Sports CEO and Corporate Derivative Usage

Abstract

Using a hand-collected dataset covering S&P 500 non-financial firms, we find that firms led by CEOs with risky sports hobbies use fewer financial derivatives. The relationship between CEO sports risk and corporate derivative usage is less pronounced for CEOs with higher firm shareholdings, and more pronounced for CEOs with greater power in their firms. Our results are robust to endogeneity concerns addressed through the Heckman self-selection model and the Oster (2019) test. We provide empirical support for the importance of managerial intrinsic motivation in curbing excessive hedging that might not be in the best interest of shareholders.

Data Availability: All data used in the study are publicly available from the sources cited in the text.

Key words: Corporate hedging; Derivative hedging; CEO sports hobby

JEL Classifications: *G30; G32; G41*

1. Introduction

One type of agency cost associated with corporate ownership emerges from the risk aversion of managers. Corporate executives often have a substantial portion of their wealth tied to the firm, both through equity holdings and the value of firm-specific human capital. As a result, these managers may be inclined to reduce the firm's risk exposure more than would be considered optimal from the perspective of an independent, diversified shareholder. The typical solution to mitigating managerial risk aversion involves structuring executive compensation as a more convex function of firm value (Smith and Stulz 1985). However, in practice, designing and implementing such a compensation scheme presents significant challenges. Moreover, prior empirical studies present mixed findings on whether convex compensation aiming to induce risk seeking influence corporate hedging (e.g., Bakke et al., 2016; Doukas and Mandal 2018). This study explores the influence of CEO personality traits on corporate hedging with derivatives and investigates the potential effectiveness of intrinsic, rather than extrinsic motivation in curbing excessive hedging that are undesirable from the perspective of shareholders.

Corporate hedging is a strategic approach employed by firms to reduce exposure to risks (Nance et al. 1993; Mian 1996). Economic theories suggest that firms are motivated to engage in hedging as adverse risks can expose firms to financial distress, force managers to delay or to forego prospective investment opportunities and increase the cost of external financing (DeMarzo and Duffie 1995; Froot et al. 1993; Smith and Stulz 1985). However, the decision to implement hedging strategies is typically at the discretion of the firm's managers, suggesting that a manager's personal traits are likely to influence corporate hedging (Chowdhury et al. 2023; Doukas and Mandal 2018). In addition, agency problem between managers and shareholders may induce managers to over-hedge, which might not be in the best interest of shareholders (Tufano, 1996; Fauver and Naranjo 2010).

Prior research has primarily focused on firm-level determinants of corporate derivative usage, few empirical studies have examined the influence of managerial personality traits on a firm's hedging policy (e.g., Croci et al. 2017; Doukas and Mandal 2018; Chowdhury et al. 2023). Our study fills this gap by demonstrating that CEOs with a higher risk tolerance driven by high reward sensitivity and low punishment sensitivity tend to engage less in hedging with derivatives and therefore may alleviate the agency problem. We capture the CEO's innate risk preferences by analyzing their involvement in risky sports.

In psychology research, participation in risky sports is often regarded as an indicator of personal attitudes toward risk. Zuckerman (1983) asserts that individuals who engage in risky sports are typically risk-seeking and tend to underestimate the risks associated with such activities. Thomson and Carlson (2014) further suggests that participation in risky sports is driven by high reward sensitivity and low punishment sensitivity. That is, risky sports may be undertaken by individuals who are reward seekers driven by strong reward sensitivity and less inhibited by punishment sensitivity. According to Reinforcement Sensitivity Theory (RST) in psychology research, people with high reward sensitivity tend to be more motivated by the prospect of gaining rewards and may take risks to achieve them. And people with low punishment sensitivity tend to be less concerned about the potential negative consequences and losses. This suggests that risk-sports takers are reward seekers who are less sensitive to the downsides. We use CEOs' revealed preference for taking risky sports to capture their risk tolerance driven by reward and punishment sensitivity, and demonstrates that CEOs with risky sports hobbies tend to use fewer derivatives.

We hand collect corporate derivative information and CEOs' sports hobbies data for S&P 500 firms. The derivative information (e.g. notional amount of derivatives) is manually collected from corporate 10-K filings or annual reports. We manually read 10-K filings to obtain the fiscal year-end notional amount of derivatives. The CEOs' sports hobbies data are

manually collected from Boardroom insiders[1] and supplemented by google searches[2.] We read the CEO profiles of Boardroom Insiders or articles from google searches and identify CEO's sports hobby information. We then measure CEOs' risk preferences based on the injury rate of CEO's hobby sports.

We find that firms led by CEOs with risky sports hobbies are less likely to engage in derivative hedging. This suggests that the preference for risky sports reflects the CEO's natural inclination towards risk-seeking driven by high reward sensitivity and low punishment sensitivity, showing that CEOs who are risk seeking in sports activities are more likely to reduce their hedging activities. In addition, we find that a CEO's incentive and power reinforce the relationship between risk attitude and corporate hedging. The cross-sectional tests suggest that the relationship between CEO sports risk and corporate derivative usage is less pronounced for CEOs with higher shareholdings tied to the firm, and more pronounced for CEOs with greater power to push through policies that match their own risk preferences. Moreover, the results between CEO sports hobby and corporate derivative usage remain robust after addressing self-selection issues in CEOs reporting sports hobbies in the public domain, and omitted variable bias through Oster (2019) test. In addition, the results are robust after controlling for additional CEO personal characteristics and incentives, and using alternative measures of sports risk. Moreover, we find that the negative relation between derivative and firm value because of agency cost is alleviated when CEOs are less risk averse. That is, the CEO's intrinsic motivation – risk seeking attitude is effective in curbing excessive hedging that are undesirable from the perspective of shareholders.

[1] Boardroom Insider is a database that covers the profiles of the top executives mostly from Fortune 500 companies and the information included in the profile includes CEO's basic biographic highlight information, the personal attributes and interests, etc.

[2] For each CEO, we conduct a Google keyword search based on a combination of the CEO's full name and a list of sports (e.g., ''golf,'' ''fish,'' ''yoga''). The full list of sports included in the keyword search is comprised of the most popular sports reported by CEOs on Boardroom Insiders. We then follow each web link on the first three pages of search results and record all sports hobbies cited in the links.

The study contributes to two strands of literature. First, our study contributes to the literature on the role of intrinsic motivation in curbing excessive corporate hedging. Prior studies primarily focus on the role of incentives from executive compensation structure, e.g., making compensation as a convex function of firm value (e.g., Smith and Stulz 1985; Knopf et al. 2002), to curb excessive hedging and alleviate agency problem. Our study underscores the importance of intrinsic motivation in corporate hedging. We find that CEOs with risky sports hobbies hedge less and might be beneficial to curb excessive hedging that are not in the best interests of shareholders.

