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Market Perception of SOX Act in the Case of US Listed Banks

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Abstract:

This paper examines the net effect of Sarbanes – Oxley Act of 2002 onto market valuation of bank holding shares. Overall analysis finds significant price growth in the years following the SOX Act. At the same time liquidity of the bank shares has improved, which implies SOX Act has produced benefits for US listed bank holdings. When analyzing shorter sequences, we confirm that banking industry enjoys reputation as well regulated industry as opposed to other industries, which drove the share prices and liquidity up.

Key Words: *Sarbanes-Oxley Act, Bank Share Price Valuation, Liquidity, Equity Market of the US*

JEL Classification*: C33, M48*

1. Introduction

On 25th of July 2002 the US president has signed the Sarbanes-Oxley Act (SOX Act) as a response to severe corporate scandals that have shaken the economic scene of the US. The SOX Act requires intensifying of financial reporting, auditor independence, corporate responsibility and other internal control mechanisms of all the US publicly listed companies and establishes penalties often to the extent of criminal accountability if the rules are not obliged (Sarbanes – Oxley Act of 2002).

The important question is, conditional on the fact that the SOX Act imposed significant additional compliance costs to the companies, what consequences has it produced. Given the costs were indeed significant, companies' response on SOX Act could have been various - the companies could agree with compliance expenses, but also could go 'dark' (deregister from Security Exchange Commission but still keep trading their securities at OTC), completely withdraw from US markets and become private (as in Leuz, 2007) or register at a less regulated equity market abroad instead (noticed in Doidge, Karolyi and Stulz, 2010). Since the compliance

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costs of the SOX Act reduced the net benefits of US listing, for some foreign companies, the value of a listing became negative and hence led these companies to choose to deregister. It is a fact that multinational companies involve in international profit shifting that depends, as Huizinga and Laeven (2008) mention, on tax regimes on specific countries. Companies optimize their tax burdens using various mechanisms. Taxes, as well as compliance costs are consequences of governmental policies. It could be expected that the banks would (as in Demirguc – Kunt and Huizinga (2001) research mentioned in the Huizinga and Laeven article) accommodate to regulatory environments of their headquarters versus subsidiaries as a response to SOX Act implementation, as they did when shifted profits with respect to tax rates of countries of their subsidiaries. When considering what the consequences of SOX Act onto US publicly listed companies actually could be, we can present two opposing arguments.

Firstly, we can agree that SOX Act imposes significant costs on companies. Ahmed, McAnally, Rasmussen and Weaver (2010) note that direct costs are dominated by audit fees, however other types of costs have made significant negative effects on operating performance of companies as well. Krishnan, Rama and Zhang (2008) analyze the SOX Act disclosures of firms and conclude that the compliance burden is uneven with respect to the size of companies Indirect costs count for the extra costs that firms that are going public incur (by D'Aquila, (2004)). Doidge, Karolyi and Stulz (2010) mention magnified risk-aversion of the CEOs due to increased scrutiny which can cause lower growth prospects. Both types of the costs can negatively affect companies' performances, and therefore the share prices.

However, another view can be argued - as Coates (2007) notes, SOX Act is perceived as a promise for future benefits: as the increased financial disclosure takes place, information asymmetry decreases, causes lower risk perceived by market and translates into lower equity costs (Ashbaugh-Skaife, Collins, Kinney Jr. and Lafond, 2009). Aligned with this is a research by Jain, Kim and Rezaee (2008). They observe long-term significant liquidity improvements signaling recovery of the investors' trust after the period of corporate scandals. SOX Act added to the reliability of financial reports, reduced information asymmetry which in turn resulted in improved market liquidity. However, the effect was positively related to the firm size, meaning the larger firms enjoyed the benefit more.

The focus of this analysis will be determining which effect – costs or benefits – has dominated in the investors' perception of the SOX Act. We wonder if the investors have considered the SOX Act as the determinant of the lower company profitability, the increased probability of discovering another corporate fraud or the overregulation in the U.S. market. The effect of SOX Act could have been perceived by the investors in completely opposite direction – as a long-awaited tool bringing order to chaotic markets, increasing the accuracy of information and lowering probability of another frauds occurring.

