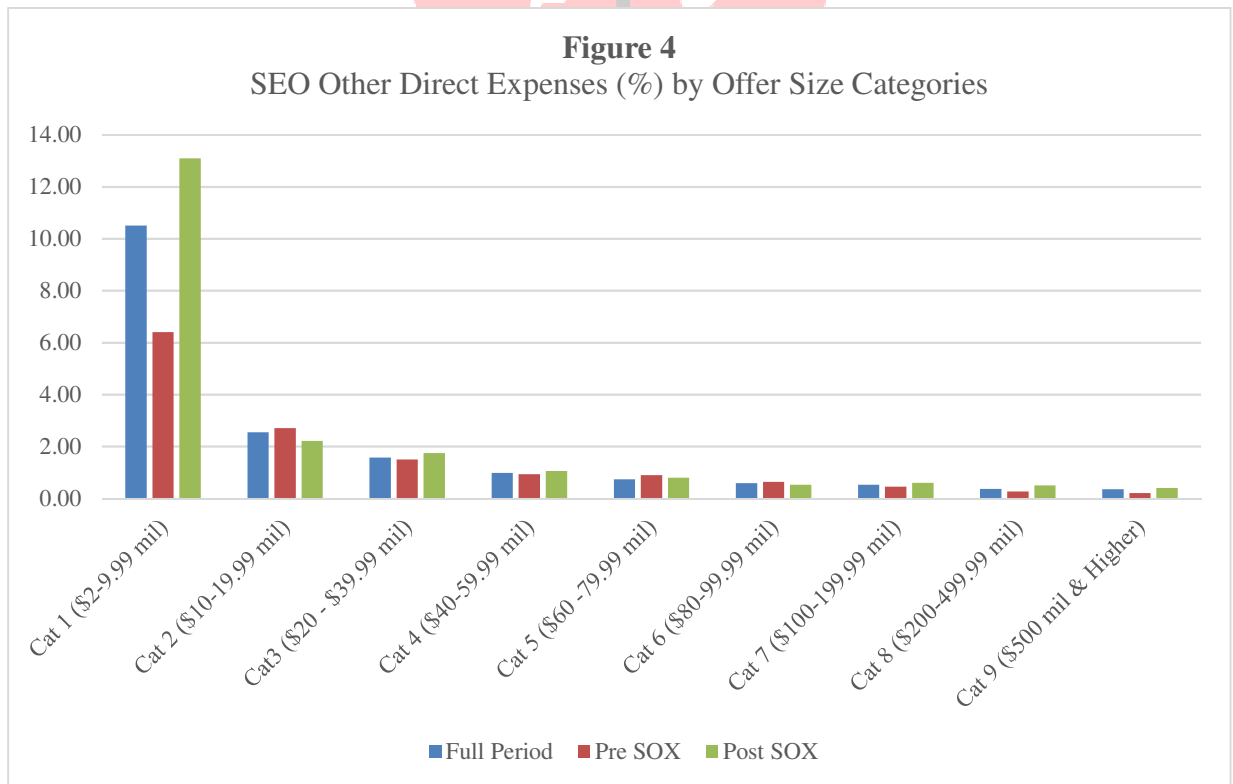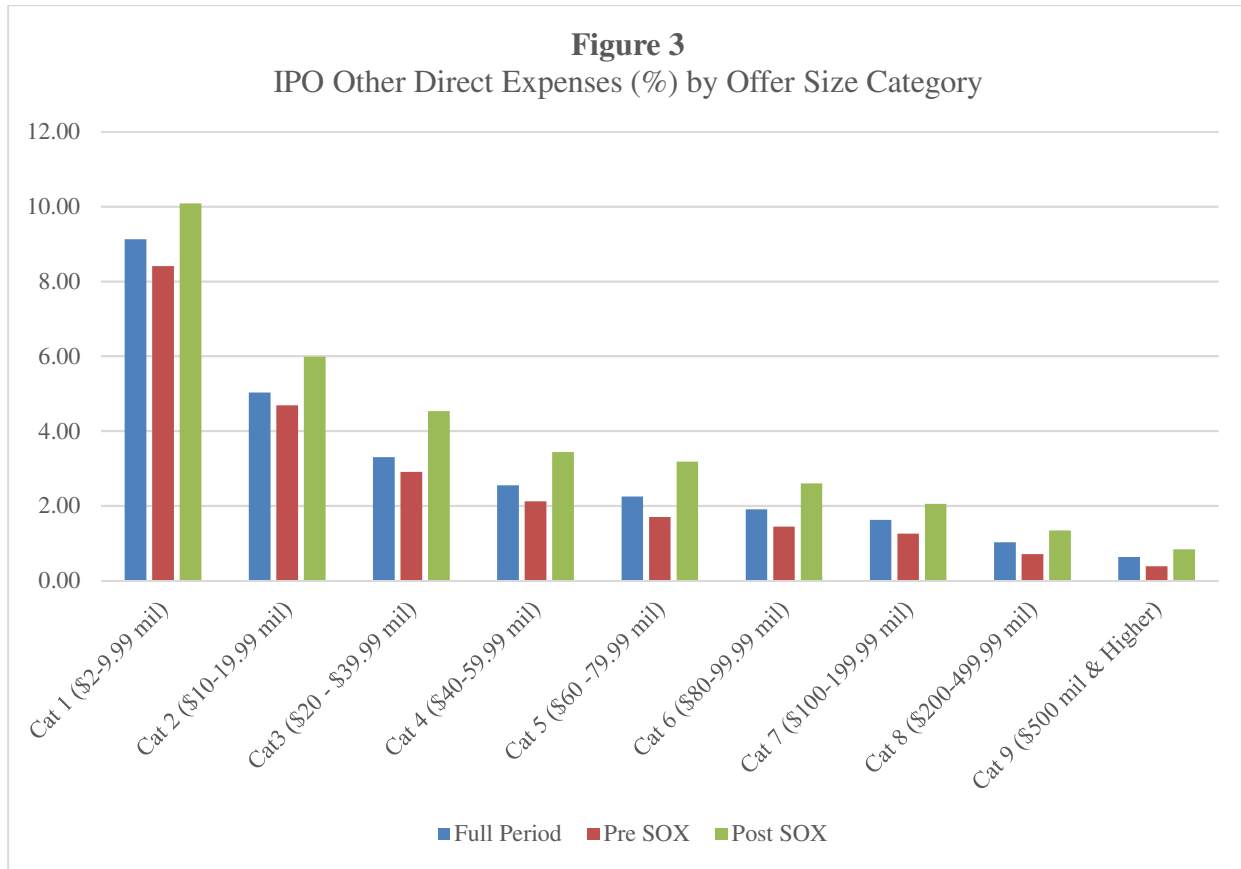
REFERENCES