Second, our study provides new evidence to the empirical findings of whether managerial risk preferences affect the extent of corporate hedging. While theories (e.g., Smith and Stulz 1985) and survey (e.g., Bodnar, et al. 2019) support the notion, empirical findings have been mixed. Using multiyear analysis, Doukas and Mandal (2018) find that CEO risk preferences proxied by Vega and Delta have no significant bearing on hedging decisions, while CEOs with longer tenure are more likely to be risk averse and hedge more. Using data on derivative portfolios in the oil and gas industry, Croci et al. (2017) find that CEO age positively influences the decision to hedge. By employing a measure of risk preferences reflected by CEO sports hobbies, our paper shows that CEOs' sports hobby risk preferences, which may reflect CEOs' intrinsic motivation, is negatively associated with derivative hedging.

Moreover, our study has practical implications for corporate governance. To the extent that intrinsic motivation cannot be induced through contracts, the ex-ante measure of CEO's risk attitude reflected by sports hobbies can be used by boards to identify CEOs.

The remainder of the paper proceeds as follows: Section 2 reviews prior literature and develops the hypothesis. Section 3 describes our sample, data and research design. Section 4 provides empirical results. Section 5 concludes.

2. Hypothesis Development

Managerial Risk Preference and Corporate Hedging

In the Modigliani and Miler's world with perfect market, corporate hedging policy is irrelevant to firm value. With fixed investment policy and with no contracting costs or taxes, hedging does not add value to the firm because shareholders can change their holdings of risky assets to offset any change in the firm's hedging policy, leaving the distribution of their future wealth unaffected. In practice, frictions create rationales for hedging to reduce the variability of firm's future value. The conventional explanations relate to tax incentives (Mayers and Smith 1982; Smith and Stulz 1985), reduction of underinvestment (Froot et al. 1993), and reduction of financial distress costs (Mayers and Smith 1982; Smith and Stulz 1985).

Besides the above explanations based on the shareholder maximization view, another important imperfection in capital market that creates a rationale for hedging is the agency cost. Managers, whose objective is to maximize their own personal utility functions, often have personal incentives that do not align with the interests of shareholders. Their wealth and human capital are tied to the firm, making their expected personal utility dependent on the firm's payoff distribution. On the one hand, managers' human capital, including knowledge, skills, experience or connections, are concentrated in the firm. One the other hand, manager's compensation is often an increasing function of the firm's performance (e.g., the equity-based compensation). Thus, managers have a vested interest in the firm's payoff distribution, which creates a risk for managers if the firm does poorly.

Managers may diversify the risk either by hedging their own account or hedging at the firm level. However, hedging at a personal level might be difficult because selling restrictions are usually included in executive stock or stock-option based compensation contracts. Furthermore, Rule 144 of the U.S. Securities and Exchange Commission (SEC) places severe restrictions on the ability of most corporate insiders and affiliates to sell shares in their firm. Another option is to hedge at firm level. Managers are the ones who make the hedging decision

within the firm. By hedging, which reduces the variance of the firm's payoffs, managers can alter the firm's payoff distribution and their expected utility.

The undiversified wealth portfolios and firm-specific human capital can make managers risk averse, leading them to forgo risky positive net present value projects. Managers might be inclined to hedge more than shareholders would prefer. By implementing hedging strategies that reduce the firm's payoff variance, managers can limit the financial downside and create a more stable environment for their wealth and job security. However, this hedging might not be in the best interest of well-diversified shareholders, who could accept more risk in pursuit of higher returns, as their diversified portfolios allow them to absorb more firm-specific risk.

To address the over-hedging problem, one solution is to impose extrinsic motivation and make the manager's compensation a convex function of firm value (Smith and Stulz 1985). Smith and Stulz (1985) argue that if the manager's expected utility is a convex function of the value of the firm, the managers will behave like a risk seeker and engage in less hedging. However, crafting and enacting such compensation plans proves to be a complex task. For instance, the addition of more stock options doesn't straightforwardly translate to reduced hedging activities. The reason lies in the dual influence that options exert on a manager's risk management incentives: the effect of options on the manager's responsiveness to stock volatility (known as vega) and the effect on their responsiveness to the stock price itself (known as delta). Theory suggests that companies with higher vega tend to hedge less (Smith and Stulz 1985), while a higher delta is associated with more hedging (Knopf et al. 2002). Moreover, empirical findings so far on the relation between Vega and hedging has been mixed (e.g., Doukas and Mandal 2018; Bakke et al. 2016; Knopf et al. 2002). These findings underscore the shortcomings of traditional incentive structures in curbing the tendency to over-hedging.

An alternative approach to reducing over-hedging could be to leverage the intrinsic risk preferences of managers. In essence, if a manager naturally inclines towards risk-seeking, they are more likely to reduce their hedging activities. The notion is also closely related to the upper-echelons perspective theory (Hambrick and Mason 1982), which emphasizes managers' influential role in corporate decision making or firm performance. We contend that the manager's attitude towards risk influences their hedging behavior, with risk-loving managers being less likely to use derivatives for hedging.

Risky Sports Hobbies and Risk Preference

An individual's propensity to take risks is influenced by both the objective risk of a given situation and their personal evaluation of that risk (Freixanet 1991). The inherent risk associated with sports is determined by factors such as the speed, height, and environmental conditions involved in the activity. However, how individuals perceive and respond to these objective risks is shaped by their personality traits. Psychological research has identified several traits common among those who engage in high-risk sports. Thomson and Carlson (2014) suggest that individuals with high reward sensitivity and low punishment sensitivity are more likely to engage in risky sports. According to the Reinforcement Sensitivity Theory (RST; Gray and McNaughton, 2000), individual differences in behavior can be understood through variations in sensitivity to rewards and punishments. This theory provides insights into the biological mechanisms underlying risk-taking behaviors (Maher et al., 2015). Individuals with high reward sensitivity tend to be more responsive to potential rewarding stimuli and individuals with low punishment sensitivity tend to be less sensitive to potential loss and exhibit lower risk aversion. That is, individuals with high reward sensitivity could accept more risk in pursuit of higher returns, and individuals with low punishment sensitivity are less sensitive to the downside. Moreover, research has shown the consistency of individual risk preferences across a range of decision-making contexts, including both personal and

professional domains. Dohmen et al. (2011) establish that individuals' risk attitudes are significantly correlated across various spheres, including driving, financial decisions, sports and leisure activities, health, and career choices. Kirkcaldy and Cooper (1992) note a spillover effect from leisure activities to work, observing that individuals who favor competitive sports like basketball also exhibit heightened competitiveness in their professional careers. Similarly, prior studies find that Pilot CEOs are associated with higher firm risk (Cain and McKeon, 2016), significantly better innovation outcomes (Sunder et al. 2017), and higher cash holdings (Chen et al. 2025). Luo et al. (2022) find that firms run by CEOs with risky sports hobbies are associated with greater tax aggressiveness.

