

## Determinants of Financial Derivative Usage: Empirical Evidence from the Perspective of Governance Structure

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**Abstract:** By examining the use of derivatives in a sample of US firms, this paper studies the relationship between the structure of corporate governance, including both bondholder rights and shareholder rights, and managerial hedging decision. We detect a significant association between the hedging decision and governance structure after controlling for well-documented rationales in the prior literature. As one of the first papers, we recognize the impact of bondholder rights on risk management. Our results document both strong bondholder rights and strong shareholder rights encourage hedging strategy, which supports our hypothesis that the main role of corporate hedging is to overcome inefficient markets and maximize firm value, and therefore strong bondholder (or shareholder) rights are positively related to the hedging policy. Our main results keep robust after adopting multiple alternative measures of bondholder rights and shareholder rights and using simultaneous equations model (SEM) to control for potential endogeneity. Moreover, we find weakly significant results echoing earnings management hypothesis but no evidence of risk-shifting hypothesis is observed.

**Keywords:** Corporate hedging; Governance; Bondholder rights; Stockholder rights

**JEL Classification:** G30, G32, G34

### 1. Introduction

Hedging strategy has become a critical dimension of corporate financial policy. A growing literature emerges to provide theoretical justifications, for example, reduction in bankruptcy risk, avoidance of taxes liability (Smith and Stulz, 1985), and lessening of the underinvestment problem (Bessembinder, 1991). The benefits of hedging are also explored from agency theory. Hedging may alleviate risk-shifting problem through providing credible commitments to lenders and reducing borrowers' incentive to shift risk after the debt contracts are signed. As a result, it may be optimal for bondholders to include covenants which require hedging (Campbell and Kracaw, 1990). However, Stulz (1996) proposes an argument of "selective hedging" where hedging is an opportunistic behavior and manipulated by managers for private benefits. Managerial usage of hedging as a substitute for earnings management is reported by Barton (2001) and Pincus and Rajgopal (2002). In Barton (2001) managers view derivatives as practical tools of earnings management, and Pincus and Rajgopal (2002) indicate that hedging is treated the same as using discretionary accruals for smoothing income.

Although the existing literature provides rich theoretical explanations, the debate about the nature of corporate hedging still exists. More importantly, how corporate hedging decision is motivated and wrestled by firm stakeholders remains unclear. This study tends to objectively qualify the role of hedging via a horse race by incorporating hedging decision within the mix of two main stakeholder rights (bondholder rights and shareholder rights). Due to the different nature of claims on the company's cash flows, potential conflicts between shareholders and bondholders emerge in modern companies: Shareholders earn the residual income after satisfying the fixed claims of the bondholders. Particularly, risky projects promising high returns conform to shareholders' interests of a high residual income, whereas creditors only want to cover their interest claims and avoid risky investments. Therefore, governance structure inevitably affects firms' risk attitude. In this research we tend to "twine" these two aspects of governance structure, and answer how shareholder rights and bondholder rights affect the risk management decision, and especially add insight into the role of financial derivatives usage.

As one of the attempts to explore the influence of overall governance structure on corporate hedging, this research documents both strong shareholder rights and strong bondholder rights promote hedging propensity, which supports our first hypothesis that hedging overcomes the inefficient market and maximizes firm value, so strong shareholder (bondholder) rights are positively related to the hedging strategy. By using multiple alternative measures of shareholder rights and bondholder rights, and also controlling for potential endogeneity, our main results keep robust. This paper also investigates if hedging mitigates the risk-shifting problem. But no evidence supports this hypothesis. However, by exploring the influence of governance structure on hedging in different pair of governance structure, we find weakly significant evidence to suggest that hedging can be used as a vehicle of earning management in the case of entrenched management along with poor bondholder governance.

To our best knowledge, this paper is the first to explore how the interaction of bondholder rights and shareholder rights affects corporate hedging policy. Lel (2012) provides to the literature with an evidence that firms with weak shareholder governance are more likely to hedge. However, the existing research also suggests that debt acts as a self-enforcing governance mechanism and highlight the role of debtholders in corporate governance (Shleifer and Vishny, 1997). Our research furthers the understanding of the interplay between the interests of two stakeholders and managerial motivation of hedging. Calomiris and Carlson (2016) examine a sample of banks and argue that risk management practices may introduce an implicit transfer of wealth from creditors to stockholders. The results in our research relate to their finding, but add new evidence to the debate between optimal contracting and managerial power by showing that the well-designed governance structure can result in a value-maximization effect of hedging practice. The findings of this paper also enrich the hedging literature. The scholars have investigated hedging practice in US airline industry (Carter *et al.*, 2006), in US gold mining firms (Adam and Fernando, 2006), and in 34 oil refiners (Mackay and Moeller, 2007). By employing a large sample across a wide array of industries and over an extended period, we are able to investigate corporate hedging policy and its relation with the governance in industries with distinct characteristics and across economic cycles.