Altinkilic, O., and R. S. Hansen, 2000, "Are There Economies of Scale in Underwriting Fees?" Evidence of Rising External Financing Costs." *Review of Financial Studies* 13, 191-218.

Bhagat, S. and P. A. Frost, 1986, "Issuing costs to existing stockholders in competitive and negotiated underwritten public utility equity offerings," *Journal of Financial Economics* 15, 233-259.

Booth, J. R. and R. L. Smith, II, 1986, "Capital raising, underwriting and the certification hypothesis," *Journal of Financial Economics* 15, 262-281.

Chhaochharia, V. and Y. Grinstein, 2007, "Corporate Governance and Firm Value: The Impact of the 2002 Governance Rules," *Journal of Finance¸* 62, 1789-1825.

Coates, J.C., 2007, "The Goals and Promise of the Sarbanes-Oxley Act," *Journal of Economic Perspectives*, 21, 91-116.

Hansen, R. S., 1988, "The demise of the rights issue," *Review of Financial Studies* 1, 289-309.

Hansen, R. S.,and J. M. Pinkerton, 1982, "Direct equity financing: A resolution of a paradox," *Journal of Finance* 37, 651-665.

Hansen, R. S., and P. Torregrosa, 1992, "Underwriter Compensation and Corporate Monitoring." *Journal of Finance* 47, 1537-1555.