Building on this stream of literature, we propose that a CEO's preference for risky sports may reflect their natural inclination towards risk-seeking driven by high reward sensitivity and low punishment sensitivity, and therefore use fewer derivatives. Our hypothesis can be stated as:

H1: Firms led by CEOs with a preference for risky sports engage less in derivative hedging.

3. Sample, Data and Descriptive Statistics

Sample Selection

Our sample begins with all non-financial firms of S&P 500 from 2002 to 2016 where we hand collect derivative information from corporate 10-K filings or annual reports. We then hand collect CEO's sports hobby information from two sources: Boardroom Insiders and through articles from Google searches. We start from 2002 because this is the year when SFAS133[3] was applicable to majority of the firms.

[3] Prior to SFAS 133, *Accounting for Derivative Instruments and Hedging Activities*, derivatives were off the balance sheet, and changes in their fair values were not presented in the income statement. After the adoption of SFAS 133, firms are required to report derivatives on the balance sheets at their fair value and recognize gains and losses on derivatives in earnings for the current period unless the derivatives qualify for hedging accounting treatment.

The derivative information is collected from corporate 10-K filings or annual reports. To locate information about firms' derivative usage, we use the following keywords: "derivative", "hedge", "forward", "futures", "option", "swaps", "notional", and "risk" (Huang et al. 2019). We then read the surrounding text to obtain the fiscal year-end notional amount of interest rate derivatives, foreign currency derivatives and commodity derivatives. We sum up the three types of derivatives to obtain the overall amount of notional value of derivates.

The CEOs' sports hobby information are obtained from CEO profiles of Boardroom Insider and articles from Google searches. Boardroom Insiders is a database that provides profiles of top executives, mostly of Fortune 500 companies. The executive profiles in Boardroom Insiders include biographical details such as top executives' personal attributes, interests, and hobbies. For CEOs where we do not find sports information, or CEOs who are not covered by Boardroom Insider, we conduct another round of searching in google based on a combination of the CEO's full name and a list of sports. The full list of sports included in the keyword search is comprised of the most popular sports reported by CEOs on Boardroom Insiders. We then follow each web link on the first three pages of search results and record all sports hobbies cited in the links. The reported sports hobbies range from car racing and wind surfing, to running and golfing. Although our theoretical construct of CEO sports hobby is CEOs' perceived risks when playing the sports, it is possible that some of our collected CEO self-claimed sports hobby may not be consistent with this construct. For example, a CEO may claim tackle football as his sports hobby, but in reality he simply enjoys watching others play the sport, rather than participating in the sport himself. Therefore, in our models, we exclude CEOs whose disclosed spectator sports hobbies (i.e., football)[4].

We obtain firm- and tenure-related data for the CEOs from Execucomp and retrieve financial data from Compustat based on the starting and ending dates of these CEOs in the

[4] Our results hold both for excluding and including spectator sports hobbies.

CEO position in the firm. Additional requirements for non-missing values for other variables used in the regression analyses further reduce the number of observations to 843 firm-years, representing 191 distinct CEOs in 140 distinct firms. Table 1 describes our sample selection process.

[Insert Table 1 about here]

Measurement of Sports Risk

Following Luo et al. (2022), our measure of the risk of the CEO's sports hobbies is based on the actual injury rate of that particular sport. This injury rate is a ratio constructed for each sport using the total number of injuries for the sport divided by the total number of people participating in that sport during the same period.[5] We assume that CEOs who play the same sport(s) are likely to have similar risk preferences. To estimate an individual CEO's risk preferences for our empirical analyses, we match each sport risk calculated above to the reported sports hobby of each CEO in our sample. If an individual CEO has multiple sports hobbies, we use the maximum sport risk value among all sports hobbies of that CEO to proxy for his risk attitude (i.e., his riskiest sport hobby).

Research Design

To test our hypotheses, we use the following regression model in our empirical analyses. We include industry- and year- fixed effects with standard errors clustered at firm level in the regressions.

$$Derivative_{it} = \beta_0 + \beta_1 SportsRisk_i + \beta_2 ForeignSale_{it} + \beta_3 Size_{it} + \beta_4 NOL_{it} + \beta_5 Leverage_{it} + \beta_6 CashRatio + \beta_7 PayoutRatio_{it} +$$

[5] Data on sports-related annual injuries are obtained from the National Electronic Injury Surveillance System (NEISS). NEISS is a nationwide system which gathers information on patient hospital visits in the United States. It provides details on the activities (including sports) that caused the injuries and classifies the consumer products involved. The sport-specific injury rates are calculated as the total annual hospital visits for injuries related to a specific sport divided by the total number of participants aged 25 to 85 in that sport for the same year. We obtain the participation data from the U.S. Census Bureau's Statistical Compendia Branch, as it provides annual statistics on recreational sports participation across various age groups. We measure the risk associated with each sport from 2001 to 2009 by calculating the ratio of total injuries to total participation. This ratio is then interpolated across the entire sample period. Our computation of the sport risk starts in 2001 due to a major change in NEISS data collection methods in 2000 and concludes in 2009, which aligns with the termination of the Statistical Compendia program by the Census Bureau in 2011, with a two-year data lag.

$$\beta_8 Corr\_CashInvestment_{it} + \beta_9 ConvertibleDebt_{it} + \beta_{10} PreferredStock_{it} + \beta_{11} NO\_BusiSeg_{it} + \beta_{12} Ln\_EquityHodings_{it} + \beta_{13} CEO\ Duality_{it} + \beta_{14} CorGov\_Score_{it} + \sum Industry\ dummies + \sum Year\ dummies + e_{it}$$

In the model, the dependent variable *Derivative* is calculated as the notional amount of derivatives divided by total assets (Choi et al. 2015). The notional amount of derivatives is a reasonable measurement of hedging activities because it represents the total value of an underlying asset at its spot price and provides the basis for calculating the amounts needed to be exchanged among parties of the derivatives (Barton 2001). Our main variable of interest is *SportsRisk*, for which we predict the coefficient *(β1)* to be significantly negative. A negative coefficient for *β1* suggests that firms run by CEOs who participate in risky sports hobbies use fewer derivatives.

With regard to the control variables, we follow prior studies (e.g., Huang, Huang and Zhang 2019) and include the following variables in the regression: Foreign Sales (*ForeignSale*), Size (*Size*), Tax loss carryforwards (*NOL*), Leverage (*Leverage*), Cash Ratio (*CashRatio*), Payout Ratio (*PayoutRatio*), Correlaltion between firm's cash flow from operations and industry median R&D (*Corr_CashInvestment*), Covertible Debt (*ConvertibleDebt*), Preferred Stock (*PreferredStock*), Number of business segments (*NO_BusiSeg*), CEO equity holdings (*Log_Equityholdings*), CEO duality (*CEO_Duality*), KLD's corporate governance score (*CorGov_Score*). Detailed definitions for these variables are in the Appendix.

