



Director and officer liability protection and firm value: Unintended consequences[☆]

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ABSTRACT

This study sheds light on some of the unintended consequences of directors' and officers' (D&O) liability protection provisions. In particular, it examines whether D&O protection affects firm value. Using a sample of U.S. firms, we find that firms with greater director liability protection have significantly lower firm value as measured by Tobin's Q, and that the negative effect of director liability protection on firm value is more pronounced in the period before the Sarbanes-Oxley Act of 2002. These findings are consistent with the notion that director liability acts as a strong corporate governance mechanism and that protecting directors and officers does not preclude them from undertaking sub-optimal investments and less risky projects.

1. Introduction

This paper investigates whether protecting the liability of Directors and Officers (D&Os hereafter) affects firm value. D&Os leadership positions expose them to litigation initiated by shareholders, employees, and/or regulatory agencies. A rise in litigation risk and a subsequent surge in D&O insurance premia in the mid-eighties caused a D&O liability crisis (Romano, 1989). As a result, directors refrained from serving on boards and firms were unable to hire and retain competent executives. To alleviate this issue, states passed legislation aimed at protecting directors in the case of a lawsuit,¹ however it is still unclear whether and how protecting D&Os from litigation affects firm value.

D&O liability protection has been the subject of public policy debate. However, inferences about the consequences of D&O protection are mixed. On the one hand, some evidence suggests that D&O liability protection may have had an overall positive effect on firm value. The main contention of this stream of literature is that firms that provide director protection are overall better managed and governed (e.g. Core, 2000; Bradley and Chen, 2011; Black et al., 2006a).²

On the other hand, other evidence suggests that limiting D&O liability may be detrimental to shareholders value. Proponents of this view argue that establishing D&Os protections in fact weakens an effective monitoring mechanism and that directors that enjoy

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¹ Some states (e.g. Ohio) chose to reduce the standard of culpability in such cases (self-executing statutes), some others (e.g. Delaware) authorized firms to include charter provisions that eliminate or limit the director's personal liability for monetary damage (charter option statutes), and others (e.g. Virginia) chose to impose a cap on liability for monetary damages. See Hanks (1988) for an extensive review of various state responses to the D&O liability crisis.

² See Boubakri (2011) for a review of empirical research assessing the impact of corporate governance on firm performance and risk taking.

limited liability are shielded from court discipline. Shielded directors may be less diligent and may take sub-optimal decisions when undertaking projects and making investments (e.g. Brook and Rao, 1994; Black et al., 2006a,b; Bebchuk et al., 2009; Donelson and Yust, 2014). Taken together, these arguments suggest that limiting directors' personal liability may ultimately be associated with a lower firm value. Since arguments on both sides are valid theoretically, it remains an empirical question whether and how D&O liability protection impacts firm value.

The literature on directors and managers risk taking preference is inconclusive (Adams et al., 2005). While protection provisions are originally intended to attract high quality directors, those directors might take decisions that do not necessarily benefit the shareholders. Given their non-diversified portfolios and their own interests, they are prone to take opportunistic decisions that ultimately reduce the value of the firm (e.g. Boubakri et al., 2008).

Another related question we ponder is whether the passage of the Sarbanes-Oxley Act of 2002 (SOX hereafter) had an impact on the relationship between D&O protection and firm value. The role of director and officer protection became more important after the reforms introduced by the SOX Act (Cao and Narayanmoorthy, 2014; Bormann, 2014). Despite the passage of time, the SOX Act impact remains controversial. Some claim that these measures resulted in increased personal liability (e.g. Linck et al., 2009) while others conclude that increased litigation is not a consistent pattern after SOX (Coates and Srinivasan, 2014). We therefore propose to examine whether the enactment of SOX had an impact on the relationship between D&O liability protection and firm value.

Using a sample of 1791 firms and 12,410 firm-year observations, we report evidence that director liability is an important monitoring mechanism. Specifically, we find that after controlling for firm characteristics and other governance provisions, firm value, as measured by Tobin's Q, decreases when the personal liability of D&Os is limited. These results are consistent with the view that holding management accountable is an effective corporate governance mechanism and that shielding directors from their legal responsibilities has detrimental consequences on firm value. We also conjecture and show that while liability protection is negatively associated with firm value in the pre-SOX period, the negative impact of protection weakens in the post-SOX period. We infer that in a post-SOX environment, liability protection does not shield directors as much as it did before the Act. We also examine whether the governance quality affects firms' decisions to add/remove protection provisions and find that firms that have better governance are more likely to remove D&O liability protection.

Our study makes several contributions to the D&O protection literature and to the policy debate. First, this paper is the first to examine the relationship between D&O liability protection and firm value. We extend two studies that investigated the implications of D&O protection provisions (Aguir et al., 2014; Khan and Wald, 2015) and we provide evidence corroborating the findings from both studies. Khan and Wald (2015) conclude that D&O protection is associated with accrual-based earnings management. Since income manipulation is detrimental to firm value in the long-run, our findings provide support to their conclusion. On the other hand, Aguir et al. (2014) find that protected directors are less likely to accept an acquisition offer, and if a deal goes through, the bid premium is lower on average. They infer that protected directors have reduced incentives to perform necessary due diligence and negotiations required during an acquisition. To the extent that lower effort and less due diligence have a detrimental effect on firm value, our results are in line with these conclusions as well.