This paper proceeds as follows. Section 2 reviews the extant literature and proposes testable hypotheses. In Section 3, we introduce the data, variables and summary statistics. Section 4 discusses the empirical results, and Section 5 presents a further investigation. The main conclusions follow in Section 6.

## 2. Hedging Literature and Testable Hypotheses

One strand in literature links hedging with the presence of market imperfections, such as deadweight costs related with bankruptcy risk, aggressive tax region, and underinvestment. From these aspects, existing empirical research documents that hedging increases firm value by overcoming these imperfections (Nelson, *et al.*, 2005; Carter *et al.*, 2006; Chen and King, 2014). The reconciliation of risk reduction and value generation in hedging practice raises a question as to how hedging is affected by the shareholder rights. Serving as a part of governance mechanism, the shareholder rights are designed to protect shareholders' interest and increase the value. Strong shareholder rights will encourage firms to take high-return (and high-risk) projects in order to maximize stock price, directly or indirectly. Therefore, we conjecture a positive association between the shareholder right and hedging policy that aims to increase the firm value. On the other side, hedging also affects bond value. Merton (1974) proposes that corporate debt can be regarded as a risk-free bond security less a put option, which has firms as underlying assets and face value of debt as strike price. An increase in firm value leads to a decrease in the value of put option and therefore an increase in corporate debt value. Following these, we propose that bondholders also sponsor hedging policy. In particular, our first hypothesis is below:

**Hypothesis 1:** *Hedging overcomes the inefficient market and maximizes firm value, so both strong shareholders and bondholder rights are positively related to the hedging decision.*

Another stream of research in hedging discusses the benefits of hedging from the agency theory. Jensen and Meckling (1976) develop risk-shifting theory suggesting that shareholders tend to increase firm risk after raising debt capital. By taking more risks, shareholders harvest the benefits if the projects perform well, but bondholders bear the costs if the opposite occurs. Hedging can alleviate the risk-shifting problem by reducing earnings volatility and the probability of default. Campbell and Kracaw (1990) argue that hedge can provide credible commitments to lenders by reducing borrowers' incentive to shift risk after debt contracts are signed. Meanwhile, they also suggest that it may be optimal for bondholders to include covenants which require borrowers to hedge observable risks in debt contracts. Since hedging prevents bondholders from being exploited while resulting in a cap on the upward potentials of shareholder value, we expect to find that strong shareholder rights discourage hedging, but strong bondholder rights boost hedging. To sum up, we form the second hypothesis as follows:

**Hypothesis 2:** *Hedging mitigates the risk-shifting problem and facilitates conservative firm investments, so strong shareholder rights are negatively related to the hedging strategy, whereas strong bondholder rights are positively related to the hedging strategy.*

However, the Wharton survey of derivative usage conducted by Géczy *et al.*, (2007) reports that firms with greater managerial power are more likely to tout their use of derivatives for speculation. Lel (2012) argues that managers may use hedging to increase the utility of their compensation packages, particularly in firms with weak internal control. So the third strand links to "selective hedging" in which hedging practice is manipulated by managers for their private benefits. The motivation of "selective hedging" is in line with discussion from Stulz (1996). If overconfident managers tend to believe that they have superior information or ability when they actually do not, managers action on overoptimistic views may in fact destroy firm value. Managers can also use hedging as a substitute for earnings management (Barton, 2001; Pincus and Rajgopal, 2002). A negative relation is detected between audit committee independence (or board independence) and

abnormal accruals. A similar view from the bondholder side argues that strong bondholder rights could reduce hedging as a way of earnings management since managers have incentive to manipulate earnings to avoiding debt covenant violations. Taking together the third hypothesis can be formulated as follows:

**Hypothesis 3:** *If hedging is used for managerial private benefits or earnings management purpose, strong shareholder (bondholder) rights will be negatively related to hedging decision.*

### 3. Sample Selection and Variable Construction

#### 3.1 Sample selection

We start our sample collection with the data of shareholder rights and bondholder rights. Gompers *et al.* (2003) construct a well-known governance index (GIM index) as a proxy for shareholder rights.<sup>1</sup> Following them our main dataset of shareholder rights is from RiskMetrics (Governance Legacy Data) from 1993 through 2006. To retrieve the information of bondholder governance, we adopt the methodology in the spirit of Billett *et al.* (2007) and King and Wen (2011) to use the covenants of publicly-traded bonds from Mergent's Fixed Income Securities Database (FISD) database. We identify corporate hedging by performing a keyword searching in 10-K reports compiled in EDGAR from 1993 to 2008.<sup>2</sup> For each keyword found, we review the context in which the keyword appears in the report to confirm the use of derivatives for hedging.<sup>3</sup> Following Géczy *et al.* (1997), we use a dummy variable to represent if a firm hedges in a given year. To incorporate firm characteristics and managerial incentive as suggested in literature for other possible determinants in the analysis, we further require firms to have financial information in COMPUSTAT, executive compensation in EXECUCOMP, and stock prices in CRSP. After merging all these datasets, we arrive at the final sample of 8,286 firm-year observations from 1,204 unique firms.