Table 2 reports the summary statistics of our sample. First, Panel A provides descriptive statistics of variables used in our baseline regressions. The mean (median) values of *Derivative* are 0.082 (0.046), similar to the derivative ratios reported in Choi et al. (2015). The average injury rate of CEOs' hobby sports *(SportsRisk*) has a mean (median) of 0.216 (0.110), with 0.035at the 25th percentile and 0.291 at the 75th percentile, suggesting that our sample CEOs participate in a range of sports with varying levels of risk. The descriptive statistics of other

firm characteristic variables are consistent with those reported in prior studies (e.g., Huang et al. 2019).

Panel B of Table 2 presents Pearson correlations for the variables used in our baseline regressions. Injury rate of CEOs' sports hobby (*SportsRisk*) is significantly and negatively correlated with *Derivative*, providing univariate support for our hypothesis.

[Insert Table 2 about here]

4. Empirical Results

4.1 Sports Risk and Derivative Usage

Table 3 reports the regression results of the effects of CEOs' sports risk on firm's derivative usage. Consistent with H1, we find a negative and significant coefficient on *SportsRisk*, suggesting that CEOs with riskier sports hobbies engage in less derivative hedging. In terms of the economic significance of the effect of CEOs' sports riskiness on firms' hedging activities, we find moving from CEOs in the 25th percentile of sports risk (0.035) to CEOs in the 75th percentile of sports risk (0.291) decreases firm's hedging (*Derivative*) from 0.091 to 0.078, representing a 16 percent decrease (0.013/0.078). Overall, we find the coefficients on *SportsRisk* are not only statistically significant, but also economically significant in explaining firms' hedging behavior.

With regard to the control variables, we find the coefficients of *ForeignSale*, and *Size* are positive and significant, suggesting firms with higher foreign sales and larger size engage in more derivative hedging. This is consistent with the view that firms with foreign sales face greater exposure to foreign exchange rate movements thus are likely to hedge more extensively. And firms with larger scales tend to hedge more. The coefficient on *CashRatio*, *ConvertibleDebt* and *PreferredStock* are negative and significant, suggesting firms with higher cash, more convertible debt and more preferred stock engage in less hedging. This is because firms with higher cash ratios have greater ability to meet their short-term obligations thus

having less incentive to hedge. Convertible debt and preferred stock may potentially mitigate conflicts of interest between stockholders and bondholders, which in turn, reduce a firm's incentive to hedge.

[Insert Table 3 about here]

4.2 Endogeneity Bias

Self-Selection bias

Our baseline results may suffer from self-selection bias as CEOs who choose to voluntarily and publicly disclose their sports hobby may be different from those who do not. To address the self-selection bias, we employ a Heckman two-stage regression model which corrects for non-random selection. In the first stage, we estimate the probability of a CEO disclosing his/her sports hobby. We incorporate a set of biographical characteristics of CEOs into the model because prior study suggests that managers have capital and labor market incentives to manage their reputation and strategically disclose their information to the public (e.g., Gow et al. 2018). Specifically, we control for the extent a CEO publicizes his personal information (Publicity), CEO age (Ln_Age), and gender (Male). We also include several firm-level factors that may influence voluntary financial disclosures (e.g., Ajinkya et al. 2005; Feng et al. 2009) such as firm size (Ln_MV), capital market information demands (Ln_Analyst), whether a firm operate in a litigious industry (Litigation), firms' growth opportunities (MTB), profitability (LOSS), whether firm performance exceeds market expectations (News), earnings volatility (EarnVol), market risk (Beta), and whether the firm-year observation falls within the post-Regulation FD period (FD). Publicity is used as the instrumental variable in our first-stage regression. We measure Publicity as the total number of Google search results for each CEO's biographical information. We hypothesize that CEOs who are more inclined to publicize their personal information are also more likely to disclose their sports hobbies. However, a CEO's propensity to reveal more personal information publicly is not directly related to their decision

on corporate derivative usage. Thus, Publicity meets the criteria for being an exclusion variable in the two-stage Heckman model. We then incorporate the inverse Mills ratio into the second stage to investigate the effect of *SportsRisk* on corpoarte derivative usage.

Results are presented in Table 4. The dependent variable in Panel A of Table 4 is *Dummy_Sports,* an indicator variable that equals 1 if we have the CEO's sports hobby information and equals 0 otherwise. Consistent with our expectation that a CEO who is more visible in the public domain is more likely to disclose his sports hobby information in public, we find the coefficients on *Ln_Publicity* to be positive and significant. Importantly, Panel B of Table 4 shows that after including the inverse Mills ratio (*IMR*) generated from the first stage, the coefficients on *SportRisk* remain negative and significant in the second stage regression, suggesting our results remain robust after addressing the sample selection issue in the model.

[Insert Table 4 about here]

Omitted Variable Bias

We employ Oster (2019) test to assess the susceptibility of our results to omitted variable bias. The method estimates the degree of selection on unobservables, relative to the selection on observables, necessary to overturn our results. The Oster (2019) test assumes that the R-squared can be improved 1.3 times if the unobserved variables are included in the regressions. That is, the maximum attainable R-squared (Rmax) is set to 1.3 times the R-squared obtained from the main regression including observable variables.

In Table 5, the first column reproduces our baseline estimates. The second column presents the Oster delta, indicating how significant unobservables must be relative to observables to overturn our results. An absolute value of Oster delta greater than 1 indicates the stability of the coefficient of interest. The Oster delta in our test is –87.9, implying that the effect of the unobservables would have to be more than 87.9 times stronger than the effect of

the observables and in the opposite direction to obtain a zero estimate. Given the results, it is unlikely that our primary findings are driven by omitted unobservables.

[Insert Table 5 about here]

4.3 Incentive and Power

Our baseline results suggest that firms led by CEOs with risky sports hobbies are less likely to engage in derivative hedging. We suggest that the likelihood of a CEO implementing a corporate policy is influenced by their attitude, the incentives they have, and their power within the firm. "Attitude" refers to a CEO's natural tendency to justify engaging in certain behaviors. Our CEOs' preference for risky sports aligns with the attitude dimension, showing that these CEOs may have a natural inclination to take risks in business decisions. 'Incentive' refers to the context-specific drivers that motivate an individual to carry out a policy, such as financial benefits or the avoidance of personal losses. 'Power' refers to the CEO's capacity within a firm to surmount opposition from other parties when implementing firm policies that are in line with their own preferences.

We anticipate that a CEO's incentives and power might influence how their personal risk-taking attitude relates to the company's hedging practices. We expect that the extent of influence that CEO sports risk has on a firm's hedging policy is affected by CEOs' shareholding in the firm. Managerial wealth invested in a firm's equity can exacerbate managerial risk aversion (Tufano 1996; Haushalter 2000). Because equity compensation reduces the diversification of the executive's portfolio, we expect that CEOs with higher shareholdings of the firm have higher incentives to hedge. Thus, the relationship between CEO sports risk and hedging policy would be less pronounced for CEOs with higher equity holdings tied to the firm.