Jain, P.K., Z. Rezaee, 2006, "The Sarbanes-Oxley Act of 2002 and Capital-Market Behavior: Early Evidence," *Contemporary Accounting Research*, 23, 629-654.

Johnston, J. and M. Madura, 2009, "The Pricing of IPOs Post-Sarbanes-Oxley," *Financial Review¸* 44, 291-310.

Kaserer, C, A. Mettler, and S. Oberngerger, 2011, "The Impact of the Sarbanes-Oxley Act on the Cost of Going Public," *Business Research*, 4 125-147.

Kim, D., D. Palia, and A. Saunders, 2008, "The Impact of Commercial Banks on Underwriting Spreads: Evidence from Three Decades," *The Journal of Financial and Quantitative Analysis 43*, 975-1000.

Lee, I., S. Lochead, J. Ritter, and Q. Zhao, 1996, "The Cost of Raising Capital." *Journal of Financial Research* 19, 59-74.

Leuz, C., 2007, "Was the Sarbanes-Oxley Act of 2002 Really this Costly? A Discussion of Evidence from Event Returns and Going-Public Decisions," *Journal of Accounting and Economics* 44, 146-165.

Li, H. M. Pincus, and S.O. Rego, 2008, "Market Reaction to Events Surrounding the Sarbanes-Oxley Act of 2002 and Earnings Management," *Journal of Law and Economics* 51, 111-134.

Litvak, K., 2007, "The Effect of the Sarbanes-Oxley Act on Non-US Companies Cross-Listed in the US," *Journal of Corporate Finance*, 13, 195-228.

Smith, C. W., Jr., 1977, "Alternate methods for raising capital: Rights versus underwritten Offerings," *Journal of Financial Economics* 5, 273-307.

Stephens, L. and R.G. Schwartz, 2006, "The Chilling Effect of Sarbanes-Oxley: Myth or Reality?" *The CPA Journal*, 76, 14-19.

Wintoki, M.B., 2007, "Corporate Boards and Regulation: The Effect of the Sarbanes-Oxley Act and the Exchange Listing Requirements on Firm Value," *Journal of Corporate Finance*, 13, 229-250.

Zang, I.X., 2007, "Economic Consequences of the Sarbanes-Oxley Act of 2002," *Journal of Accounting and Economics*, 44, 74-115.

