

## **Sarbanes-Oxley Act (SOX) and Corporate Risk Management**

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# Sarbanes-Oxley Act (SOX) and Corporate Risk Management

## Abstract

*Prior studies have found mixed relationship between corporate risk management activities and firm value. In this paper, we document that corporate risk management activities are significantly affected by the strength of corporate governance. Firms use significantly less derivatives after the passage of SOX, i.e., when the corporate governance is stronger. The passage of SOX allows us to implement the difference-in-differences approach and mitigate endogeneity bias. The relation is both statistically and economically significant. Our findings shed new light on the agency problem associated with the risk management activities.*

Keywords: Corporate risk management, corporate governance, SOX

## 1. Introduction

It is widely accepted that corporate risk management is an important element of a firm's business decision. This is because that in the market with frictions, risk management will enhance firm values by reducing corporate taxes and expected costs of bankruptcy, and mitigating the under-investment problem (Smith and Stulz, 1985; Froot, Scharfstein and Stein, 1993). A small group of recent literature in risk management has emphasized the role of managers in corporate hedging. Researchers argue that increasing hedging activities reduces future cash flow volatility, thereby raises the expected utility of risk-averse managers whose personal wealth is tied with future cash flow realization (Morellec and Smith, 2007) and corporate hedging reduces the cost and reliance of external financing (Tufano, 1998; Kumar and Rabinovitch, 2011).

In this paper, we investigate the role of corporate governance in corporate hedging. Researchers have long argued that CEOs have incentives to limit risk taking (Amihud and Lev, 1981). We argue that the risk limiting incentive is particularly strong when corporate governance system is weak.

After a series of corporate governance failures in 2001 and 2002, especially the Enron and WorldCom scandals, Sarbanes-Oxley Act (SOX) was passed to discipline managers of publicly listed companies. One of the major provisions of SOX is to require a majority of independent board of directors. The changes in corporate governance brought about by the passage of SOX have extensive influences on corporate policies. However, the impact of SOX on corporate risk management is rarely studied in the literature.

We hypothesize that firms might use less financial derivatives after the passage of SOX. Consistent with this proposition, we find that, on average, firms that were not in compliance of SOX's requirements before SOX reduce 54% derivatives after the passage of SOX.

While many prior studies focus on the conflict of interest between shareholders and managers caused by CEO's stock and options holding, we show that corporate governance is also a determinant of corporate risk management policy. Our study contributes to this line of the literature by documenting evidence that exogenous shock of strengthened corporate governance curbs firms' excessive investments in corporate risk management activities.

## **2. Literature Review and Hypothesis Development**

In a frictionless market, Modigliani and Miller's (1958) work implies that corporate risk management is irrelevant to firm value. However in the presence of market frictions, corporate hedging could enhance firm value via reducing expected deadweight costs of bankruptcy, minimizing tax payments, and mitigating the under-investment problem (Stulz, 1984; Smith and Stulz, 1985; Froot, Scharfstein, and Stein, 1993).

While theoretical work advocates for the benefits of corporate hedging, empirical findings are however mixed. For example, Allayannis and Weston (2001) find that firm value is positively associated with the use of foreign currency derivatives. Carter, Rogers and Simkins (2006) find that, in the airline industry, hedging jet fuel prices increases firm value. Campello et al. (2011) suggest that firms that use derivatives pay lower interest rates and are subject to fewer restrictions in bank loan contracts. On the contrary, Tufano (1996) and Jin and Jorion (2006) find no evidence that risk management increases firm value in the gold mining industry and the oil and gas industry. Similarly, Guay and Kothari (2003) find that the gains from hedging for most firms are small relative to their risk exposures. Brown's (2001) case study analyzes the cost-benefit trade-off of a risk management program. He estimates the annual costs to maintain the foreign currency hedging program to be \$3.8 million and the net effect of this program on operating cash flows and earnings is to reduce annual changes by about \$5 million. He argues that traditional risk management theory is unlikely to fully explain the motivation for the derivative program.

In this paper, we investigate the role of corporate governance in corporate hedging decision by examining a rare opportunity, a controlled experiment in the financial markets, namely the passage of SOX. In particular, SOX requires that publicly listed company to have a majority of independent board of directors. It is widely accepted that independent directors increase board oversight and provide effective monitoring. For example, board independence has been found to significantly affect CEO's incentive contracts (e.g. Faleye et al., 2011; Coles, et al., 2008), CEO turnovers (Knyazeva et al., 2013; Guo and Masulis, 2015, etc.), and antitakeover devices (Brickley, et al., 1994). On the other hand, managers are inclined to overly-investing in risk management when corporate governance is weak, because managers may exhibit strong risk aversion to safeguard their undiversified human capital in the firm. For example, Tufano (1998) argues that cash flow hedging can protect managers from capital market scrutiny, potentially exacerbating shareholder-manager conflicts. Consistent with this view, Tufano (1998) finds a positive relationship between hedging and managerial equity ownership. Kumar and Rabinovitch

(2011) provide a theoretical model and document empirical evidence that corporate hedging is positively related to CEO entrenchment. As such, we expect that managers without effective monitoring may want to overly invest in risk managements. The passage of SOX can mitigate the agency problem by implementing better corporate governance and effective outside monitoring of independent directors to urge managers to reduce the over-investment. Based on the above arguments, we propose the following hypothesis:

*H0: The passage of SOX has no effect on corporate risk management.*

*Ha: Corporate risk management activities drop after the passage of SOX.*

### **3. Data, Method and Summary Statistics**

In this section, we describe our data and method, and then present summary statistics of the sample.