#### 3.2 Bondholder governance measures

Following Billett *et al.* (2007), we collect 35 covenants in bond contracts and group them into 15 categories to create firm-year index (FBX-index) of bondholder rights. FBX-index ranges from 0 to 15 theoretically, and high FBX-index denotes strong debt holder rights. In addition, we adopt two alternative measures from Wei (2005) and Toke and Wei (2009), where J-index and W-index are used to measure bondholder rights. Although both two indices are based on the same FISD database, they are constructed differently. J-index is based on 28 covenants and is computed as the total number of covenants in each contract. Whilst to partially address the issue of equal weight in

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<sup>1</sup> Because the IRRC has published data only in 1990, 1993, 1995, 1998, 2000, 2002, and 2004, 2006, we assume that firms' governance provisions reported in a given IRRC volume keep the same in the years between each publication.

<sup>2</sup> Due to the fact that IRRC governance index data end by 2006 which can be applied up to 2008 by using a "filling" method as a convention in literature (Gompers *et al.*, 2003), our final sample covers the firms from 1993 to 2008. Using a different "filling" method, however, does not change our results.

<sup>3</sup> We consider the usage of foreign currency derivatives, interest rate derivatives and commodity derivatives. Taking foreign currency derivatives for example, the set of keywords include: *currency derivative, currency swaps, currency forwards, currency futures, currency options, currency contract, currency forward contract, exchange forward, exchange future, exchange swap, exchange option, exchange contract, or forward exchange contract.*

J-index, the methodology of W-index proposes 28 covenants first to be grouped into five categories: production/investment, dividend, financing, default-related, and event-related. By the way of construction, W-index ranges between 0 (weak) and 5 (strong). Consequently we expect that the firms with a high J-index/W-index have strong bondholder rights.

### 3.3 Shareholder governance measures

Our main measure of shareholder governance is from Gompers *et al.* (2003) who construct a firm-level governance index (GIM Index) based on the prevalence of 24 anti-takeover provisions. The firms with stronger shareholder rights (lower GIM Index) are found to have higher shareholder values. Besides GIM index, Bebchuk *et al.* (2009) calculate another index (E-index) by selecting 6 anti-takeover provisions and document that high E-index denotes more managerial entrenchments or weak shareholder rights. In addition, institutional investors have a strong incentive to actively monitor executives' decisions in corporate policies. For this purpose, a blockholder is defined as a stockholder who hold at least 5% of the firm's equity. Moreover, following Coles *et al.* (2006) we construct a measure of the influence power between outside directors and inside directors, namely board director competition, as the difference between independent board ratio and dependent board ratio. Furthermore, we adopt CEO duality by defining a dummy variable which takes the value of one if the board chair and CEO are the same person in a given firm. Finally, since blockholders represent the interest of majority stockholders, how the role of blockholders exerts an influence on CEOs' discretion of hedging decision is worth exploring. We identify those CEOs who hold more than 1% (including) firms' outstanding shares and construct a dummy variable of CEO-blockholder. These CEOs are supposed to have significant decision power on corporate hedging strategy.<sup>4</sup>

### 3.4 Other variables and summary statistics

Existing research suggests that hedging decision is related with other economic rationales, such as risk exposure (foreign sales or floating debt), expected taxes (tax convexity), the underinvestment problem (correlation between cash flow and investment expense), or a natural hedging (cash holding). At the end, we use leverage to measure financial distress and consider other characteristics, such as firm size and market-to-book ratio, as general control variables.

Based on the sample of 8,286 firm-year observations, we examine the interplays among stockholder rights, the bondholder rights, and the impacts of governance structure on the hedging decision. We Winsorize the sample at the 1% and 99% to reduce the effect of outliers. Table 1 provides summary statistics for the sample. Approximately 59% of the sample firms are classified as hedgers of using financial derivatives. The average GIM index of sample firms are 9.44. The blockholders hold 14% firm equity on average, and independent board directors obtain more seats than dependent board directors. The sample also suggests that CEO and chairperson of board are the same person for majority of firm-years, and meanwhile CEO on average owns 1.3% of firm total equities and a considerably large portion of CEO population (21%) is identified as CEO-blockholders as they own at least one percent of firm total equities. Across the measures of bondholder rights, we find a consistent result that both FBX index and J-index have a mean value of around 4. In contrast, W-index has an average value of 2.49 which can be attributed to the

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<sup>4</sup> We thank an anonymous referee for suggesting the variable of CEO-blockholder to explain the hedging strategy. We also use 5% as a cut-off level and find 6.1% of CEOs own more than 5% of firm shares, but applying the rule of 5% does not qualitatively change the results of our analysis based on 1% cut-off level.

construction method of this variable. The statistics of control variables are generally consistent with the literature.