Second, our study also contributes to the D&O liability insurance literature. Since D&O insurance is considered as a form of protection, our results are relevant to the debate about the implications of D&O insurance. Hwang and Kim (2018) examine the Korean setting and find that D&O liability insurance increases firm value compared to non-insured firms. In this paper, we provide additional evidence on this matter from the U.S. market. Contrary to Hwang and Kim (2018), our findings suggest that protecting directors by limiting their legal liability exposure is negatively associated with firm value. We conclude that while liability insurance might have a positive effect on firm value in other settings, limiting D&Os liability through legal provisions may have the opposite effect.

Third, we provide evidence that SOX reinvigorated D&O liability as a control mechanism. We show that while the negative effect of D&O protection on firm value is negative before SOX, the results from the post-SOX period show that the relationship is insignificant. We add to the debate about the effectiveness of the Act and its net impact on shareholder value (Coates and Srinivasan, 2014). Our findings are relevant to corporate boards who may want to eliminate protective provisions. They are also relevant to regulators since we show that the states D&O protection provisions are no longer effective after the enactments of SOX. This study is the first to use a large sample of U.S. firms to examine the impact of SOX on the relation between director liability protection, firm investment policy, and firm value.

The remainder of the paper is organized as follows. Section 2 provides the background, discusses related research, and introduces the hypotheses. Section 3 presents the sample and the research design. Section 4 presents the empirical results followed by sensitivity analyses, and the last section concludes the paper.

2. D&O liability protection: institutional background

Directors and Officers (D&Os) can face litigation from two main types of claimants: shareholders and third parties. A recent Willis Towers Watson Survey (2018) reports that D&Os remain sensitive to potential financial and reputational repercussions from claims against themselves and their firms. Boyer (2005) suggests that firms can reduce top management personal exposure in three ways: D&O insurance, corporate indemnification plans, and D&O protection.

While D&O insurance coverage remains a popular tool to reduce legal exposure, increasingly high insurance premia (Mallen and Evans, 1987), lengthy litigation, and detrimental reputational damage resulted in a D&O insurance crisis. It ensued that several U.S. states passed legislation to contain this crisis and limiting the legal exposure of D&Os.

In the U.S., the limitation of liability provisions (LLP) are allowed by state laws. States have adopted three main variants of legal

provisions to help firms limit director liability: provisions that limit director liability on all firms within the state, provisions that allow firms to add limitations on liability in their charter, and laws that cap the director liability (Romano, 2006). According to Kaplan and Harisson (1993), these provisions became popular after the Smith vs. Van Gorkom case in 1985.³ The purpose of these laws was to reduce the impact of the high director liability exposure after these court decisions, to increase the value of the firm by attracting good quality directors, and to allow the board to act without being exposed to the risk of being sued.

Some view that adopting protective provisions limiting D&O liability helps attract and keep competent directors thus increases firm value. For example, Brook and Rao (1994) show that firms whose directors are more likely to be sued gain from adopting LLPs. In the same vein, Gutierrez (2003) shows that LLPs adoption increases with damages awards and legal uncertainty. Bradley and Chen (2011) find that a greater director liability protection implies that directors follow self-serving lower risk strategies. This low-risk strategy implies a lower cost of debt, and ultimately a higher firm value.^{4,5}

Boubakri et al. (2008) examine managerial behavior of highly covered D&Os and find that higher D&O coverage limit is associated with higher risk of opportunistic behavior and accounting manipulation. Similarly, Kalelkar and Nwaeze (2015) find that excessive D&O protection is positively associated with aggressive investing and reporting behavior. Donelson and Yust (2014) examine the impact of D&O litigation risk on agency cost. They find that firms that significantly limited the personal legal liability of its directors and officers have suffered a decrease in firm value. Examining the issue from a cost-of-equity stand point, Chen et al. (2016) find a positive association between D&O liability insurance and the cost of equity, discretionary accruals, bid-ask spreads, illiquidity, analysts' earnings forecast error, and the dispersion of analysts' earnings forecast. They conclude that D&O insurance weakens the disciplining effect of shareholder litigation. In the same vein, Boubakri and Bouslimi (2016) examine analysts' behavior and D&O insurance around equity issues and find that analysts are more pessimistic about earnings growth for insured firms compared to uninsured peers. More recently, Donelson et al. (2018) find that firms that have higher levels of D&O insurance premia face a higher litigation rate and conclude that the required disclosure of the insurance information may be detrimental to firms. Therefore, we state the following hypotheses:

H1. *D&O liability protection is not associated with firm value.*

H2. *D&O liability protection is not associated with firm risk.*

H3. *The effect of D&O liability protection on firm value is the same before and after SOX.*

3. Data and variable measurement

3.1. Data and sample selection

We examine the impact of director protection on firm value using companies with data available from several databases: (i) Compustat and CRSP (for financial data), (ii) Risk Metrics (for governance variables), and (iii) ExecuComp (for control variables). We merge this data with the set of state-level director protection provisions from Romano (2006). We exclude financial firms and regulated utilities industries. The final sample consists of 1791 firms and 12,410 firm-year observations from 1992 to 2006, date after which no director liability protection data is available in RiskMetrics.