APPENDIX

Figure 1
IPO Underwriting Spread (%) by Offer Size Categories

Full Period   Before Sox   Post Sox

Figure 2
SEO Underwriting Spread (%) by Offer Size Categories

Full Period   Before Sox   Post Sox

Figure 3
IPO Other Direct Expenses (%) by Offer Size Category

Figure 4
SEO Other Direct Expenses (%) by Offer Size Categories

Figure 5
IPO Total Direct Costs (%) by Offer Size Categories

■ Full Period   ■ Pre SOX   ■ Post SOX

Figure 6
SEO Total Direct Costs (%) by Offer Size Categories

■ Full Period   ■ Pre SOX   ■ Post SOX

Table 1
Underwriting Spreads of IPOs and SEOs by Issue Size Categories

Variable	IPO (1980-2015)			SEO (1980-2015)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Constant	7.8742***	8.1375***	8.1199***	5.8234***	6.2133***	6.0061***
	(0.03)	(0.03)	(0.05)	(0.05)	(0.05)	(0.07)
Cat 2	-0.6900***	-0.8302***	-0.8371***	-0.0994	-0.2429***	-0.2513***
	(0.04)	(0.04)	(0.04)	(0.07)	(0.07)	(0.06)
Cat 3	-1.0036***	-1.1058***	-1.1024***	-0.5966***	-0.7042***	-0.7264***
	(0.04)	(0.04)	(0.04)	(0.06)	(0.06)	(0.06)
Cat 4	-1.0915***	-1.0901***	-1.0845***	-0.9363***	-1.0245***	-1.0532***
	(0.04)	(0.04)	(0.04)	(0.06)	(0.06)	(0.06)
Cat 5	-1.2490***	-1.1765***	-1.1724***	-1.2500***	-1.2833***	-1.3166***
	(0.05)	(0.05)	(0.05)	(0.07)	(0.06)	(0.06)
Cat 6	-1.4676***	-1.3541***	-1.3422***	-1.4372***	-1.4447***	-1.4774***
	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)
Cat 7	-1.7226***	-1.5488***	-1.5258***	-1.8238***	-1.7550***	-1.7818***
	(0.04)	(0.04)	(0.04)	(0.06)	(0.06)	(0.06)
Cat 8	-2.3086***	-2.0895***	-1.9935***	-2.4738***	-2.3324***	-2.3310***
	(0.05)	(0.05)	(0.05)	(0.07)	(0.07)	(0.07)
Cat 9	-3.2695***	-3.0171***	-2.6033***	-3.1859***	-2.9403***	-2.7727***
	(0.07)	(0.07)	(0.09)	(0.09)	(0.09)	(0.11)
SOX Dummy		-0.9112***	-0.9299***		-0.8265***	-0.7798***
		(0.02)	(0.03)		(0.03)	(0.03)
Size			-0.0004***			-0.0002***
			(0.00)			(0.00)
CEFD			-0.0097***			0.0010
			(0.00)			(0.00)
Recession Period			0.1447**			0.0250
			(0.06)			(0.07)
Initial Return			0.0018*			-0.0002
			(0.00)			(0.00)
Number of Issues			0.0016***			0.0042***
			(0.00)			(0.00)
Securities Litigation			-0.0221			0.0514
			(0.03)			(0.05)
Internet Bubble			-0.0934			0.4434***
			(0.06)			(0.07)
Economic Crisis			0.6110***			0.3784***
			(0.07)			(0.10)
Adj. R-Square	24.72%	32.43%	33.55%	26.24%	32.52%	33.10%
N	11,992	11,992	11,992	10,021	10,021	10,021

Standard errors are in parenthesis just below coefficients.
***, **, and * represent statistical significance at 1%, 5%, and 10% level respectively.

Table 2
Sarbanes Oxley and Underwriting Spreads of IPOs and SEOs by Issue Size Categories

Variable	IPO			SEO		
	Pre-SOX	Post-SOX	Difference	Pre-SOX	Post-SOX	Difference
Constant	8.4462***	6.4857***	-1.9605***	6.8051***	4.2287***	-2.5764***
	(0.04)	(0.12)	(0.10)	(0.07)	(0.12)	(0.14)
Cat 2	-1.2941***	-0.1221	1.1720***	-0.8695***	0.2252*	1.0947***
	(0.03)	(0.13)	(0.10)	(0.07)	(0.12)	(0.13)
Cat 3	-1.6862***	0.2709***	1.9570***	-1.4729***	0.0907	1.5636***
	(0.03)	(0.10)	(0.08)	(0.06)	(0.10)	(0.12)
Cat 4	-1.7999***	0.5094***	2.3093***	-1.9172***	-0.0032	1.9139***
	(0.03)	(0.10)	(0.09)	(0.07)	(0.11)	(0.12)
Cat 5	-1.9551***	0.3936***	2.3487***	-2.1244***	-0.3565***	1.7679***
	(0.04)	(0.11)	(0.09)	(0.07)	(0.11)	(0.13)
Cat 6	-2.1173***	0.1326	2.2499***	-2.3432***	-0.4460***	1.8972***
	(0.05)	(0.13)	(0.11)	(0.08)	(0.12)	(0.14)
Cat 7	-2.2985***	-0.0998	2.1987***	-2.6350***	-0.7691***	1.8658***
	(0.04)	(0.10)	(0.08)	(0.08)	(0.10)	(0.13)
Cat 8	-2.7045***	-0.6633***	2.0412***	-3.1186***	-1.3099***	1.8088***
	(0.05)	(0.11)	(0.10)	(0.11)	(0.11)	(0.16)
Cat 9	-2.9193***	-1.6132***	1.3061***	-2.9161***	-1.8635***	1.0526***
	(0.10)	(0.16)	(0.18)	(0.25)	(0.15)	(0.32)
Size	-0.0005***	-0.0004***	0.0002	-0.0013***	-0.0002***	0.0011***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
CEFD	0.0158***	-0.0614***	-0.0772***	0.0096**	-0.0118	-0.0213***
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)
Recession Period	0.0660	0.3572*	0.2912*	0.0540	0.0774	0.0234
	(0.05)	(0.20)	(0.15)	(0.07)	(0.14)	(0.15)
Initial Return	0.0025***	-0.0012	-0.0037	-0.0021	0.0000	0.0022
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Number of Issues	0.0016***	-0.0001	-0.0017	0.0025***	0.0093***	0.0067***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Securities Litigation	-0.0666***	-	-	0.1188***	-	-
	(0.02)	-	-	(0.04)	-	-
Internet Bubble	-0.0351	-	-	0.5329***	-	-
	(0.04)	-	-	(0.06)	-	-
Economic Crisis	-	-0.0246	-	-	0.2664*	-
	-	(0.11)	-	-	(0.14)	-
Adj. R-Square	51.02%	13.38%		40.49%	15.28%	
N	8,338	3,638		5,531	4,490	