**Table 1.** Summary statistics

<b>Variables</b>	<b>N</b>	<b>Mean</b>	<b>Median</b>	<b>Std. Dev.</b>	<b>P25</b>
General Hedging (Dum)	8,286	0.59	1.00	0.49	0.00
GIM Index	8,286	9.44	9.00	2.66	2.00
Blockholder Ownership	8,286	0.14	0.12	0.14	0.00
Board Director Comp. (Indep. - Dep.)	6,120	0.51	0.57	0.24	-0.22
E-Index	8,286	1.56	2.00	1.12	0.00
CEO Duality	6,120	0.81	1.00	0.39	0.00
Shares Owned by CEO (%)	8,286	1.30	0.00	4.42	0.00
CEO-blockholder (Dum)	8,286	0.21	0.00	0.41	0.00
FBX Index	8,286	4.28	4.00	2.90	0.00
J-index	8,286	3.88	3.00	3.34	0.00
W-index	8,286	2.49	3.00	1.55	0.00
CEO Delta/Total Compensation	8,286	0.18	0.05	0.56	0.00
CEO Vega/Total Compensation	8,286	0.03	0.02	0.03	0.00
Foreign Sales/Total Sales	8,286	0.28	0.18	0.33	0.00
Floating-rate Debt/Total Debt	8,286	0.24	0.16	0.25	0.00
Corr(CF, Investment)	8,286	0.33	0.42	0.49	-0.90
Tax Convexity (M\$)	8,286	2.09	1.68	1.74	-0.25
Cash & Cash Equivalent /Total Assets	8,286	0.09	0.04	0.13	0.00
Log (Total Assets)	8,286	8.20	8.08	1.32	5.46
Leverage (%)	8,286	23.41	20.50	14.88	1.22
Market-to-book Ratio	8,286	1.74	1.45	0.94	0.80

Table 1 reports summary statistics of hedging dummy, governance structure and other explanatory variables for 8,286 observations with Winsorization at 1th and 99th percentiles.

## 4. Empirical Results

### 4.1 Univariate tests

We first conduct a univariate comparison analysis in Table 2 to compare hedging propensity based on the groups of governance measures and other proxies. For example, we divide the total sample of 8,286 firm-years into above-median group and below-median group based on the median value of stockholder power (1-GIM/24). There are 5,262 firm-years in the above-median group with the mean value of hedging propensity 0.596, which suggests that 59.6% of firm-years with strong stockholder power are hedgers. In contrast, only 57.5% of firm-years in the below-median group (3,024 firm-years) with weak stockholder power are hedgers.<sup>5</sup> The difference in the median values of hedging propensity between these two subgroups (2.1%) is also tested with the approach of Satterthwaite Approximation (Milliken and Johnson, 1984). With the corrected T-statistics to

<sup>5</sup> Note that due to the nature of GIM index which is a count of the number of 24 anti-takeover provisions, stratifying the whole sample by the median value of GIM index will result in the subsamples containing different numbers of observations. However, our results do not change if we use the mean value of GIM index to categorize.

consider unequal sample sizes and unequal variances, we find that the hedging strategy is statistically more popular for the firms with stockholder rights above the median level. Additionally, other measures of stockholder rights show the similar results as well. On the other side, we use FBX index, J-index and W-index to explore the bondholder governance. We follow the same procedure to split the sample into above-median group and below-median group based on these three bondholder governance measures. The univariate comparison shows that the firms with strong bondholder rights are more likely to hedge. For instance, the likelihood of hedging for the firms with high FBX index is 2.1% higher than that of firms with low FBX index. Given the results of all significant difference in means, our conjecture that strong bondholder rights boost hedging strategy is supported. The evidence from univariate tests supports our first hypothesis and may signal the presence of systemically different hedging motivations among firms with the different governance structure. However, we treat such supposition with caution and tend to verify again in the multivariate regressions.

**Table 2.** Univariate tests

Grouping Variables	Above Median (1)		Below Median (2)		(1) – (2)
	<i>N</i>	Mean	<i>N</i>	Mean	Diff. in Mean
Stockholder Rights (1-GIM/24)	5,262	0.596	3,024	0.575	0.021**
Blockholder Ownership	4,143	0.620	4,143	0.557	0.063***
Board Director Comp. (Indep. - Dep.)	3,061	0.625	3,059	0.612	0.013
E-Index	4,222	0.595	4,064	0.581	0.014*
CEO Duality*	4,957	0.637	1,163	0.537	0.100***
CEO-blockholder*	6,558	0.601	1,728	0.542	0.059***
Bondholder Rights (FBX/15)	5,377	0.595	2,909	0.575	0.021**
Bondholder Rights (J-index/28)	5,507	0.596	2,779	0.574	0.022**
Bondholder Rights (W-index/5)	4,242	0.601	4,044	0.576	0.025***
CEO Delta/Total Compensation	4,143	0.637	4,143	0.540	0.098*
CEO Vega/Total Compensation	4,143	0.668	4,143	0.509	0.158***
Foreign Sales/Total Sales	4,143	0.670	4,143	0.507	0.163***
Floating-rate Debt/Total Debt	4,143	0.631	4,143	0.546	0.086***
Corr(CF, Investment)	4,143	0.580	4,143	0.597	-0.017*
Tax Convexity (M\$)	4,143	0.598	4,143	0.579	0.019**

**Note:** In the last column "Diff. in Mean", the asterisks \*, \*\*, and \*\*\* indicate statistical significance at the level of 10%, 5%, and 1%, respectively.