3.2. Measuring director liability protection

We measure state-level director liability provisions as used in Romano (2006), and extract firm-level provisions from RiskMetrics. Director protection is a binary variable that equals one if either the state limits the directors' personal exposure (self-executing solution), or when the firm is incorporated in a state that has adopted a limited liability solution *and* the firm also chooses to limit the directors' exposure in its charter. It is worth noting that our measure of D&O protection presents enough variability to conduct empirical tests and the decision to add or rescind protection is a choice made at the firm level and that this measure has been successfully used in prior literature (e.g. Romano, 2006; Aguir et al., 2014; Khan and Wald, 2015).

3.3. Model specification

We measure the firm value using industry-adjusted Tobin's Q.⁶ As stated in Faleye (2007), while there are several measures of Tobin's Q, empirical studies (Callahan et al., 2003; Chung and Pruitt, 1994) show that this measure performs as well as others.

$$\text{Tobin's } Q = (\text{Total Debt} + \text{Common Shares Outstanding} \times \text{Closing Price}) / \text{Total Assets} \quad (1)$$

The governance related variables include the entrenchment index (Bebchuk et al., 2009), the governance index (Gompers et al.,

³ Smith v. Van Gorkom 488 A.2d 858 (Del. 1985).

⁴ Bradley and Chen (2011) restrict their measure of director protection index to the firm-level variables and do not take into account the state-level protection provisions.

⁵ More recently, Hwang and Kim (2018) investigate the Korean market from a period where the D&O insurance disclosure was mandatory and show that firm that protect D&Os by offering them liability insurance have a higher firm value compared to non-insured firms.

⁶ See the Appendix for variables definitions.

Table 1

Descriptive statistics and difference-in-means test.

Panel A. Incidence of director liability protection provision by year										
Year	Number of observations	Mean	Median	Standard deviation						
1992	229	87.77%	1	32.83%						
1993	620	80.48%	1	39.66%						
1994	694	79.25%	1	40.58%						
1995	754	75.07%	1	43.29%						
1996	748	75.80%	1	42.86%						
1997	692	75.14%	1	43.25%						
1998	891	56.12%	1	49.65%						
1999	828	57.61%	1	49.45%						
2000	843	55.16%	1	49.76%						
2001	792	55.18%	1	49.76%						
2002	1073	44.83%	0	49.75%						
2003	1074	45.16%	0	49.79%						
2004	1103	41.98%	0	49.37%						
2005	1061	43.64%	0	49.62%						
2006	1008	43.55%	0	49.61%						
Total	12,410	57.32%	1	49.46%						

Panel B. Summary statistics by director liability protection provision										
Variable	Total			Non-protected (D&OProtect = 0)			Protected (D&OProtect = 1)			T-test differences
	Mean	Median	Std	Mean	Median	Std	Mean	Median	Std	
TobinQAdj	2.118	0.536	4.555	3.365	1.129	5.847	1.190	0.323	2.955	2.174***
Eindex	2.206	2.000	1.290	2.113	2.000	1.250	2.275	2.000	1.315	−0.162***
Gindex	7.078	7.000	1.908	5.996	6.000	1.498	7.883	8.000	1.778	−1.888***
Size	7.414	7.275	1.470	6.949	6.785	1.354	7.760	7.638	1.457	−0.812***
Delinc	0.560	1.000	0.496	0.709	1.000	0.454	0.448	0.000	0.497	0.261***
Insidown	2.160	0.269	5.307	2.425	0.372	5.379	1.963	0.216	5.244	0.463***
ROA	0.038	0.048	0.131	0.021	0.047	0.180	0.050	0.049	0.076	−0.029***
VOL	0.403	0.351	0.201	0.494	0.443	0.222	0.335	0.301	0.152	0.158***
Capex	0.061	0.047	0.052	0.060	0.044	0.058	0.061	0.049	0.047	−0.001
Lev	0.238	0.235	0.179	0.221	0.200	0.204	0.251	0.253	0.157	−0.030***
R&D	0.063	0.000	0.601	0.115	0.001	0.910	0.024	0.000	0.095	0.091***
Age	3.022	3.135	0.801	2.529	2.485	0.701	3.390	3.466	0.662	−0.861***