We will try to find the approximate answer by using the prices of the bank-holdings' shares. There are two reasons behind the choice of this industry. Firstly,

the SOX Act prescripts intensive investigation on whether the investment banks (usually organized in the form of a bank holding) have assisted public companies in manipulating their earnings and covering their true financial condition (Sarbanes – Oxley Act of 2002). The publicly listed bank holdings do not only have to cope with the compliance, but have higher potential to be revealed as having involvement in one or more corporate scandals, which adds to perceived riskiness by the investor community. Secondly, financial institutions are subject to more intense examination especially in US, where the financial markets are considered to be highly regulated (Wall Street Journal, 2008). Hence, it is reasonable to expect that the SOX Act, often seen as a one-size-fits-all regulation (and therefore less industry specific) would not cause any significant additional costs to the bank holdings, since they might have such level of transparency established ex ante.

Moreover, regulators often impose certain equity ratio or level of capitalization to banks. When the banks issue new shares, it can imply that they are becoming safer due to compliance with the regulation and thus become more liquid (Cornett, Mehran and Tehranian, 1998).

In further sections we find the SOX Act has not caused any significant operating expenses for bank holdings and that it has increased liquidity of the bank holdings' shares.

The paper is structured as follows: section 2 presents literature overview on the matter, section 3 explains and argues research design, section 4 presents the results and lastly, sections 5 and 6 provide the concluding remarks.

2. Literature Review

The research on the consequences of SOX Act has reached ambiguous conclusions. Important points were made when contemplating the costs of SOX Act compliance. Zhang (2007) uses foreign companies' returns as a control to distinguish SOX Act effect from other contemporaneous effects. Zhang achieves the results that are significantly in favor of the hypothesis that SOX Act imposes net costs on complying firms measured by the drop of the stock prices. However, the choice of the right control group of markets and the interdependence of the markets all over the world with local news occurrence hinder the findings.

Ahmed, McAnally, Rasmussen and Weaver (2010) focus on actual, realized (non audit) costs including indirect, opportunity costs of SOX Act. Audit costs are eliminated in order not to overestimate the actual cost effect of SOX Act and to provide feedback in more holistic manner taken with respect to the firm specific characteristics and firm specific compliance costs. The paper documents significant drop in cash-flow profitability after SOX Act establishment.

Litvak (2007) has found a more clean way to measure the effect of SOX Act in terms of the stock prices but in the case of non-US cross listed companies in the US. Since not all of such companies have to comply with the act, a plausible control

group is available. Litvak finds significant drop in stock prices during key act announcements and attributes it to the SOX Act enactment while suggesting that investors perceived the SOX Act as a net-cost causing event. Moreover, companies that had better disclosure habits before SOX Act suffered higher price drop compared to other companies because they were perceived as companies doubling the compliance costs by the market. However, it is necessary to note that sample selection bias can hinder the relevance of these conclusions, since we are not exactly sure based on which principle the foreign companies are chosen (or excluded) to be subject to SOX Act.

Nonetheless, vast literature on SOX Act is claiming that the short-term costs cannot offset long-term benefits, thus being in utter conflict with the standpoints above. Jain and Rezaee (2006) examine capital-market reactions to the promising events for the SOX Act to pass by observing stock prices. Investors have considered SOX Act enactment as good news because, as authors note, significantly positive abnormal returns were detected for this kind of events, and vice versa (also found by Li, Pincus and Olhoft Rego, 2008). Moreover, they find that companies with more reliable financial disclosure prior to the SOX Act enjoy the benefits of the Act in stronger way than other firms do because they have already incurred the costs of compliance.

Jain, Kim and Rezaee (2008) observe the market liquidity around key SOX Act events. The authors report that market liquidity measures deteriorate after the wave of corporate scandals, suggesting that investors perceived increased risks. Moreover, they find that market liquidity measures improve significantly, particularly in the long term, after the passage of SOX Act, implying that the reforms were successful in restoring markets' confidence in public financial information. The analysis will be relying much on approach and interpretation of this paper.