This table provides a univariate analysis of hedging as described in Section III. The median value of all variables are used as cut-off levels for grouping, except the variable of CEO duality which is categorized into group one (with duality) and group two (without duality), and the variable of CEO-blockholder which is categorized into group one (less than 1% ownership) and group two (more than 1% ownership). T-statistics are corrected for unequal variances by adopting Satterthwaite Approximation.

Moreover, the sample is divided based on various well-documented rationales of hedging to investigate how those firm characteristics affect the hedging decision. We find that the firms where CEOs have more delta incentive.<sup>6</sup> As regards to the measures of risk exposures from foreign

<sup>6</sup> However, it's worthy to point out that the insignificant results of Vega incentive are also reported in other empirical studies (Van Bakkum, 2016).

currency and interest rate, we find consistent results that more risk exposures increase the possibility of hedging. The underinvestment effect and tax benefit effect are also supported in univariate test that firms with low correlated cash flow and investment opportunity or more tax saving from smoothes net income are more likely to hedging.

#### **4.2 Baseline multivariate tests**

The univariate results in the previous section demonstrate a plausible association between governance structure (both shareholder rights and debt-holder rights) and the hedging strategy. However, hedging decision may be also concurrently affected by firm characteristics and other drivers of hedging rationales faced by the firm. We address this possibility by employing the analysis in a multivariate framework. In each regression specification we first include proxies of stockholder rights (1-GIM/24) and bondholder rights (FBX/15), and also include a common set of control variables. In addition, in Model 2 of Table 3 on the next page, we control for equity compensation incentive by including the logarithm value of CEO delta incentive and the logarithm value of CEO Vega incentive. Finally we recognize the heterogeneity of hedging across the industry and time by using Fama-French 48 industry categories to control for industry fixed effect and the year dummies to control for time fixed effect. Our multivariate regression model is specified as Equation (1) below:

$$\begin{aligned}
 \text{Hedging} = & \alpha + \beta_1 \times \text{Stockholder Rights} + \beta_2 \times \text{Bondholder Rights} + \beta_3 \times \text{Log (CEO Delta)} \\
 & + \beta_4 \times \text{Log (CEO Vega)} + \beta_5 \times \text{Foreign Sales/Total Sales} \\
 & + \beta_6 \times \text{Floating-rate Debt/Total Debt} + \beta_7 \times \text{Corr(CF, Investment)} \\
 & + \beta_8 \times \text{Tax Convexity} + \beta_9 \times \text{Cash \& Cash Equivalent/Total Assets} \\
 & + \beta_{10} \times \text{Log(Total Assets)} + \beta_{11} \times \text{Leverage} \\
 & + \beta_{12} \times \text{Market-to-book} + \text{Industry-fixed Effect} + \text{Time-fixed Effect} + \varepsilon_{i,t} \quad (1)
 \end{aligned}$$

To analyze the impact of governance structure on the hedging/non-hedging decision, we apply Probit model by regressing dummy variable of hedging on the explanatory variables. Panel A of Table 3 reports the results of Probit model with the hedging dummy as the independent variable. Across the models, we find both stockholder rights and bondholder rights have significant and positive effects on the hedging dummy, which supports our first hypothesis that both strong stockholder governance and strong bondholder governance will promote the firms to implement hedging strategy. For example, the coefficient of stockholder right is 0.689 and that of bondholder right is 0.244, both are statistically significant.

These results also suggest that hedging mainly functions as a value-maximization device to the interest of shareholders and bondholders. In addition, from Table 3 we find a significantly positive relation between CEO delta incentive and hedging, and a negative relation between CEO Vega incentive and hedging, though the coefficients of Vega incentive are not significant statistically. These two results are generally consistent with the theoretical predictions that CEO delta represents the value-creating incentive of compensation while the CEO Vega stands for the risk-taking incentive of compensation. Unlike well-diversified shareholders, managers cannot diversify their human capital, and therefore they tend to forgo positive NPV but high risky projects when their benefits from increased firm value underweight the costs associated with increased firm risk. Equity-like compensation is viewed as a mechanism to reduce this underinvestment problem through aligning the interest of managers to that of shareholders (Jensen and Meckling, 1976).