Note: Panel A provides the mean, median and standard deviation of the protection index by year. Panel B provides summary statistics of variables by protection index. The last column is the difference between non-protected and protected variables. Industry adjusted Tobin's Q (TobinQAdj) is the difference between Tobin's Q and the two-digit industry median value. Tobin's Q is the ratio of the market value of assets to the book value of assets. The market value of assets is the sum of the book value of assets and the value per share multiplied by the number of common shares less the sum of book value of assets and balance sheet deferred taxes. (D&OProtect) is a dummy variable that equals one if either the firm is incorporated in a state with a fiduciary self-executing standard or if the firm is incorporated in a state with a limited liability solution and the firm adopts charter limits to director liability. Otherwise, the protection variable equals zero. Entrenchment index (Eindex) is the sum of six Risk Metrics provisions as defined by [Bebchuk et al. \(2009\)](#) – staggered boards, limits to shareholders amendments of the bylaws, supermajority requirements for mergers, supermajority requirement for charter amendment, poison pills and golden parachute arrangements. Entrenchment index dummies take one if one of the provisions were adopted and zero otherwise. Gindex is the governance index defined as Gompers Ishii and Metric (2003) minus entrenchment index and director liability (when it applies). Insider ownership (Insidown) is the proportion of shares held by executives reported in Execucomp. Profitability (ROA) is the ratio of net income before extraordinary items to total assets. Equity volatility (Vol) is measured as the Standard Deviation of the monthly stock returns over the past 60 months. Capex ratio (Capex) is the ratio of capital expenditures to total assets. Debt Ratio (Lev) is the ratio of total debt to total Assets. R&D Ratio (R&D) is the ratio of research and development expenditures to total sales. (Age) is Log of one plus the firm age as reported in CRSP. The notation ***, ** and * denotes significance at the 1%, 5% and 10% levels.

2003), and insider ownership ([Morck et al., 1988](#)). We control for profitability (Prof), capital expenditures (Capex), research and development (R&D). We also use equity volatility (Vol) ([Yermack, 2004](#)). The appendix provides a detailed explanation of variables used in the analysis. Our main empirical model is as follows:

$$Adj\ Tobin's\ Q = \lambda_0 + \lambda_1(Protection) + \lambda_2(Governance\ Variables) + \lambda_{3-10}(Firm\ Factors) + \varepsilon_1 \quad (2)$$

4. Empirical results

4.1. Univariate analysis

We report descriptive statistics for the sample classified by director protection in [Table 1](#). The statistics include the mean, median and standard deviation of the variables used. The median industry adjusted Tobin's Q is 0.53 for the total sample, 0.32 for the protected and 1.13 for the non-protected sample. Consistent with our hypothesis, based on the *t*-test of the difference, protected firms

Table 2
Liability protection and firm value.

	Protection Index Specification			Risk Interaction Specification			Endogeneity Specification		
	(1) Pre-SOX	(2) Post-SOX	(3) Total	(4) Pre-SOX	(5) Post-SOX	(6) Total	(7) Pre-SOX	(8) Post-SOX	(9) Total
D&OProtect	−0.674*** (−2.58)	−0.411* (−1.69)	−0.583*** (−2.66)	1.069* (1.87)	0.633 (1.63)	0.277 (0.75)	−7.029*** (−2.74)	−0.785 (−0.98)	−3.165*** (−2.99)
Volpro				−4.558*** (−2.72)	−2.418*** (−2.59)	−2.125** (−2.08)			
Vol	11.889*** (10.48)	5.116*** (7.76)	7.419*** (10.87)	13.967*** (10.03)	5.849*** (7.37)	8.177*** (10.51)	9.997*** (7.06)	5.116*** (7.76)	7.010*** (9.88)
Eindex	−0.241*** (−3.84)	−0.241*** (−3.21)	−0.263*** (−4.68)	−0.225*** (−3.58)	−0.232*** (−3.12)	−0.256*** (−4.57)	−0.331*** (−3.44)	−0.248*** (−3.26)	−0.298*** (−4.71)
Gindex	0.060 (1.23)	0.023 (0.37)	0.028 (0.66)	0.061 (1.23)	0.020 (0.32)	0.027 (0.63)	0.560*** (2.70)	0.057 (0.62)	0.244** (2.48)
Size	0.317*** (4.49)	0.203** (2.29)	0.262*** (4.15)	0.308*** (4.44)	0.206** (2.33)	0.260*** (4.14)	0.417*** (4.43)	0.208** (2.32)	0.312*** (4.61)
Delinc	0.040 (0.24)	0.142 (0.64)	0.061 (0.39)	−0.005 (−0.03)	0.117 (0.52)	0.039 (0.25)	−0.506 (−1.53)	0.106 (0.43)	−0.200 (−0.97)
Insideown	−0.029 (−1.51)	−0.074*** (−5.15)	−0.047*** (−3.07)	−0.029 (−1.56)	−0.076*** (−5.30)	−0.048*** (−3.13)	−0.007 (−0.29)	−0.072*** (−4.91)	−0.038** (−2.33)
ROA	7.901*** (5.29)	6.704*** (4.47)	7.182*** (5.82)	8.329*** (5.61)	6.800*** (4.56)	7.326*** (5.98)	7.896*** (5.26)	6.652*** (4.46)	7.127*** (5.83)
Capex	4.221** (2.56)	14.377*** (5.22)	8.649*** (5.50)	4.444*** (2.74)	14.303*** (5.21)	8.755*** (5.59)	4.199** (2.06)	14.317*** (5.20)	8.832*** (5.42)
Lev	−3.847*** (−6.18)	−3.480*** (−4.23)	−3.697*** (−6.60)	−3.710*** (−5.95)	−3.420*** (−4.15)	−3.638*** (−6.44)	−4.103*** (−5.66)	−3.520*** (−4.27)	−3.781*** (−6.57)
R&D	0.809*** (4.04)	1.398*** (3.78)	0.995*** (5.40)	0.779*** (3.89)	1.366*** (3.65)	0.980*** (5.35)	0.743*** (3.67)	1.384*** (3.76)	0.955*** (5.34)
Age	−0.348*** (−3.19)	−0.664*** (−4.16)	−0.529*** (−4.95)	−0.377*** (−3.45)	−0.679*** (−4.29)	−0.545*** (−5.15)	0.826* (1.69)	−0.572** (−2.30)	0.017 (0.07)
Intercept	−6.598*** (−5.87)	−0.635 (−0.72)	−1.859* (−2.40)	−6.612*** (−5.92)	−0.852 (−0.96)	−2.264*** (−2.83)	−7.088*** (−5.24)	1.467 (0.93)	−3.681*** (−3.53)
Year & industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chow test		3.49**			4.04***			7.29***	
Prob > F		0.0307			0.0177			0.0007	
N	7091	5319	12,410	7091	5319	12,410	7089	5314	12,403
adj. R ²	0.309	0.235	0.264	0.314	0.237	0.265	0.072	0.235	0.224