To conclude the literature overview section, we can note that most of the mentioned work suffers from an empirical hurdle – crystallizing the SOX Act effect from all the other, contemporaneous events' effects in a proper way.

3. Research Design

3.1 Data and model

A panel of data was retrieved from Wharton Research Data Services on 47 biggest US publicly listed bank holdings (list of bank holdings comes from National Information Center) whereas the macroeconomic indicator data originates from World Bank database. The sample covers period from beginning of 2001 to the end of 2003. We will be using daily and monthly stock data, quarterly income statement entries and yearly data on GDP growth. The entries on bank holdings that have defaulted during the recent financial crises of 2008 were dropped out of the analysis due to lack of data. We are aware that this fact can cause the estimates to be biased

upwards, because if the investors really assess increased riskiness of the banks during corporate scandals and SOX Act, their concerns would be justified and we would expect effect of the concerns (measured by liquidity of the shares) to be more pronounced. Moreover, the fact that we include only the biggest bank holdings of US can add to the underestimation of investor's concerns because as Jain, Kim and Rezaee (2008) note, the liquidity measures are known to increase with the firm size.

The goal of this analysis will be to determine what net effect of SOX Act in the investors' opinion was. To do so, we will use a 'noisy' measure as the dependent variable – stock prices. The main explanatory variable will be a dummy for the period after the SOX Act implementation. We will use measures of operating performance, liquidity of the banks' shares, size of the bank holding and annual rate of gross domestic product growth as the controls. We assume structure on the error term that contains constant unobserved company specific effect, meaning that there is an omitted variable – a characteristic of the observed bank holding that might affect the dependent variable, but at the same time be correlated with one of the explanatory variables (for example, CEO's ability).

The regression model (including the control variables) we will use is the following:

$$\begin{aligned} &ln\_share\_price_{it} = \\ &\beta_0 + \beta_1 operating\_income\_to\_sales_{it} + \beta_2 bidask\_spread\_to\_avgprice_{it} + \\ &\beta_3 post\_sox_t + \beta_4 \ln\_assets_{it} + \beta_5 GDP\_growth_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

In which i stands for bank holding and t stands for date. Error term has a structure accounting for bank holding unobserved fixed effect ui and the actual error term of the model v_{it}:

$$\varepsilon_{it} = u_i + v_{it} \quad (2)$$

Detailed reasoning behind this specification follows.

3.2 Choice of variables

Share price is considered to be a reflection of the relevant information available at the market. As Mukherjee and Dukes (1989) note, available information forms intuitive judgment and sentiment of investors and as such plays an important role in pricing the shares. New disclosure rules restore the information content of stock prices (DeFusco, Mishra and Raghunandan, 2010) and investors account for that in their expectations. We are interested in information content of the stock prices at the time of SOX Act enactment.

Arguments for share price decrease are valid if the bank holdings become perceived as more risky due to increased scrutiny and hence the probability of a fraud occurring and also if the market becomes illiquid due to overregulation, as in Hameed, Kang and Viswanathan (2010) and Minardi, Sanvicente and Monteiro

(2006). Also, share prices of banks might drop due to decreased operating performance. Share price increase can be argued as well, because as the flow of information about companies increases, the uncertainty decreases and consequently higher liquidity causes share prices to increase (Brennan, and Hughes, 1991). In addition, share prices might increase due to demand effect – if banks are perceived as well regulated as opposed to other industries, SO X Act might bring up increased uncertainty of new frauds occurring that would affect the other industries more severely. That might drive the demand after the bank shares.

Operating income to sales ratio represents a measure of *operating performance* that is supposed to be the one most noticeably affected by the increased compliance costs. We expect this measure to cause the earnings of the bank holdings to drop, which would then affect the share price decline, as found in a research by Ahmed, McAnally, Rasmussen and Weaver (2010).