**Table 3.** Baseline models of impact of governance structure on hedging

		Panel A: Probit Model			Panel B: Margin Effect		
		[P1]	[P2]	[P3]	[M1]	[M2]	[M3]
Stockholder Rights (1-GIM/24)	+/-	0.689*** (4.680)	0.790*** (5.274)	0.653*** (4.274)	0.267*** (4.682)	0.306*** (5.275)	0.253*** (4.274)
Bondholder Rights (FBX/15)	+/-	0.244*** (2.783)	0.185** (2.082)	0.200** (2.236)	0.095*** (2.783)	0.072** (2.082)	0.078** (2.236)
Log (CEO Delta)	+		0.029*** (2.769)	0.039*** (3.622)		0.011*** (2.768)	0.015*** (3.621)
Log (CEO Vega)	-		-0.008 (-0.706)	-0.011 (-0.988)		-0.003 (-0.706)	-0.004 (-0.988)
Foreign Sales/Total Sales	+			0.497*** (7.854)			0.192*** (7.860)
Floating Debt/Total Debt	+			0.336*** (5.102)			0.130*** (5.103)
Corr(CF, Investment)	-			-0.086** (-2.548)			-0.033** (-2.548)
Tax Convexity	+			0.042*** (4.090)			0.016*** (4.089)
Cash/Total Assets	-		-0.832*** (-5.295)	-0.872*** (-5.397)		-0.323*** (-5.290)	-0.337*** (-5.391)
Log (Total Assets)	+	0.242*** (17.832)	0.206*** (13.253)	0.195*** (12.116)	0.094*** (17.778)	0.080*** (13.230)	0.075*** (12.097)
Leverage	+	0.007*** (5.139)	0.007*** (4.929)	0.006*** (4.119)	0.003*** (5.138)	0.003*** (4.928)	0.002*** (4.119)
Market-to-book Ratio	+	0.104*** (4.804)	0.106*** (4.827)	0.102*** (4.628)	0.040*** (4.805)	0.041*** (4.827)	0.040*** (4.628)
Constant		-4.017*** (-13.804)	-3.817*** (-12.628)	-3.847*** (-12.564)			
Industry and Year Control		Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations		8,286	8,286	8,286	8,286	8,286	8,286
Pseudo R <sup>2</sup>		0.221	0.225	0.236	0.221	0.225	0.236

**Notes:** We control the industry fixed effects with the Fama-French 48-industry classification, and control the time fixed effects with year dummies. The robust standard errors are used to calculate Z-statistics that are reported in parentheses below the estimates. The asterisks \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% level, respectively.

To facilitate the interpretation of regression results, in Panel B of Table 3 we report the marginal effects on the probability of implementing hedging strategy for a one standard deviation change in continuous explanatory variables. Z-Statistics based on robust standard errors are reported in parentheses below to test whether the coefficients of marginal effects are equal to zero. Consistent with the theoretical prediction, we observe a strong evidence that governance structure has important impacts on hedging strategy. For example, in Model 3 after controlling for other determinants of hedging, one standard deviation rise in the measure of stockholder rights will increase the possibility of hedging by 25.3%, and one standard deviation increase in the measure of bondholder rights will amplify the possibility of hedging by 7.8%.

#### 4.3 Robustness tests

Considering the potential issue associated with measuring stockholder governance and bondholder governance, we employ two robustness tests. First, we adopt the different proxies of stockholder governance and bondholder governance. As discussed in Section 3, we use J-index and W-index as alternative proxies of bondholder rights, and use blockholder ownership, board director ratio, E-index, and CEO duality as alternative proxies of stockholder rights. The results of Probit model on the probability of hedging decision based on various proxies are reported in Table 4.

In Model 1, we replace the bondholder rights based on FBX index with bondholder rights based on J-index and find that the relation between stockholder rights and hedging decision keeps significantly positive, and meanwhile the bondholder rights measured by J-index also show a significantly positive impact on the hedging decision. The similar results are detected from Model 2 when the bondholder rights are measured by W-index. Consistent results indicate that bondholders prefer conservative corporate policies and tend to urge more hedging as bondholders have more influence on corporate operations. From Model 3 through Model 6, we keep the main measure of bondholder rights, i.e. FBX index divided by 15, but try alternative measures of shareholder rights: blockholder ownership, board director competition, E-index, CEO duality and CEO-blockholder. We find a significantly positive correlation between the decision and blockholder ownership, and a significantly positive correlation between the hedging decision and board director competition. Given that both higher blockholder ownership and more independent board directors suggest more stockholder power, the results from Model 3 and Model 4 confirm our first hypothesis that the hedging strategy is fundamentally favorable to stockholders.