To test the impact of CEO shareholding on the relationship between CEO sports risk and derivative usage, we follow Huang et al. (2019) and use percentage of outstanding shareholding held by the CEO to proxy for CEO's incentive to hedge. We partition our sample

into two subgroups using the median value of CEO shareholding, denoted by Shareholding. A CEO is classified as *High Shareholding* (*Low Shareholding*) if his shareholding is greater than (equal to or less than) the median shareholding.

The regression results in Table 6 support our prediction. We find that the negative and significant association between *SportsRisk* and firms' hedging is present in the subsample with lower CEO shareholding. In contrast, the corresponding coefficients are statistically insignificant and in smaller magnitude for the high CEO shareholding subsample. The results suggest that with less wealth tied to the firm, the effect of CEO's risk attitude has a higher effect on the corporate hedging policy.

[Insert Table 6 about here]

We also consider the impact of CEO power on the effect of CEO sports risk and firms' hedging policy. We expect that more powerful CEOs can more easily push through policies that match their own risk preferences. Therefore, we expect that the effect of CEO sports risk on firms' derivative usage will be stronger when the CEO is more powerful.

To test this, we use the CEO's pay slice as a measure of their power, using a method from Bebchuk et al. (2011) and Feng et al. (2011)[6]. We partition our sample into two subgroups using the median value of pay slice, denoted *POWER*. A CEO is classified as *High Power* (*Low Power*) if his pay slice is greater than (equal to or less than) the median pay slice.

Table 7 presents the regression results for both subgroups. Consistent with our prediction, we find that the association between *SportsRisk* and firms' derivative usage is negative and significant in the subsample with greater CEO power. In contrast, the

[6] Pay slice is calculated based on the percentage of total pay, including salary, bonus, other annual pay, and total value of restricted stock granted, the Black-Scholes value of stock option granted, long-term incentive payouts, and all other total compensation for a CEO, over the entire top five paid executives in a firm. In cases where less than five executives' compensation is disclosed, we follow prior studies (Feng et al. 2011) and adjust the aggregated total pay for the five top-paid executives in the firm. For example, if a firm discloses compensation information for only four executives, we assume the total pay of the fifth executive is the same as the fourth one.

corresponding coefficients are statistically insignificant and in smaller magnitude for the low CEO power subsample (*Low Power*).

[Insert Table 7 about here]

4.4 Hedging Derivatives versus Non-Hedging Derivatives

While derivatives serve as effective and efficient instruments for corporate hedging, there is evidence that derivatives can also be used for non-hedging purposes, such as speculation. Derivatives used for hedging purposes intend to reduce firm's exposure to risks whereas derivatives used for speculative purposes are might be associated with higher risk (Bartram, 2019). Although derivatives used for hedging purpose constitute the main portion of total derivatives, to eliminate the influence of non-hedging derivatives on our baseline results, we utilize SFAS 133 to distinguish hedging and non-hedging derivatives.

Under SFAS 133, derivatives can be designated as either hedging or non-hedging derivatives. Hedging derivatives are those expected to be highly effective in mitigating identified risks, whereas non-hedging derivatives are not designated to or cannot effectively mitigate identified risks. However, some firms did not voluntarily disclose the accounting designations of derivatives until the implementation of SFAS 161 in November 2008, which mandated such disclosures. To investigate the effect of CEO sports hobbies on the usage of hedging and non-hedging derivatives, we hand-collect the notional amount of hedging derivatives and non-hedging derivatives separately in the post-SFAS 161 period (2009 to 2016) and re-estimate the baseline regressions.

Table 8 presents the results. We find the association between *SportsRisk* and hedging derivatives is significant and negative, while the association between *SportsRisk* and non-hedging derivatives is insignificant. These results suggest that CEOs with risky sports hobbies tend to use fewer hedging derivatives, which may reflect a higher risk tolerance. Importantly, we find no significant relationship between the riskiness of sports hobbies and the usage of non-hedging derivatives, indicating that our baseline results on the negative relation between

SportsRisk and derivatives is mainly driven by hedging derivatives, not non-hedging derivatives, further support our hypothesis.

[Insert Table 8 about here]

4.5 Robustness Tests

Controlling for CEOs' incentives and personal characteristics variables

Prior research has documented that firms' hedging policies are associated with executive compensation structure, particularly with equity risk incentives of top executives. Equity risk incentives capture the convexity of the relation between a manager's personal wealth and firms' stock price and motivate managers to take risky operational, investment, and financial decisions (e.g., Guay 1999; Rajgopal and Shevlin 2002). Following prior studies, we measure CEOs' equity incentives based on the changes in the value of a manager's stock option portfolio for a given change in stock price or stock return volatility (Guay 1999), labeled *Delta* and *Vega,* respectively. Studies find that firms tend to hedge less with higher vega (e.g., Knopf et al. 2002; Bakke et al. 2016), and hedge more with higher delta (Knopf et al. 2002). We include these two variables as additional controls in our regression models. We also include other CEO personal characteristics that may potentially affect firm's hedging policies, including military experience, CEO age and CEO tenure.

Results in Table 9 show that our main variable of interest, *SportsRisk,* remains negative and significant. The result suggests that innate CEO risk preferences play an important role in corporate hedging policies, in addition to compensation incentives and other personal characteristics.

[Insert Table 9 about here]

CEO Overconfidence

It is possible that the *SportsRisk* measure is a reflection of CEO overconfidence, as overconfident CEOs may underestimate risk and participate in more risky sports, as well as

engage in less derivative hedging. Following Schrand and Zechman (2012) and Jia et al. (2014), we construct two CEO overconfidence measures, *OC_OPTIONS* and *OC_FIRM*, and include them as additional controls to examine whether CEO sports risk has incremental explanatory power beyond the effect of CEO overconfidence on firms' derivative usage. Results in Table 10 reveal that the negative and significant effect of *SportsRisk* on firm hedging policy continues to hold after controlling for the effect of CEO overconfidence.

[Insert Table 10 about here]

Alternative Sports Risk Measures and Including Spectator Sports

We construct an alternative measure for a CEO's risk preference and re-run our main analysis. We use the mean value of the injury rates across all of a CEO's sports hobbies (*SportsRisk_Average*) to capture the CEO's overall risk attitude. Results in Table 11 reveal that our primary results are robust to the alternative measure of CEO sports risk.

Our results so far excluded CEOs who disclosed spectator sports as hobbies to address the concern that CEOs may claim spectator sports as hobbies because he simply enjoys watching rather than participating the sports. Table 12 reveals that our results hold for the sample including CEOs disclosing spectator sports as hobbies as well.