Proportional bid-ask spread or daily bid-ask spread divided by the monthly price of a share is a commonly used measure of *liquidity* of a share (used in Jain, Kim and Rezaee (2008) for instance). We can expect effect in both directions of liquidity measure onto the stock prices. Higher bid-ask spread of a share signals higher information asymmetry, which causes the liquidity of the share to drop as well as the price of the share (Minardi, Sanvicente and Monteiro, 2006). The key driver of decline in liquidity is deterioration of information environment (Jain, Kim and Rezaee, 2008). Yet, SOX Act introduces more information-symmetric environment which might bring the share prices up.

Each of the arguments can be further magnified in the case of bank holding shares. Banks are under additional suspicion on the one hand, but are more regulated ex ante on the other one. We anticipate that both of the liquidity arguments took place in the market valuation, but possibly in different time dimensions. We will test this by using different time frames.

Dummy variable *post-sox* is a difference-in-difference estimator that takes value one for the years, months or days following the SOX Act enactment, depending on specification of the model. Finally, *assets* and GDP *growth annual* rate are additional control variables used in long-term specifications. When the analysis focuses on monthly or daily frame, these variables become constant and we drop them.

Table 1. Overview of expected effects of controls on dependent variable. Estimation technique

Share price →	Increase	Decrease
Operating performance →	A. ↑ benefits	C. ↓ costs
Liquidity →	B. ↑ benefits	D. ↓ costs
Other factors (ε)	?	?

3.3 Estimation Technique

When estimating the model, we will account for company fixed effects. As mentioned in Nichols and Schaffer (2007) since we are unable to assume identical and independent distribution over the error term (observations and errors might be correlated within i), we will control for clustered errors2. In first estimations, dummy variable will equal one for the years 2002 and 2003. This approach was used by Ahmed, McAnally, Rasmussen and Weaver (2010).

While mimicking the event study approach as in Jain, Kim and Rezaee (2008), we will narrow down the analysis with respect to time by changing the time range of the dummy variable. To start, we will include four dummy variables for four time windows (*m1* - *m4*): first, the benchmark period from January to September of 2001; second, the period of accounting scandals from October 2001 to June 2002; third, period from July to December 2002 when legislation took place and finally January to April 2003 – period when regulation happens.

Next we will continue narrowing down the time frame to specific days, choice of which is argued in Jain and Rezaee (2006). Here four dummies cover four periods (*d1* - *d4*): ambiguous period from 14th of February to 25th June 2002, period when market suspicions were that SOX Act might not pass from 9th of July to 19th of July, period when the SOX Act indeed takes place, 24th of July 2002 to 7th of August 2002, and finally rest of the time period from 8th of August 2002 until 30th of July of 2003.

4. Results

Tables 2 and 3 present descriptive statistics and correlations for unbalanced panel of the variables used in the analysis.

Table 2. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
	(1)	(2)	(3)	(4)	(5)
Share prices	32707	43.28797	25.0749	-223	225
Operating performance	23754	0.378294	0.192985	-0.02211	1.992523
Liquidity	23957	0.024587	0.015542	0	0.370978
lnassets	25121	10.78301	1.446264	7.850283	14.04982
GDP annual growth	25121	1.365981	1.17852	-0.26	2.5

[2] Ahmed et al (2010) consider the same procedure however decide not to use it referring to a paper by Petersen (Petersen, M.A., 2009. Estimating standard errors in finance panel data sets: comparing approaches. The Review of Financial Studies 22 (1), 435 - 480) who concludes that clustered standard errors are biased when the number of clusters is small; however, in this case it was necessary due to wrong standard errors.

Table 3. Correlation matrix

	Share price	Operating performance	Liquidity	lnassets	GDP annual growth
Share prices	1				
Operating performance	0.0594	1			
Liquidity	-0.0522	-0.0965	1		
lnassets	0.1839	-0.0602	0.0972	1	
GDP annual growth	0.042	0.0132	-0.1711	0.0258	1

4.1 Aggregate Analysis

At first we look at full time frame of the data, therefore *post-sox* dummy will cover years after the SOX Act has passed, i.e. years 2002 and 2003.