Note: The table explains the firm growth opportunities measured by industry-adjusted TobinQ. Industry adjusted Tobin's Q (Tobin's Q Adj) is the difference between Tobin's Q and the two-digit industry median value. Tobin's Q is the ratio of the market value of assets to the book value of assets. The market value of assets is the sum of the book value of assets and the value per share multiplied by the number of common shares less the sum of book value of assets and balance sheet deferred taxes. (D&OProtect) is a dummy variable that equals one if either the firm is incorporated in a state with a fiduciary self-executing standard or if the firm is incorporated in a state with a limited liability solution and the firm adopts charter limits to director liability. Otherwise, the protection index equals zero. (Eindex) is the Entrenchment Index, measured by the sum of six Risk Metrics provisions as defined by [Bebchuk et al. \(2009\)](#) – staggered boards, limits to shareholders amendments of the bylaws, supermajority requirements for mergers, supermajority requirement for charter amendment, poison pills and golden parachute arrangements. Entrenchment index dummies take one if one of the provisions were adopted and zero otherwise. Gindex is the governance index defined as Gompers Ishii and Metric (2003) minus entrenchment index and director liability (when it applies). Insider ownership is the proportion of shares held by executives reported in Execucomp. Profitability (ROA) is the ratio of net income before extraordinary items to total assets. Equity volatility (Vol) is measured as the Standard Deviation of the monthly stock returns over the past 60 months. Capex ratio (Capex) is the ratio of capital expenditures to total assets. Debt Ratio (Lev) is the ratio of total debt to total Assets. R&D Ratio (R&D) is the ratio of research and development expenditures to total sales. (Age) is Log of one plus the firm age as reported in CRSP. Standard errors are robust to heteroskedasticity and clustering by firm. The notation ***, ** and * denotes significance at the 1%, 5% and 10% levels. T statistics are presented in parenthesis. The Chow test represents the difference between the pre-SOX and post-SOX periods.

have lower value on average. Moreover, protected firms are larger, have higher entrenchment index, higher governance index, are older, are more profitable, have higher capital expenditures, more leverage, but have on average less research and development expenses and lower inside ownership.

4.2. Multivariate analysis

4.2.1. Evidence on SOX, limited liability provisions and firm value

Table 2 reports the results of regressions explaining the firm's firm value using different independent variables, including the entrenchment index, the rest of the governance provisions and the firm characteristics. The total sample is split into two sub-samples: the Pre- and Post-SOX periods (1992 to 2002 and 2003 to 2006). We use three specifications. The first one uses the protection index, the second adds risk interactions and the third corrects for endogeneity. For each specification, we run three regressions: pre-SOX,

post-SOX and a total sample regression.

Year and industry dummies are included in the regressions to absorb time-invariant firm unobservable characteristics. The first two specifications are pooled OLS regressions with robust errors and adjusted for clustering by firm. The third is a two-stage instrumental variables regression. The basic model includes the director liability protection variable, the entrenchment index, the corporate governance index (excluding the director liability protection component and the entrenchment index components) and standard firm-level characteristics. The coefficient on the D&O liability protection variable is -0.583 and is significant at the 1% level. Therefore, we reject the first hypothesis H1 and find that D&O protection is significant and negatively associated with firm value.

We hypothesize that this negative association of protection on firm value is less pronounced after SOX given the stricter regulatory environment created by SOX. In fact, overall, the coefficient on protection is more negative and significant during the pre-SOX period, and only marginally significant after SOX. The negative effect of liability protection on firm value is greater before SOX both economically and statistically. We conduct a Chow test to statistically examine the difference in protection between the pre-SOX and post-SOX periods. The results of the Chow test show a significant difference in support of the hypothesis that the negative effect of liability protection on firm value is greater before SOX. We, therefore, reject our hypothesis H2.