[Insert Table 11 about here]

[Insert Table 12 about here]

Derivative and Firm Value: Agency Cost and CEO Sports Risk

The undiversified wealth portfolios and firm-specific human capital make CEOs risk averse, leading to an agency problem that CEOs might be inclined to hedge more than shareholders would prefer, which is potentially value-decreasing. This is consistent with the findings in Fauver and Naranjo (2010), who document that derivative usage decreases firm value in firms with high agency cost. Specifically, Fauver and Naranjo (2010) find a negative

and significant coefficient of an interaction term between derivative usage and agency cost in a regression where Tobin's Q is the dependent variable. We therefore predict that if the CEO's intrinsic motivation – risk seeking attitude is effective in curbing excessive hedging, the negative impact of derivative usage on firm value due to agency costs will be alleviated when CEOs' risk attitude is more aligned with shareholders, i.e., when CEOs are less risk averse.

To test the impact of CEO risk attitude on the relationship between derivate, agency cost and firm value, we follow the idea of Fauver and Naranjo (2010)'s model. We first test the influence of agency cost on the relation between derivatives and firm value. Consistent with Fauver and Naranjo (2010)'s findings, in the Column 1 of Table 13, we find that the coefficient of the interaction term, *Derivative * Agency Cost*, is negative and significant, suggesting that derivative usage coupled with high agency costs reduces firm value. We then partition our sample into two subgroups using the median value of CEO *SportsRisk*. A CEO is classified as *High SportsRisk* if his *SportsRisk* is greater than (equal to or less than) the median *SportsRisk*. We measure the agency cost as the negative value of KLD's corporate governance score. The results in Column 2 and Column 3 of Table 13 support our prediction. We find that the negative and significant coefficient on *Derivative * Agency* Cost is present in the subsample with lower CEO *SportsRisk*. In contrast, the corresponding coefficient is positive for the high CEO *SportsRisk* subsample. The results suggest that less risk averse CEOs alleviate the agency cost, therefore contribute to firm value through engaging less in excessive hedging.

[Insert Table 13 about here]

5. Conclusion

In this study, we use CEOs' revealed preference for risky sports as a hobby to proxy for CEO's risk attitude. We find that firms led by CEOs with risky sports hobbies hedge less. While risk-taking incentives induced by executive compensation may induce less hedging, our study provides empirical support for the importance of managerial intrinsic motivation in curbing

excessive hedging that might be not in the best interest of shareholders. The study sheds light on CEOs' preferences for risk-taking based on their sports hobbies and provides board of directors some ex-ante measures to evaluate future CEO candidates' potential risk-taking preference, ultimately leading to more informed corporate decisions.

Some caveats and limitations are in place in our study. First, our sample selection process tends to identify larger firms. Thus, we caution readers in generalizing our results to the broader population of U.S. firms and their CEOs. Second, while our research highlight risk seeking CEOs engage in less hedging and therefore may alleviate the agency problem, we do not argue that risk seeking CEOs are overall good managers. More research is needed to understand situations where CEOs with risk sports hobbies may be detrimental to firm value.

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Appendix

Variables	Definitions
Dependent Variable	
Derivative	The notional amount of derivatives scaled by total assets.
CEO Sports Risks	
SportsRisk	Maximum of the injury rates of the sports hobbies for a CEO. Sports injury rate is measured as the injury number of this particular sports reported by NEISS divided by the total number of participants of the sport aged 25-85 based on the statistics from the U.S. Census Bureau's Statistical Compendia Branch. As the numerator and the denominator in calculating *SPORTS_RISK* come from two difference sources with the participation data based on survey sample, the value of the measure is not bounded between [0,1].
SportsRisk_Average	Average of the injury rates of the sports hobbies for a CEO.
Control variables	
ForeignSale	Foreign sales scaled by total sales.
Size	Natural logarithm of total assets.
NOL	Tax loss carryforwards normalized by total assets.
Leverage	Total debt scaled by total assets.
CashRatio	Cash and cash equivalents deflated by current liabilities.
PayoutRatio	Total cash dividends scaled by total assets.
Corr_CashInvestment	Correlation between the firm's cash flow from operations and its industry-level median research and development expenditures based on the firm's two-digit SIC code over the past six years.
ConvertibleDebt	Values of convertible debt scaled by total assets.
PreferredStock	Value of preferred stock scaled by total assets.
NO_BusiSeg	Natural logarithm of Number of business segments.
Log_Equityholdings	Natural logarithm of CEO's equity holdings in the firm.
CEO_Duality	An indicator variable equals to one if the CEO is also the chair of the board, zero otherwise.
CorGov_Score	KLD's corporate governance score, i.e., the net value of KLD's strength and concern scores in many aspects of corporate governance attributes, such as executive and director compensation, ownership structure, transparency, political account- ability, and firm culture.
Other variables	
CEO Shareholding	The percentage of outstanding shares held by the CEO.
CEO Power	CEO Power is the pay slice of the CEO's total compensation over the five top paid executives in a firm. The total compensation includes salary, bonus, other annual pay, and the total value of restricted stock granted, the Black-Scholes value of stock option granted, long-term incentive payouts, and all other total compensation for a CEO. In cases where fewer than five executives' compensation is disclosed,

	we follow Feng et al. (2011) and adjust the aggregated total pay for the five top-paid executives in the firm. For example, if a firm discloses compensation information for only four executives, we assume the total pay of the fifth executive is the same as the fourth one.
Ln_CEO_Tenure	Natural logarithm of the CEO's tenure in the firm (in years).
Ln_Age	Natural logarithm of the CEO's current age (in years).
Ln_Delta	Natural logarithm of 1 plus the expected dollar change in the CEO's equity portfolio for a 1 percent change in the share price of the firm, calculated based on the Prof. Lalitha Naveen's website.
Ln_Vega	Natural logarithm of 1 plus expected dollar change in the CEO's equity portfolio based on a 1 percent change in the volatility of the firm's stock price, calculated based on the Prof. Lalitha Naveen's website.
Military_Experience	An indicator variable that equals 1 if the CEO has previous military experience based on Who's Who search results, and 0 otherwise.
OC_options	An indicator variable that equals 1 if the in-the-money unexercised exercisable options held by a CEO are greater than the industry median, and 0 otherwise.
OC_firm	An indicator variable that equals 1 if a CEO is categorized as being overconfident, and 0 otherwise. A CEO is overconfident if his/her firm meets the requirements of at least two of the following four criteria: (1) AD_XSINVEST > 0, where AD_XSINVEST is the residual from a regression of total asset growth on sales growth, adjusted for the industry median; (2) AD_ACQUIRE>0, where AD_ACQUIRE is the net acquisitions from the statement of cash flows, adjusted by the industry median; (3) AD_DERATIO>0, where AD_DERATIO is the debt-to-equity ratio defined as long-term debt plus short-term debt, scaled by the total market value of the firm adjusted by the industry median; and (4) RISKYDT = 0, where RISKYDT is an indicator variable that equals 1 if either convertible debt or preferred stock is greater than 0; and 0 otherwise.