Table 4.Main variables after the SOX Act

	Operating performance (1)	Liquidity (2)	ln(Share prices) (3)
postsox	0.080***	-0.006***	0.022
	(6.013)	(-7.697)	(0.507)
GDP annual growth (%)	0.012***	-0.003***	0.008
	(3.359)	(-9.519)	(1.136)
lnassets	-0.010	0.001**	0.055
	(-0.650)	(2.327)	(1.256)
constant	0.411***	0.019***	3.088***
	(2.920)	(3.317)	(6.449)
Number of observations	23,754	23,957	25,119
R2	0.039	0.068	0.037

Note: *** p<0.01, ** p<0.05, * p<0.1.

In the first column of Table 4 we observe highly significant positive effect of *post-sox* dummy on operating performance - on average the operating income has increased by 8% of the sales per year after SOX Act (assuming field A in Table 1, not sure yet). This is aligned with the fact that bank holdings have overcame auditing and similar costs before, so if the share prices indeed drop after the SOX Act, it would not be caused by the decrease in operating performance (eliminating field C of Table 1).

In column 2 we observe negative coefficient of *post-sox* dummy on proportional bid-ask spread. The effect is highly significant and implies that in every year of the sample following the SOX Act passage, bid-ask spread of bank holding share prices has decreased on average by 0.6% of the monthly share price. Hence, the overall liquidity of the bank holding shares increased in the years 2002 and 2003, which is consistent with the fact that the overall information asymmetry decreased and the investors' confidence in bank holdings was additionally supported by SOX Act beneficial effect (could be field B in Table 1). Third column tells us that in the years following SOX Act a bank holding share price increase of 2.2% has been present, however this effect is insignificant.

Table 5. Main aggregate analysis

	OLS	OLS	FE	FE	FE	FE
	(1)	(2)	(3)	(4)	(5)	(6)
Operating performance	0.122	0.153	0.380**	0.391**	0.335*	0.357**
	(0.394)	(0.435)	(2.124)	(2.273)	(1.905)	(2.122)
Liquidity	-2.027*	-2.550*	-2.417***	-2.446***	-0.146	-0.160
	(-1.661)	(-1.932)	(-6.851)	(-6.544)	(-0.225)	(-0.248)
Postsox	0.008	-0.003	-0.020	-0.018	0.082***	0.081**
	(0.193)	(-0.055)	(-0.536)	(-0.396)	(2.812)	(2.329)
GDP annual growth (%)		0.006		-0.001		-0.006
		(0.596)		(-0.142)		(-0.808)
lnassets		0.067		-0.028		-0.012
		(1.637)		(-0.250)		(-0.112)
Interaction term					-3.822***	-3.979***
					(-4.586)	(-4.465)
Constant	3.715***	2.994***	3.324***	4.080**	3.318***	3.820**
	(26.131)	(6.048)	(52.974)	(2.573)	(54.473)	(2.511)
Number of observations	22,654	22,654	22,654	22,654	22,654	22,654
R2	0.010	0.066	0.857	0.857	0.861	0.862
Company dummies	No	No	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1.

The columns 1 and 2 of the Table 5 present results of OLS estimations. Mainly insignificant results are captured here, not accounting for bank-specific constant unobserved effects.

Next we turn to fixed-effects estimations, reported in columns from 3 to 6. R2 value has improved heavily, since most of the variation of the variables we attribute to the bank specific unobserved effect. Key variables start to make statistically significant points: operating performance measure coefficient in column 3 implies that when the the ratio of operating income to sales increases by one percent, share prices would increase on average by 0.38%; this effect has been expected and thus, by verifying the significance of the causality and its direction, we confirm the effect in field A in Table 1. Measure of liquidity is highly significant and when the bid-ask spread increases by one percent of monthly prices, the share prices would drop on average by 2.45%; finally, the key variable – *post-sox* dummy has a negative but insignificant coefficient.

These results give relevance to the findings of OLS regressions, however do not provide us with any finding or foundation for reasoning about the matter we are primarily interested in – the behavior of share prices after the SOX Act. The findings remain similar even when adding control variables, as reported in the column 4.