#### **3.1. Data and Sample Construction**

We start with a sample of S&P 500 firms for a period of 1996 to 2006. We remove financial and utilities firms since the risk-management incentives of these firms are not comparable to those of other firms. Firms' accounting information is obtained from the Compustat database. Board characteristics are retrieved from the RiskMetrics database. After requiring all the firm-year observations to have the relevant firm-specific variables, information on board characteristics, and notional value of foreign exchange and interest rate derivatives, we are left with a sample of 1,719 firm-year observations from 316 firms.

#### **3.2 Measures of Corporate Risk Management**

We measure corporate hedging using notional value of foreign exchange and interest rate derivatives. We obtain derivative information by searching the entire 10-K filings for the following key words: "risk management", "hedg", "notional", "derivative", and "swap". If a string is matched to any of these key words, we then read the surrounding paragraphs to extract information on foreign currency and interest rate derivatives. We collect data on the notional amount of derivatives used across various derivative instruments such as swaps, forwards, futures, and options. If there are no hits to any of the key words, we classify the firm as not using any derivatives.

Among the 316 firms in our sample, 60 firms never use any derivatives, consisting of 677 firm-year observations. In other words, about 81% of firms engage in corporate hedging via derivatives during the sample period.

#### **3.3 Other control variables**

Following Guay and Kothari (2003), we control for leverage, size ( $\ln(\text{asset})$ ), fraction of total pay as bonus, sensitivity of CEO wealth to stock price, liquidity (average cash to assets ratio during the prior three years), cash flow volatility (average absolute change in annual cash flow

from operation activities divided by assets during the prior three years), and number of business segments. Detailed variable definitions are described in Appendix A.

### 3.4. Summary Statistics

Table 1 presents the summary statistics of the main variables in a sample of U.S. non-financial firms from 1996 to 2006. The variable measuring risk management activities, Derivative Ratio has a mean of 0.07, a median of 0.01 and a standard deviation of 0.12. The average Market to book ratio in our sample is 2.57. The book leverage ratio averages 22%. Cash as a percentage of total assets is 14% on average.

<b>Table 1 Descriptive Statistics</b>						
	N	Mean	Std. Dev.	25 <sup>th</sup>	Median	75 <sup>th</sup>
Derivative Ratio	1719	0.07	0.12	0	0.01	0.09
Board size	1719	10.37	2.53	9	10	12
Ln(Assets)	1719	8.48	1.31	7.64	8.4	9.38
Book Leverage	1719	0.22	0.15	0.11	0.21	0.32
Market to book	1719	2.57	1.92	1.39	1.95	3
Cash to asset ratio	1719	0.14	0.16	0.02	0.07	0.19
Delta	1566	2915.17	23242.75	244.04	565.91	1253.19
Abs chg of cash flow	1712	0.04	0.05	0.01	0.03	0.06
# of Segments	1559	2.6	1.69	1	2	4

## 4. Empirical Results

We use the passage of Sarbanes-Oxley Act (SOX) of 2002 as an exogenous shock to the corporate governance mechanisms for U.S. public firms. It allows us to identify the causal relationship between corporate governance and corporate risk management. SOX requires public firms to have a majority of independent directors. In our sample, some firms were already in compliance with the requirement before the passage of SOX (control group). But other firms were not in compliance (treatment group) before the passage of SOX, and were forced to make compliance after 2002. It allows us to use the difference-in-differences (DiD) approach to compare the changes in risk management activities between firms that were already in compliance and firms that were not in compliance (see, e.g., Bertrand and Mullainathan, 1999, 2003). In particular, we run a model with the following specifications:

$$\begin{aligned}
 \text{Derivatives Ratio}_{i,t+1} = & \beta_0 + \beta_1 \times \text{Noncompliant board '02}_i \times \text{Dummy('03-'06)}_t \\
 & + \gamma' \times \text{Control variables}_t + \text{Firm}_i + \text{Year}_t + \varepsilon_{i,t}
 \end{aligned} \tag{1}$$

,where  $i$  indexes the firm,  $t$  indexes the time. In these models, the dependent variable is **DERIVATIVE RATIO**, which is calculated as total notional value of foreign exchange and interest rate derivatives scaled by book value of total assets. *Noncompliant board '02<sub>i</sub>* is a dummy variable that equals to one if firm  $i$  did not have a majority of independent directors in

2002 and zero otherwise.  $Dummy('03-'06)_t$  is a dummy variable that equals to one if the observation is in the period 2003 to 2006 and zero otherwise. The variable of interest,  $Noncompliant\ board\ '02_i * Dummy('03-'06)_t$ , takes on the value of 1 for companies which did not have a majority of independent directors for the sample period 2003-2006. In other word, the variable  $Noncompliant\ board\ '02_i * Dummy('03-'06)_t$  identifies the firm-year observations which were forced to make compliance due to the passage of SOX. Following prior literature, we control for size ( $\ln(asset)$ ), leverage, Market to book ratio and liquidity (cash to assets ratio). We also include firm dummies and year dummies in all regression.