Standard errors are in parenthesis just below coefficients.
***, **, and * represent statistical significance at 1%, 5%, and 10% level respectively.

Table 3
Sarbanes Oxley and Other Expenses of IPOs and SEOs by Issue Size Categories

	IPO			SEO		
Variable	Pre-SOX	Post-SOX	Difference	Pre-SOX	Post-SOX	Difference
Constant	8.0554***	6.9961***	-1.0594***	5.4484***	13.5004***	8.0520***
	(0.11)	(0.49)	(0.36)	(0.34)	(2.59)	(2.32)
Cat 2	-3.1366***	-3.5771***	-0.4406	-2.6312***	-11.0914***	-8.4602***
	(0.09)	(0.40)	(0.30)	(0.32)	(2.55)	(2.23)
Cat 3	-4.8226***	-3.6986***	1.1240***	-3.7165***	-11.6498***	-7.9333***
	(0.09)	(0.34)	(0.25)	(0.30)	(2.19)	(1.99)
Cat 4	-5.6065***	-4.5164***	1.0901***	-3.8464***	-12.1568***	-8.3104***
	(0.10)	(0.36)	(0.28)	(0.31)	(2.28)	(2.08)
Cat 5	-6.0261***	-5.0316***	0.9946***	-4.2670***	-12.1900***	-7.9230***
	(0.13)	(0.39)	(0.32)	(0.34)	(2.32)	(2.17)
Cat 6	-6.2215***	-5.5864***	0.6351*	-4.4736***	-12.4292***	-7.9556***
	(0.16)	(0.46)	(0.38)	(0.38)	(2.55)	(2.42)
Cat 7	-6.3796***	-5.8074***	0.5722**	-4.6180***	-12.4303***	-7.8123***
	(0.13)	(0.33)	(0.29)	(0.36)	(2.11)	(2.14)
Cat 8	-6.8886***	-6.4378***	0.4508	-4.6612***	-12.4461***	-7.7849***
	(0.18)	(0.38)	(0.36)	(0.52)	(2.25)	(2.75)
Cat 9	-6.8846***	-6.9068***	-0.0222	-4.3676***	-12.5452***	-8.1776
	(0.40)	(0.60)	(0.71)	(1.15)	(3.13)	(5.51)
Size	-0.0004	0.0000	0.0005	-0.0007	0.0000	0.0008
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
CEFD	-0.0213***	0.0078	0.0291	-0.0198	-0.2219	-0.2021
	(0.01)	(0.04)	(0.03)	(0.02)	(0.16)	(0.15)
Recession Period	-0.3517**	0.1271	0.4788	0.4324	0.8914	0.4590
	(0.15)	(1.06)	(0.72)	(0.35)	(2.91)	(2.49)
Initial Return	-0.0065***	-0.0146	-0.0081	-0.0109	-0.0006	0.0103
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.04)
Number of Issues	-0.0054***	0.0430***	0.0483***	-0.0026	0.0236	0.0261
	(0.00)	(0.01)	(0.01)	(0.00)	(0.03)	(0.03)
Securities Litigation	0.5774***	-	-	-0.0253	-	-
	(0.07)	-	-	(0.20)	-	-
Internet Bubble	0.7745***	-	-	0.1153	-	-
	(0.16)	-	-	(0.28)	-	-
Economic Crisis	-	0.0575	-	-	-1.4150	-
	-	(0.65)	-	-	(2.97)	-
Adj. R-Square	47.12%	16.62%		5.21%	0.64%	
N	7,143	2,870		5,531	4,490	

Standard errors are in parenthesis just below coefficients.
***, **, and * represent statistical significance at 1%, 5%, and 10% level respectively.