The ambiguous results gave us an incentive to follow the procedure in Ahmed (2010) by interacting liquidity measure with *post-sox* dummy and thus separate the effect of proportional bid-ask spread to pre and post SOX Act years. The results are reported in the 5th and 6th column of the Table 5. *Post-sox* variable has a highly significant and positive effect suggesting that after the SOX Act implementation, bank holdings' share prices have increased by 8.2%.

The interaction term has significant average negative coefficient of 3.82%, which means that responsiveness of share prices to proportional spread increased after the SOX Act has passed by 3.82 percent more than in the period before. After SOX act, liquidity become more compelling – market participants become more sensitive to the bid-ask spread when pricing the stocks after SOX Act.

We conclude the bank holdings have enjoyed benefits after SOX Act enactment. Share prices have increased over the observed period due to the fact that banks have not incurred any significant drop in operating performance (no significant compliance costs) and due to decrease in bid-ask spread that signals increased investors' confidence about the shares, especially in the period after SOX Act. Hypothesis that banks are perceived as well regulated despite SOX Act is supported and is in accordance with the previous research conclusions. SOX Act has contributed to the overall information symmetry in the market in the case of bank holding shares. These results can be summarized by left column in Table 1 - share price increase and SOX Act benefits for bank holdings, where the effect magnitude is divided upon operating performance, liquidity and other unspecified factors (possibly the increased demand after bank holding shares). Column 6 reports the similar results using additional control variables.

4.2 Event Analysis

Table 6 and 7 contain time-narrowed analyses. The monthly approach has yielded compelling results (Table 6). First time dummy, *m1*, is for the benchmark period. In this case the coefficient is significantly negative, which means that in this (pre-SOX Act) period, as opposed to the following time periods, the prices have been on average lower by 6.9%. Liquidity measure is significantly positive.

Table 6.Event analysis(months)

	m1 (1)	m2 (2)	m3 (3)	m4 (4)
Operating performance	0.354** (2.065)	0.327* (1.694)	0.349* (1.839)	0.387** (2.040)
Liquidity	-3.733*** (-10.613)	-2.389*** (-5.599)	-1.370*** (-2.847)	-2.298*** (-6.676)
m1*liquidity	3.988*** (4.299)			
m1	-0.069** (-2.515)			
m2*liquidity		0.233 (0.339)		
m2		0.008 (0.386)		
m3*liquidity			-2.321*** (-3.754)	
m3			0.021 (0.661)	
m4*liquidity				-1.831 (-1.487)
m4				-0.081*** (-3.430)
Constant	3.361*** (51.583)	3.340*** (50.117)	3.325*** (51.288)	3.321*** (50.214)
Number of observations	22,654	22,654	22,654	22,654
R2	0.862	0.856	0.859	0.865
Company dummies	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1.

Dummy *m2* stands for the period of accounting and corporate scandals, when the overall uncertainty and asymmetry of information become more emphasized. Consistent with this, we note positive (but insignificant) sign of the time dummy, which suggests that the bank holding share prices have increased on average by 0.8% as opposed to other periods (left column of Table 1).

Dummy *m3* covers legislation period, period when the probability of another scandals being discovered is high because the new act is taking place. The share prices rise by additional but insignificant 2.1%, whereas liquidity has increased significantly. This is consistent with our hypothesis of market perception being in favor of bank holding shares – as the uncertainty of the whole market is increasing, the bank shares maintain their attractiveness to liquidity traders.

The last period covering the beginning of the year 2003 shows that market participants' uncertainty might have diminished. The dummy *m4* takes up a negative and significant value, which suggests share prices have leveled out by 8.08% on average.

When it comes to analysis of specific dates, the results are consistent with the assumptions, however not more pronounced (Table 7). Dummy covering the days of ambiguous period when the scandals were revealed and SOX Act in preparation shows significant average increase in the share prices of 4.72%.