Our results are also in the line with Eling and Marek (2013) who suggest that the independent directors and major stakeholders have considerable impacts on risk-taking behaviors of insurance companies and should attract more attention from the regulators. Considering the fact that E-index is based on six of twenty-four anti-takeover provisions and reflects strong managerial entrenchment (namely, weak shareholder rights), a negative coefficient (-0.026) of E-index indicates that firms with weak shareholder rights are less likely to use hedging. This result of the multivariate regression is in line with the prediction of the first hypothesis since more entrenched managers mean weak shareholder rights. While the coefficient of CEO duality is insignificant, our overall inference does not change. Recall what we find in the univariate test, the results of E-index and CEO duality in multivariate regressions minimize the chance of spurious correlation driven by firm-characteristics related factors, and thereby provide the validity of our model specification.

In addition, the firms with CEO-blockholders are found to more likely implement hedging strategy, which buttresses the intuition that top executives are more encouraged to carry out derivative hedging when they hold an influential portion of firm ownership (voting rights). To summarize, multiple proxies of governance in regressions ensure the robustness of our results and strengthen the finding about the positive (incremental) effect of stockholder rights and bondholder rights on firms' appetite for hedging risk exposures.

**Table 4.** Alternative measures of shareholder and bondholder governance

		[A1]	[A2]	[A3]	[A4]	[A5]	[A6]	[A7]
Stockholder Rights (1-GIM/24)	+/-	0.639 <sup>***</sup> (4.177)	0.654 <sup>***</sup> (4.281)					
Blockholder Ownership	+/-			0.477 <sup>***</sup> (3.847)				
Board Director Comp.(Indep. - Dep.)	+/-				0.355 <sup>***</sup> (3.912)			
E-Index	+/-					-0.026 <sup>*</sup> (-1.802)		
CEO Duality	+/-						0.066 (1.327)	
CEO-blockholder	+/-							0.150 <sup>***</sup> (2.976)
Bondholder Rights (FBX/15)	+/-			0.213 <sup>**</sup> (2.387)	0.012 (0.113)	0.201 <sup>**</sup> (2.247)	0.007 (0.061)	0.199 <sup>**</sup> (2.232)
Bondholder Rights (J-index/28)	+/-	0.487 <sup>***</sup> (3.287)						
Bondholder Rights (W-index/5)	+/-		0.136 <sup>**</sup> (2.443)					
Other Control		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry and Year Control		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations		8,286	8,286	8,286	6,120	8,286	6,120	8,286
Pseudo R <sup>2</sup>		0.237	0.236	0.236	0.251	0.235	0.249	0.235

**Notes:** This table reports the results of robustness checks from adopting alternative measures as proxies for shareholder rights and bondholder rights. The robust standard errors are used to calculate Z-statistics that are reported in parentheses below the estimates. The asterisks \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% level, respectively.

In the context of managerial entrenchment, risk-averse managers can choose conservative investment policy (hedging) to secure their private benefits and maximize their utility. As a result, the interaction among shareholder governance, bondholder governance and managerial behavior can be linked to the conflicts of interest between value-maximum shareholders and risk-averse managers, and the conflicts of interest between fixed-claiming bondholder and residual-claiming shareholders. All these imply that it is important to implement a thorough analysis about the interplays among endogenous governance setting and the behaviors of economic agents under this environment. To address such potential issue of endogeneity involved among shareholder governance, bondholder governance and the hedging decision, our second robustness analysis is to implement a simultaneous equations model (SEM) where shareholder governance, bondholder governance and the hedging decision are allowed to affect interactively and their respective influences are estimated through a 3SLS procedure.

**Table 5.** Simultaneous equation model of hedging decision

	Hedging Dummy	Bondholder Rights	Stockholder Rights
Hedging Dummy		-0.352*** (-5.373)	-0.719*** (-4.406)
Stockholder Rights (1-GIM/24)	0.664* (1.872)	0.432*** (4.386)	
Bondholder Rights (FBX/15)	0.305*** (4.174)		0.073 (1.601)
Log (CEO Delta)	-0.002 (-0.816)		
Log (CEO Vega)	0.022*** (5.343)		
Debt Maturity		-0.000*** (-3.297)	
Convertibles		-0.258*** (-32.152)	
Volume			2.769 (0.837)
Delaware Incorporation			0.044*** (4.540)
Other Control	Yes	Yes	Yes
Industry and Year Control	Yes	Yes	Yes
Number of Observations	8,286	8,286	8,286
Pseudo R <sup>2</sup>		n.a.	

**Notes:** This table reports the results of the simultaneous equation model on the relationship between the mix of governance structure and hedging decision. The robust standard errors are used to calculate Z-statistics. The asterisks \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% level, respectively.