Table 1: Sample Selection Procedure

Sampling Procedure	N
CEO-level sample	
(1a) CEOs disclosed sports hobby of S&P 500 companies from 2002 to 2016	295
(2a) CEOs with spectator sports hobbies	(18)
Final Sample with CEO sports information ((1a) - (2a))	277
Firm-year level sample	
(1b) Total firm-year observations from 2002 to 2016	1383
(2b) Missing data for variables required in the regression	(540)
Final firm-year observations ((1b)–(2b))	843

This table reports sample selection procedures that result in a final sample of 843 firm-year observations and sample period from 2002 to 2016.

Table 2: Descriptive Statistics

Panel A: Summary Statistics for Selected Regression Variables

Variables	Observations	Mean	Std.	Q1	Median	Q3
Derivative	843	0.082	0.108	0.004	0.046	0.114
SportsRisk	843	0.216	0.304	0.035	0.110	0.291
ForeignSale	843	0.357	0.265	0.092	0.347	0.564
Size	843	9.618	1.184	8.622	9.657	10.440
NOL	843	0.056	0.115	0.000	0.012	0.059
Leverage	843	0.259	0.172	0.146	0.232	0.336
CashRatio	843	0.346	0.226	0.164	0.290	0.518
PayoutRatio	843	0.024	0.025	0.004	0.018	0.036
Corr_CashInvestment	843	0.103	0.427	0.000	0.000	0.368
ConvertibleDebt	843	0.010	0.039	0.000	0.000	0.000
PreferredStock	843	0.002	0.010	0.000	0.000	0.000
NO_BusiSeg	843	9.415	6.284	3.000	9.000	15.000
Ln_Equityholdings	843	10.511	1.702	9.431	10.464	11.309
CEO_Duality	843	0.553	0.498	0.000	1.000	1.000
CorGov_Score	843	-0.260	0.663	-1.000	0.000	0.000

This table reports descriptive statistics of the variables in the main regression. Definitions of these variables are provided in the Appendix.

Panel B: Pearson Correlations for Selected Regression Variables

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1)	Derivative	**1.00**														
(2)	SportsRisk	**-0.07**	**1.00**													
(3)	ForeignSale	**0.27**	**0.07**	1.00												
(4)	Size	0.02	**0.18**	**-0.15**	1.00											
(5)	NOL	**-0.06**	-0.02	**0.17**	**-0.19**	1.00										
(6)	Leverage	0.02	**0.03**	**-0.24**	**0.11**	**-0.03**	1.00									
(7)	CashRatio	**0.04**	**0.16**	**0.44**	**-0.08**	**0.10**	**-0.27**	1.00								
(8)	PayoutRatio	**0.20**	**0.09**	**0.11**	**0.04**	**-0.21**	**0.30**	**-0.03**	1.00							
(9)	Corr_CashInvestment	**0.07**	**0.03**	**0.23**	**-0.05**	-0.02	**-0.13**	**0.13**	**0.03**	1.00						
(10)	ConvertibleDebt	**-0.07**	**-0.08**	**0.07**	**-0.17**	**0.21**	**0.05**	**0.16**	**-0.18**	**0.03**	1.00					
(11)	PreferredStock	**-0.06**	**-0.04**	-0.01	0.00	0.01	**0.03**	0.02	**-0.08**	0.00	0.00	1.00				
(12)	NO_BusiSeg	**-0.18**	**-0.12**	**0.03**	**0.25**	-0.01	**-0.07**	**-0.06**	**-0.13**	0.00	**-0.04**	**0.04**	1.00			
(13)	Ln_Equityholdings	**-0.03**	**0.08**	**0.03**	**0.32**	-0.01	**-0.13**	**0.11**	**-0.04**	-0.01	**-0.03**	**-0.06**	**0.10**	1.00		
(14)	CEO_Duality	**-0.07**	0.02	**-0.19**	**0.26**	**-0.11**	**0.09**	**-0.22**	**0.15**	0.01	**-0.03**	**0.06**	**0.08**	**0.19**	1.00	
(15)	CorGov_Score	**0.16**	0.01	**0.04**	**0.17**	**-0.08**	**0.11**	-0.01	**0.18**	**-0.03**	**-0.14**	**-0.05**	**-0.09**	**0.04**	**-0.03**	1.00

This table reports the Pearson correlations for the variables used in the main regression. Numbers in bold represent statistical significance at the $p < 0.10$ level. Variable definitions are in the Appendix.

Table 3: The Effect of CEO Sports Hobbies Risk on Firms' Hedging

Independent variables	*Derivative* OLS	*Derivative TOBIT*
SportsRisk	-0.048**	-0.048**
	(-2.083)	(-2.162)
ForeignSale	0.071*	0.071*
	(1.662)	(1.724)
Size	0.015*	0.015*
	(1.741)	(1.807)
NOL	-0.057	-0.057
	(-1.279)	(-1.327)
Leverage	-0.047	-0.047
	(-1.068)	(-1.108)
CashRatio	-0.087**	-0.087**
	(-2.380)	(-2.470)
PayoutRatio	0.388	0.388
	(0.869)	(0.902)
Corr_CashInvestment	0.009	0.009
	(0.700)	(0.727)
ConvertibleDebt	-0.032***	-0.032***
	(-3.460)	(-3.590)
PreferredStock	-0.160**	-0.160**
	(-2.022)	(-2.098)
NO_BusiSeg	-0.251	-0.251
	(-0.667)	(-0.692)
Ln_Equityholdings	-0.005	-0.005
	(-1.072)	(-1.112)
CEO_Duality	-0.006	-0.006
	(-0.395)	(-0.410)
CorGov_Score	0.009	0.009
	(1.316)	(1.366)
Intercept	0.143*	0.143**
	(1.892)	(1.963)
Industry and Year fixed effects	yes	yes
Observations	843	843
Pseudo/adjusted R^2	0.312	-0.277

This table presents regression results on the association between CEOs' sports risk (*SportsRisk*) and firms' hedging (*Derivative*). Variable definitions are in the Appendix. Two-tailed t-statistics are in parentheses based on standard deviations of the coefficient estimates clustered at the firm level. ***, **, * denote statistical significance at the $p < 0.01$, $p < 0.05$, and $p < 0.10$ levels, respectively.