This short term analysis shows first the prices increased due to more emphasized uncertainty towards the overall market and in favor of bank shares, but then leveled out, possibly because no unexpected frauds occurred. The results can be interpreted as consistent with aggregate analysis, where the bank holding share prices on average increase. It is possible to argue that the liquidity of bank shares has not deteriorated due to fact that the shares are generally perceived more favorably and enjoy industry specific reputation.

Table 7. Event analysis (days).

	d1 (1)	d2 (2)	d3 (3)	d4 (4)
Operating performance	0.299	0.317	0.320*	0.459**
	(1.511)	(1.643)	(1.657)	(2.451)
Liquidity	-2.305***	-2.440***	-2.309***	-1.448***
	(-6.065)	(-5.961)	(-6.345)	(-3.608)
d1*liquidity	0.541			
	(0.692)			
d1	0.047**			
	(2.535)			
d2*liquidity		0.717		
		(1.229)		
d2		-0.004		
		(-0.136)		
d3*liquidity			-1.149**	
			(-2.342)	
d3			0.037	
			(1.264)	
d4*liquidity				-2.688***
				(-2.914)
d4				-0.026
				(-1.222)
Constant	3.351***	3.346***	3.344***	3.287***
	(48.396)	(49.513)	(49.688)	(51.023)
Number of observations	22,654	22,654	22,654	22,654
R2	0.858	0.856	0.856	0.869
Company dummies	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1.

5. Limitations

By accounting for short term and long term dimension of SOX Act effect on the share prices of bank holdings in US, we managed to put certain structure to the results obtained. However, we do face many empirical drawbacks. Firstly and most

importantly – ability to net out the effect of SOX Act onto prices with taking into account only the relevant time frame is questionable, since there might have been events occurring contemporaneously that we have not controlled for. As noted before, finding a plausible control group to net out the pure SOX Act effect is difficult due to fact that many (somewhat comparable) countries have applied similar regulations at about the same time. The ones that did not do so (UK, for instance) have been affected indirectly by SOX Act by welcoming the inflow of companies newly deregistered from US markets (as mentioned in Doidge, Karolyi and Stulz, 2010).

Secondly, we might suffer from sample selection upward bias, due to the fact that we have selected only the biggest bank holdings listed in US. Consequences of this have been discussed in data section.

Thirdly, the difficulty of selecting the time windows has taken its due in the days-analysis. The daily news reported in media affect the investors' valuation and during this time news created various waves of information on SOX Act (as well as other global happenings we have not accounted for). It seems difficult to choose the right dates and interpret the corresponding events in isolation without accounting for all the media clutter cumulated in investors' memory.

Finally, the liquidity measure used in the model can tell us something about the information that investors account for when valuing the shares, however the model could include other measures as well.

6. Discussions and Conclusions

The focus of this analysis is determining which effect – costs or benefits – has dominated in the investors' perception of the SOX Act enactment in the case of US listed bank holdings. We try to account for two time dimensions – short term and long(er) term observation. Operating performance has not induced drop of bank holding share prices, quite the opposite, implying the banks have not incurred significant compliance costs and have been well regulated prior to SOX Act. Aggregate data show that shares have risen after the SOX Act, and the liquidity has improved as well. Therefore, investor confidence into bank holdings measured by the liquidity has improved, especially for the time period following the SOX Act. Therefore, SOX Act contributed to the improving of the information symmetry at the US bank holding stock market. Bank holdings could be perceived as the ones benefiting from SOX Act significantly – since there is possibility that the demand after their shares has increased at the cost of other industries' shares. While narrowing down the time frame of the data, we conclude that bank holding share prices have increased during the corporate scandals and SOX Act preparation and legislation period. However share prices have leveled out in period of 5 months after SOX Act has taken place, meaning that the investors recovered from short-term

increased uncertainty and began realizing the long-term liquidity benefits implied by the new act for the market as a whole.

Finally, since we have noted no significant drop in operating performance, nor an extreme drop in the bank holding shares, we see no empirical reason for banks to turn private or list their headquarters or other establishments at other equity markets in response to SOX Act and cost optimization.

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