**Table 2: SOX and Risk management**

	(1)	(2)	(3)	(4)	(5)
	Derivative Ratio	Derivative Ratio	Derivative Ratio	Derivative Ratio	Derivative Ratio
Noncompliant board '02 * Dummy ('03 - '06)	-0.038*** (0.010)	-0.042** (0.012)	-0.039*** (0.008)	-0.035** (0.038)	-0.040** (0.032)
Board size	-0.000 (0.877)	-0.002 (0.423)	-0.000 (0.833)	-0.000 (0.997)	-0.001 (0.534)
Ln(Assets)	0.003 (0.610)	0.005 (0.481)	0.004 (0.542)	0.005 (0.453)	0.009 (0.281)
Leverage	0.118*** (0.001)	0.124*** (0.001)	0.118*** (0.001)	0.131*** (0.001)	0.141*** (0.001)
Market to book	-0.001 (0.550)	-0.002 (0.364)	-0.001 (0.577)	-0.001 (0.490)	-0.002 (0.337)
Cash to asset ratio	-0.030 (0.270)	-0.033 (0.246)	-0.036 (0.198)	-0.047 (0.106)	-0.055* (0.086)
Delta		0.000*** (0.001)			0.000*** (0.001)
Abs chg of cash flow			0.089* (0.066)		0.070 (0.144)
# of Segments				0.001 (0.801)	0.001 (0.767)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Constant	0.026 (0.660)	0.029 (0.655)	0.018 (0.762)	0.007 (0.915)	-0.008 (0.911)
Observations	1,719	1,566	1,712	1,559	1,413
Adjusted R <sup>2</sup>	0.521	0.495	0.522	0.530	0.510

\*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% level, respectively. The dependent variable is *Derivative Ratio*, which is calculated as total notional value of foreign exchange and interest rate derivatives scaled by book value of total assets.  $Noncompliant\ board\ '02_i$  is a dummy variable that equals to one if firm  $i$  did not have a majority of independent directors in 2002 and zero otherwise.  $Dummy('03-'06)_t$  is a dummy variable that equals to one if the observation is in the period 2003 to 2006 and zero otherwise. The positive coefficient on the cross product is consistent with a reduction in a firm's corporate risk management activities after the passage of SOX.

The result is reported in Table 2. In columns (1), the coefficient of the interaction term,  $Noncompliant\ board\ '02_i * Dummy('03-'06)_t$ , is significant and negative, suggesting that SOX is negatively related to firms' corporate risk management activities as measured by the notional value of derivatives. In the model, the dependent variable equals one if the firm use financial derivatives and zero otherwise. Relative to those firms that are already in compliance of SOX,

the non-compliance firms reduce derivative ratio by 0.038 on average, which is about 54% ( $=0.038/0.07$ ) for an average firm in our sample.

Specifications (2) through (5) incorporate additional control variables to address omitted variable concerns. The coefficients of these additional variables are consistent with prior literature (e.g., Guay and Kothari, 2003). Including these variables has little effect on the coefficient of the cross product, *Noncompliant board* '02<sub>*i*</sub> \* *Dummy('03-'06)*<sub>*t*</sub>.

## **5. Conclusion**

We document that corporate risk management activities are significantly affected by the strength of corporate governance. Firms use significantly less derivatives after the passage of SOX, i.e., when the corporate governance is stronger. The passage of SOX allows us to implement the difference-in-differences approach and mitigate endogeneity bias. The relation is both statistically and economically significant. Our findings shed new light on the agency problem associated with the risk management activities.

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### **Appendix A. Definitions of variables**

Variables	Definition
<b>Measures of Hedging</b>	
Derivative Ratio	Total notional value of derivatives scaled by book value of total assets
<b>Firm Characteristics</b>	
Leverage	Ratio of total debt to book value of total asset
Ln (asset)	Natural logarithm of book value of total assets
Market to book	Ratio of market value of assets (book value of assets minus book value of equity plus market value of equity) to book value of total assets
Cash to asset	Ratio of cash and short-term investments scaled by total assets
Abs chg of cash flow	Prior three year average of absolute change in annual cash flow from operation scaled by total assets
# of Segments	Number of business segments as stated in the Compustat segment database.
Board size	The number of directors on board