A related concern relates to the risk-channel through which director liability might affect firm value. Firm risk affects managerial behavior and corporate outcomes (Boubakri, 2011). In model 2 of Table 2 we include the interaction between firm risk and director liability protection in order to test whether the impact of liability on firm value becomes more or less pronounced as firm risk increases. We hypothesize that the negative impact of liability protection on firm value becomes more pronounced as firm risk increases. Consistent with the hypothesis, we find a negative significant coefficient on the interaction between volatility and protection variables. The negative impact is economically more pronounced before SOX. Moreover, the results on the Chow test show a significant difference between pre- and post-SOX periods, supporting the hypothesis that the negative effect of liability protection on firm value is greater before SOX. Hence, hypothesis H3 is rejected.

The third specification controls for possible endogeneity in the protection decision.⁷ We use the instrumental variables approach to correct for possible omitted variables and reverse causality problems OLS regressions might entail. Following Aguir et al. (2014) and Khan and Wald (2015), we consider, as instruments, state laws from the state where the firm is headquartered instead of state laws from the state where the firm is incorporated. Given that firms do not frequently change their headquarters location, and that these variables are correlated with the protection decision, these variables are exogenous to the firm value and are consequently valid instruments in our study. The effect of protection remains negative and highly significant especially before SOX. To further support our findings, we conduct the Chow test to statistically examine the difference in protection between the pre-SOX and post-SOX periods. The results show a significant difference for all the specifications of Table 2 supporting the hypothesis that the negative effect of liability protection on firm value is greater before SOX. Overall, the coefficients on the results are consistent across all specifications. In terms of the other governance variables, as in Bebchuk et al. (2009)'s results, the coefficients on the entrenchment Index (E-Index) are negative and statistically significant at the one percent level while the remaining governance provisions index is not significant, implying a strong negative correlation between the firm value and the six provisions forming the entrenchment index. In terms of the other control variables, the coefficients are consistent with the existing literature. We find that the firm value is positively associated with size, firm profitability, capital expenditures, R&D expenses, and negatively related to the firm age and to firm leverage and insider ownership³.

The results imply that director protection is an influential mechanism of corporate governance and matters for the firm. Director legal liability exposure is initially used as a monitoring mechanism to dissipate the agency conflict between the shareholders and the managers. Limiting this exposure leads to a reduction in the value of the firm. Controlling for unobserved firm characteristics, firm protection is negatively associated to the firm value especially before SOX.

The results presented on Table 2 suggest that limiting director liability provisions are negatively associated with firm value, especially before SOX enactment. In the next section, we examine the relation between these provisions and the directors' corporate policies and risk-taking behavior.

4.2.2. Evidence on SOX, limited liability provisions and risk-taking regressions

We examine whether firms with protected directors engage in lower-risk corporate policies compared to their unprotected counterparts. We study three variables used in the literature as measures of risk-taking behavior: R&D expenditures and two measures of risk: equity volatility (VOL) and financial risk (STDROA). In Table 3, we report regression results relative to three sub-samples: pre-SOX, post-SOX and full sample.

$$R\&D = \beta_0 + \beta_1(Protection) + \beta_2(Governance\ Variables) + \beta_{3-10}(Firm\ Factors) + \epsilon_1 \quad (3)$$

$$VOL = \delta_0 + \delta_1(Protection) + \delta_2(Governance\ Variables) + \delta_{3-10}(Firm\ Factors) + \epsilon_2 \quad (4)$$

$$STDROA = \gamma_0 + \gamma_1(Protection) + \gamma_2(Governance\ Variables) + \gamma_{3-10}(Firm\ Factors) + \epsilon_3 \quad (5)$$

We find that overall, limiting director liability is associated with lower risk-taking activity. Using the total sample, the coefficients

⁷ This endogeneity may occur because some firms are more likely to add director liability protection to their charters or because firms re-incorporate for other possible reasons into a state with the fiduciary standard protection laws. Refer to Aguir et al. (2014), Wald and Long (2007) and Bebchuk and Cohen (2003) for more on the instrumental variables approach.

Table 3
Protection provisions and firm risk taking.