In the spirit of King and Wen (2011), we use instruments in each equation in the estimation system. In the equation with the dependent variable of shareholder rights we use *Delaware* and *Stock Volume*, where Delaware is the dummy variable equaling to one if a firm is incorporated in Delaware and zero otherwise. Stock Volume is the average of the monthly trading volume divided by the number of stock shares outstanding. In the equation with the dependent variable of bondholder rights we adopt *Debt Maturity* and *Convertibles*. CEO Delta incentive and Vega

incentive serve as the instruments in the equation of hedging decisions based on the literature findings (Guay, 1999). Table 5 represents the results of the SEM regression. From the hedging dummy equation we observe significantly positive coefficients of stockholder rights (0.664 at 10% significance level) and bondholder rights (0.305 at 1% significance level), which confirm the results from the baseline models. Either strong influence of stockholders or strong influence of bondholders will increase the probability of hedging. Additionally, from the equation of bondholder rights and the equation of stockholder rights we find less power for bondholders and stockholders is associated with the implementation of hedging strategy. Interestingly, in the framework of SEM, we find that stockholder rights also have positive impact on bondholder rights. This positive relation is in line of one view in literature that low GIM index represents few anti-takeover provisions, which is regarded as a threat to bondholders. Klock *et al.* (2005) point out that bondholders impose more bond covenants to protect themselves from the takeover risk. Therefore a positive relation from shareholder rights and bondholder rights provides the evidence to support this argument.

## 5. Extended Analysis

Given a significant and positive relation documented between the hedging decision and both shareholder rights and bondholder rights, a related and important question is that how this relation varies in different circumstances of governance structure. We explore this question by grouping the whole sample into two subsamples based on the median value of stockholder rights, and two subsamples based on the median value of bondholder rights. For each of four subsamples we run the baseline Probit model regressions and report the results in Table 6. From Model 1 and Model 2, we find that for the subsample with strong stockholder rights the hedging decision remains a significantly positive relation with both stockholder rights and bondholder rights, while such positive correlation becomes insignificant for the subsample with weak stockholder power. These results suggest that stockholder governance works as an important mechanism not only in regulating managerial risk-taking, but also in reconciling the relations between bondholders' influence and managerial decision-making. Both insignificant coefficients of stockholder rights and bondholder rights in Model 2 indicate that hedging may not be used to maximize the firm (all stakeholders) value when managerial entrenchment is severe.

**Table 6.** The hedging propensity between governance groups

		[1]	[2]	[3]	[4]
		Strong Stockholder Rights (> Median)	Weak Stockholder Rights (< Median)	Strong Bondholder Rights (> Median)	Weak Bondholder Rights (< Median)
Stockholder Rights (1-GIM/24)	+/-	0.611* (1.669)	0.068 (0.175)	0.995*** (5.014)	-0.017 (-0.063)
Bondholder Rights (FBX/15)	+/-	0.240** (2.018)	0.163 (1.146)	0.127 (0.774)	-1.070*** (-3.243)
Other Control		Yes	Yes	Yes	Yes
Industry and Year Control		Yes	Yes	Yes	Yes
Number of Observations		4,215	4,071	5,377	2,909
Pseudo R <sup>2</sup>		0.246	0.263	0.249	0.261

**Notes:** The robust standard errors are used to calculate Z-statistics. The asterisks \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% level, respectively.

On the other side, we find the distinct results when the sample is divided by bondholder governance. From Model 3, the stockholder rights show a significantly positive impact on the hedging decision when the companies have strong bondholder rights in place. This suggests that stockholders have more incentive to implement hedging when the incumbent bondholders impose more constraints. One potential interpretation is that stockholders tend to use more hedging strategy as commitments for bondholders when the firms invest on risky projects and bondholders use more protective covenants. More interestingly, Model 3 shows that in the situation of a weak existing governance bondholder rights have a significantly negative impact on hedging, whilst the stockholder rights have an insignificantly negative impact on hedging. Recall our third hypothesis that managers may use hedging to manipulate the earnings. Thus, the negative relations detected from Model 4 provide a modest evidence to support this hypothesis. Considering lack of control on disciplining managerial decisions and possibility of hedging being used as earnings management, the bondholders may oppose to the use of hedging strategy.

## 6. Conclusions

This paper studies the influence of governance structure including both shareholder rights and bondholder rights on hedging decision by examining the use of financial derivatives in a large sample of US firms. We detect a significant relation between firms' hedging decision and the governance structure after controlling for well-documented rationales in literature.

Our results indicate both strong shareholder rights and strong bondholder rights promote high hedging propensity, which supports our first hypothesis that hedging overcomes the inefficient market and hence maximizes firm value, and therefore strong shareholder (bondholder) rights are positively related to the hedging strategy. These results keep robust after adopting multiple alternative measures of governance and addressing the concern of potential endogeneity.

This paper also investigates whether hedging mitigates the risk-shifting and then results in a negative relation between hedging and shareholder rights while a positive relation between hedging and bondholder rights. Little evidence is found to support this hypothesis. However, by exploring the hedging in different governance environment, we observe some empirical results suggesting that hedging can be used as a vehicle of earning management, particularly when both shareholder rights and bondholder rights are weak, which further points out that governance mechanism plays a critical role in risk management activity.

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