Table 4

Sarbanes Oxley and Total Direct Costs of Offering of IPOs and SEOs by Issue Size Categories

	IPO			SEO		
Variable	Pre-SOX	Post-SOX	Difference	Pre-SOX	Post-SOX	Difference
Constant	16.5310***	12.6527***	-3.8783***	12.2535***	17.7291***	5.4756**
	(0.12)	(0.53)	(0.39)	(0.36)	(2.59)	(2.33)
Cat 2	-4.4271***	-3.0961***	1.3310***	-3.5007***	-10.8662***	-7.3655***
	(0.10)	(0.46)	(0.33)	(0.33)	(2.55)	(2.24)
Cat 3	-6.4744***	-2.6971***	3.7773***	-5.1893***	-11.5591***	-6.3698***
	(0.09)	(0.38)	(0.28)	(0.31)	(2.20)	(1.99)
Cat 4	-7.3529***	-3.1740***	4.1789***	-5.7635***	-12.1600***	-6.3965***
	(0.11)	(0.39)	(0.30)	(0.33)	(2.28)	(2.08)
Cat 5	-7.9457***	-3.6871***	4.2586***	-6.3914***	-12.5466***	-6.1551***
	(0.14)	(0.43)	(0.34)	(0.35)	(2.33)	(2.18)
Cat 6	-8.2412***	-4.6538***	3.5874***	-6.8168***	-12.8752***	-6.0584**
	(0.18)	(0.49)	(0.40)	(0.40)	(2.55)	(2.42)
Cat 7	-8.6120***	-4.9485***	3.6634***	-7.2530***	-13.1994***	-5.9464***
	(0.14)	(0.36)	(0.30)	(0.37)	(2.11)	(2.14)
Cat 8	-9.4708***	-6.2063***	3.2645***	-7.7798***	-13.7560***	-5.9762**
	(0.20)	(0.41)	(0.38)	(0.54)	(2.25)	(2.75)
Cat 9	-9.5038***	-7.8658***	1.6380**	-7.2837***	-14.4087***	-7.1250
	(0.44)	(0.64)	(0.73)	(1.20)	(3.14)	(5.53)
Size	-0.0010***	-0.0003	0.0007	-0.0021	-0.0002	0.0019
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
CEFD	-0.0033	-0.0436	-0.0402	-0.0102	-0.2337	-0.2235
	(0.01)	(0.04)	(0.03)	(0.02)	(0.16)	(0.15)
Recession Period	-0.4088**	0.3398	0.7486	0.4864	0.9687	0.4823
	(0.17)	(1.09)	(0.75)	(0.36)	(2.91)	(2.50)
Initial Return	-0.0035	-0.0078	-0.0043	-0.0130	-0.0006	0.0124
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.04)
Number of Issues	-0.0048***	0.0341**	0.0389***	0.0000	0.0328	0.0329
	(0.00)	(0.01)	(0.01)	(0.00)	(0.03)	(0.03)
Securities Litigation	0.4888***	-	-	0.0934	-	-
	(0.08)	-	-	(0.20)	-	-
Internet Bubble	0.6283***	-	-	0.6482**	-	-
	(0.17)	-	-	(0.29)	-	-
Economic Crisis	-	0.1920	-	-	-1.1486	-
	-	(0.66)	-	-	(2.98)	-
Adj. R-Square	57.21%	14.41%		12.86%	0.79%	
N	7,105	2,518		5,531	4,490	

Standard errors are in parenthesis just below coefficients.

***, **, and * represent statistical significance at 1%, 5%, and 10% level respectively.