	R&D Specification			Equity Volatility Specification			Financial Risk Specification		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
D&Oprotect	-0.02929* (-1.73)	-0.03531 (-1.51)	-0.04155*** (-2.92)	-0.03030*** (-4.21)	-0.00487 (-0.45)	-0.02366*** (-3.22)	-0.01145*** (-3.11)	-0.00620 (-1.05)	-0.01343*** (-3.89)
Eindex	-0.00898* (-1.81)	-0.00943 (-0.83)	-0.00718 (-1.12)	-0.00579*** (-3.10)	-0.00746** (-2.30)	-0.00604*** (-3.03)	-0.00303*** (-2.89)	-0.00333* (-1.76)	-0.00300*** (-2.84)
Gindex	0.00070 (0.28)	-0.01764* (-1.82)	-0.00558 (-1.31)	-0.00273* (-1.79)	-0.00604** (-2.45)	-0.00355** (-2.27)	0.00057 (0.81)	-0.00058 (-0.42)	0.00034 (0.47)
Size	-0.01741** (-2.56)	-0.04650*** (-3.88)	-0.02904*** (-4.20)	-0.02333*** (-10.62)	-0.02930*** (-9.13)	-0.02651*** (-11.89)	-0.00757*** (-6.53)	-0.01666*** (-8.42)	-0.01101*** (-9.45)
Delinec	-0.02107 (-1.04)	0.03532 (1.39)	0.00070 (0.04)	0.00520 (0.95)	0.01638* (1.85)	0.00980* (1.70)	0.00473* (1.69)	0.02010*** (4.16)	0.00998*** (3.51)
ROA	-1.01519*** (-2.72)	-1.22359*** (-3.81)	-1.13619*** (-4.01)	-0.33232*** (-9.41)	-0.39973*** (-7.99)	-0.37512*** (-9.52)	-0.27102*** (-15.81)	-0.28445*** (-16.30)	-0.28277*** (-21.64)
Lev	-0.15506 (-1.55)	0.23351* (1.69)	0.00832 (0.11)	0.00258 (0.15)	0.05287* (1.81)	0.02440 (1.29)	-0.02566*** (-3.29)	-0.01609 (-1.09)	-0.02346*** (-3.04)
Age	0.00073 (0.07)	-0.03069 (-1.29)	-0.00575 (-0.50)	-0.03076*** (-7.95)	-0.05606*** (-7.32)	-0.03868*** (-9.24)	-0.01124*** (-5.77)	-0.02277*** (-5.73)	-0.01417*** (-7.38)
Intercept	-0.25999** (-2.07)	0.50651*** (4.36)	-0.10773 (-1.12)	0.71525*** (31.18)	0.82050*** (29.41)	0.93868*** (40.31)	0.15954*** (17.73)	0.27435*** (13.79)	0.24142*** (23.40)
Year & Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chow test		8.01***	12.78***					46.89***	
Prob > F		0.0003	0.0000					0.0000	
N	13,333	8202	21,535	8340	5901	14,241	13,333	8202	21,535
adj. R ²	0.084	0.123	0.096	0.571	0.516	0.557	0.397	0.360	0.373

Note: The table explains the firm risk-taking strategies measured by Research and Development ratio (R&D), Equity Volatility (Vol) and Financial Risk (stdROA). R&D Ratio (R&D Rat) is the ratio of research and development expenditures to total sales. Equity volatility (Vol) is measured as the Standard Deviation of the monthly stock returns over the past 60 months. Financial risk is the five-year rolling standard deviation of the Return On Assets (ROA) as measured by the ratio of net income divided by total assets. Protection index is a dummy variable that equals one if either the firm is incorporated in a state with a fiduciary self-executing standard or if the firm is incorporated in a state with a limited liability solution and the firm adopts charter limits to director liability. Otherwise, the protection variable equals zero. Entrenchment index is the sum of six Risk Metrics provisions as defined by [Bebchuk et al. \(2009\)](#) – staggered boards, limits to shareholders amendments of the bylaws, supermajority requirements for mergers, supermajority requirement for charter amendment, poison pills and golden parachute arrangements. Entrenchment index dummies take one if one of the provisions were adopted and zero otherwise. Gindex is the governance index defined as Gompers Ishii and Metrick (2003) minus entrenchment index and director liability (when it applies). Insider ownership is the proportion of shares held by executives reported in Execucomp. Profitability (ROA) is the ratio of net income before extraordinary items to total assets. Capex ratio (Capex) is the ratio of capital expenditures to total assets. Debt Ratio (Lev) is the ratio of total debt to total Assets. (Age) is Log of one plus the firm age as reported in CRSP. Standard errors are robust to heteroskedasticity and clustering by firm. The notation ***, ** and * denotes significance at the 1%, 5% and 10% levels. T statistics are presented in parenthesis. The Chow test represents the difference between the pre-SOX and post-SOX periods.

on R&D expenditures and volatility are negative. This negative association is more pronounced before SOX. The coefficients on R&D expenditures and volatility pre-SOX are both negative, which reinforces the results in the first hypothesis. In terms of other governance variables, consistent with previous literature (John et al., 2008), we find a negative sign for the coefficients on BCF entrenchment index and the other governance index for R&D expenditures and firm risk regressions especially before SOX for research and development. This implies that more entrenched directors and lower governance quality firms have tendency to undertake lower risk activities.

Finally, we conduct a Chow test to statistically examine the difference in protection between the pre-SOX and post-SOX periods. The results show a significant difference for all the specifications of Table 3 supporting the hypothesis that the negative effect of liability protection on firm value is greater before SOX.

5. Additional analysis & firms incorporated in Delaware

As a further robustness check, we consider a regime switching model (Maddala, 1983) where we explain in a first stage the firms' decision whether to incorporate away from the location of their headquarters. This model may be more effective at capturing unobserved variables associated with the state. We find similar results to the primary findings after correcting for self-selection. We find negative and statistically significant effect of protection provisions for firms that incorporate in state and for firms that incorporate out of state and significant inverse mills ratios in both subsamples as well.

Additionally, in order to check whether the results are driven by other incorporation factors, we run a smaller sample for Delaware only incorporated firms and find similar results, with lower statistical significance on the protection variable. These findings prove that the results are not driven by self-selection in the choice of protection.⁸

6. Conclusion

Firms primarily use directors' liability exposure as a monitoring mechanism to reduce their opportunistic behavior and alleviate agency costs. Such firms, however, find difficulties to attract and retain good quality officers. Consequently, they introduced D&O protection provisions to encourage them take decisions that ultimately improve firm performance. Oppositely, protected directors might be less incentivized to better perform their duties and might take decisions that are not necessarily in line with the interest of the firm and its shareholders. In sum, the association between director protection and firm performance is not well documented and the literature is far from being conclusive.

In this paper, we study the impact of director liability protection on firm value with regards to the Sarbanes Oxley act. We consider director protection at the state-level as well as the firm-level. We find that the value of firms with protected directors is on average lower than the value of firms without protected directors and that this negative impact is more pronounced before the passage of SOX. This finding is consistent with protected directors making decisions that do not benefit shareholders, and this in turn having a negative impact on the value of the firm, suggesting that liability protections are not in line with the shareholders' best interests.

Overall, this study adds to the little U.S.-based evidence available to inform policymakers, standard setters, and the public regarding the effectiveness of D&O liability protection provisions. Future research may examine the effectiveness of such provisions around the financial crisis of 2008 and whether the new regulation introduced by the Dodd-Frank Act of 2010 had any implications for the relationship between D&O liability protection and firm value.

Appendix. Variables definitions

Variable	Designation	Definition
TobinQ	Tobin's Q	Ratio of the market value of assets to the book value of assets. The market value of assets is the sum of the book value of assets and the value per share multiplied by the number of common shares less the sum of book value of assets and balance sheet deferred taxes.
TobinQAdj	Adjusted Tobin's Q	Difference between Tobin's Q and the two-digit industry median value.
D&OProtect	Protection Index	A dummy variable that equals one if either the firm is incorporated in a state with a fiduciary self-executing standard or if the firm is incorporated in a state with a limited liability solution and the firm adopts charter limits to director liability. Otherwise, the protection variable equals zero.
Eindex	Entrenchment Index	Bebchuk et al. (2009) index defined as the sum of six Risk Metrics provisions: staggered boards, limits to shareholders amendments of the bylaws, supermajority requirements for mergers, supermajority requirement for charter amendment, poison pills and golden parachute arrangements. Entrenchment index dummies take one if one of the provisions were adopted and zero otherwise.
Gindex	Governance Index	

⁸ We also examine whether firms' governance quality affects this decision. We find that better governed firms are more likely to remove protection during both the pre-SOX and the post-SOX periods while lower governance quality firms are more prone to adding protection provisions pre- and post-SOX. Results and tables are available upon request.

Size	Firm Size	Gompers et al. (2003) index less the entrenchment index and the relevant firm-level director liability provisions from RiskMetrics.
Age	Firm age	Log of total assets.
ROA	Profitability	Firm age computed as the number of years reported in CRSP.
Lev	Debt Ratio	Ratio of earnings before interest, taxes, depreciation, and amortization to total Assets.
R&D	R&D Ratio	Ratio of total debt to total Assets.
Insideown	Insider Ownership	Ratio of research and development expenditures to total sales.
Capex	Capital Expenditures Ratio	Proportion of shares held by insiders reported in Execucomp.
Vol	Equity Volatility	Ratio of Capital expenditure divided by total Assets.
Finrisk	Financial Risk	Standard Deviation of the monthly stock returns over the past 60 months.
SOX	SOX	The five year rolling standard deviation of the Return On Assets (ROA) as measured by the ratio of net income divided by total assets.
Add Protection	Add Protection [Change from non-protected to protected firms]	Dummy variable that takes on the value of one after year 2002.
Remove Protection	Remove of Protection [Change from protected to non-protected firms]	A dummy variable that equals one if the firm changed its protection status from not offering protection to its directors to offering them protection and zero otherwise.
Change Protection	Change of Protection [Change from protected to non-protected firms or change from non-protected to protected]	A dummy variable that equals one if the firm changed its protection status from offering protection to its directors to not offering it to them and zero otherwise.
Add vs. Remove (One for Add zero for Remove)	Add vs. Remove Protection [Change from Add to Remove]	Change protection is a dummy variable that equals one if the firm changed its protection status from not offering protection to its directors to offering them protection or from offering them protection to not offering them protection and zero otherwise.
		Add versus Remove protection is a dummy variable that equals one if the firm changed its protection status from not offering protection to its directors to offering them protection and zero if the firm changed its protection status from offering protection to its directors to not offering them protection.

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