Table 4: Sample Selection Bias

Panel A: Predicting the Likelihood that a CEO Discloses a Sports Hobby

First stage regression	*Dummy_Sports*
Ln_Publicity	0.094***
	(11.078)
Ln_Age	-1.177***
	(-5.428)
Male	0.180
	(1.270)
Ln_MV	0.229***
	(9.547)
Ln_Analyst	0.002
	(0.023)
Litigation	-0.497***
	(-5.487)
MTB	-0.001
	(-0.912)
LOSS	-0.033
	(-0.352)
News	0.000
	(0.000)
EarnVol	0.279
	(0.177)
Beta	0.176***
	(4.465)
FD	-0.493**
	(-2.167)
Intercept	0.158
	(0.178)
Year fixed effects	yes
Observations	4,364

Panel B: Controlling for Self – Selection Bias

Second Stage Regression	*Derivative*
SportsRisk	-0.040***
	(-3.065)
ForeignSale	0.070***
	(3.405)
Size	0.011**
	(2.440)
NOL	-0.058*
	(-1.897)
Leverage	-0.043
	(-1.570)
CashRatio	-0.105***
	(-5.307)
PayoutRatio	0.183
	(0.933)
Corr_CashInvestment	-0.001
	(-0.154)
ConvertibleDebt	-0.036***
	(-6.753)
PreferredStock	-0.168*
	(-1.912)
NO_BusiSeg	-0.117
	(-0.336)
Ln_Equityholdings	-0.008***
	(-3.099)
CEO_Duality	-0.000
	(-0.036)
CorGov_Score	0.010*
	(1.786)
IMR	-0.044***
	(-2.905)
Intercept	0.273***
	(4.177)
Industry and Year fixed effects	Yes
Observations	787
Pseudo/adjusted R^2	0.3414

This table reports the results of the Heckman two-stage regressions. The dependent variable in the first stage is *Dummy_Sports*, an indicator variable that equals 1 if we have the CEO sports information included in our main analyses and equals 0 otherwise. The dependent variables in the second stage are the measure for hedging behavior. IMR is the inverse Mills ratio generated from the first stage regression. Definitions of all other variables are in the Appendix. Two-tailed t statistics are in parentheses based on standard deviations of the coefficient estimates clustered at the firm level. ***, **, * denote statistical significance at the $p < 0.01$, $p < 0.05$, and $p < 0.10$ levels, respectively.

Table 5: Robustness to omitted variable bias

Dependent Variables	Controlled effect	Delta (Rmax=1.3R)
SportsRisk	-0.048**	-87.9
Baseline controls	Yes	Yes
Industry and year fixed effect	Yes	Yes
Excluded zero		

The table shows the results of Oster (2019) test. Delta indicates how much larger the selection on unobservables would have to be, compared to the selection on observables, for the coefficient of interest to be zero. ***, **, * denote statistical significance at the $p < 0.01$, $p < 0.05$, and $p < 0.10$ levels, respectively.

Table 6: The Effect of CEO Sports Hobbies Risk on Firms' Hedging – CEO Shareholding

Independent variables	*Derivative*	
	High Shareholding	*Low Shareholding*
SportsRisk	-0.019	-0.080*
	(-0.433)	(-1.872)
ForeignSale	0.185***	0.019
	(2.674)	(0.251)
Size	0.013	0.022**
	(0.775)	(2.036)
NOL	-0.079	-0.043
	(-1.159)	(-0.506)
Leverage	-0.048	-0.037
	(-0.878)	(-0.601)
CashRatio	-0.178***	0.013
	(-3.482)	(0.229)
PayoutRatio	-0.245	0.582
	(-0.254)	(1.478)
Corr_CashInvestment	-0.020	0.013
	(-1.054)	(0.479)
ConvertibleDebt	-0.059***	-0.016
	(-2.771)	(-1.268)
PreferredStock	-0.114	-0.241
	(-0.660)	(-1.169)
NO_BusiSeg	0.515	-0.000
	(1.083)	(-0.000)
Ln_Equityholdings	-0.005	-0.060
	(-1.172)	(-0.524)
CEO_Duality	0.016	-0.019
	(0.753)	(-0.785)
CorGov_Score	0.004	-0.004
	(0.231)	(-0.360)
Intercept	0.094	0.464***
	(0.616)	(3.021)
Industry and Year fixed effects	yes	yes
Observations	293	290
Pseudo/adjusted R^2	0.330	0.477
Coefficient Difference	0.024	

This table presents regression results on the association between CEOs' sports risk (*SportsRisk*) and firms' hedging behavior (*Derivative*), after partitioning the sample into firms with CEOs of high shareholding and low shareholding. Variable definitions are in the Appendix. Two-tailed t statistics are in parentheses based on standard deviations of the coefficient estimates clustered at the firm level. ***, **, * denote statistical significance at the $p < 0.01$, $p < 0.05$, and $p < 0.10$ levels, respectively.

Table 7: The Effect of CEO Sports Hobbies Risk on Firms' Hedging – CEO Power

Independent variables	*Derivative*	
	High Power	*Low Power*
SportsRisk	-0.101***	-0.006
	(-2.665)	(-0.248)
ForeignSale	0.111**	-0.005
	(2.126)	(-0.119)
Size	0.023*	0.019**
	(1.897)	(2.110)
NOL	-0.067	-0.035
	(-0.943)	(-0.915)
Leverage	-0.062	0.004
	(-1.061)	(0.102)
CashRatio	-0.048	-0.143***
	(-1.133)	(-3.697)
PayoutRatio	0.853	-0.258
	(1.471)	(-0.694)
Corr_CashInvestment	0.003	0.008
	(0.123)	(0.617)
ConvertibleDebt	-0.037***	-0.023***
	(-3.072)	(-2.794)
PreferredStock	-0.257	-0.139
	(-1.644)	(-1.408)
NO_BusiSeg	-0.551	-0.174
	(-1.077)	(-0.434)
Ln_Equityholdings	-0.007	-0.003
	(-0.809)	(-0.992)
CEO_Duality	0.004	-0.017
	(0.153)	(-1.253)
CorGov_Score	0.001	0.010*
	(0.108)	(1.672)
Intercept	0.085	0.099
	(0.757)	(1.254)
Industry and Year fixed effects	yes	yes
Observations	422	421
Pseudo/adjusted R^2	0.373	0.398
Coefficient Difference	P value = 0.0151	

This table presents regression results on the association between CEOs' sports risk (*SportsRisk*) and firms' hedging behavior (*Derivative*), after partitioning the sample into firms with CEOs of high power and low power. Variable definitions are in the Appendix. Two-tailed t statistics are in parentheses based on standard deviations of the coefficient estimates clustered at the firm level. ***, **, * denote statistical significance at the $p < 0.01$, $p < 0.05$, and $p < 0.10$ levels, respectively.

Table 8: Hedging Derivative versus Non-Hedging Derivative

Independent variables	*Hedging Derivatives*		*Non-Hedging Derivatives*	
	OLS	*TOBIT*	*OLS*	*TOBIT*
SportsRisk	**-0.063****	**-0.063*****	**-0.015**	**-0.015**
	(-2.575)	**(-2.703)**	**(-0.813)**	**(-0.854)**
ForeignSale	0.039	0.039	0.041	0.041
	(0.948)	(0.995)	(1.461)	(1.533)
Size	0.021**	0.021**	0.008*	0.008*
	(2.138)	(2.244)	(1.833)	(1.924)
NOL	-0.017	-0.017	-0.058**	-0.058**
	(-0.277)	(-0.291)	(-2.163)	(-2.271)
Leverage	-0.047	-0.047	0.029	0.029
	(-0.982)	(-1.031)	(1.059)	(1.112)
CashRatio	-0.018	-0.018	-0.077***	-0.077***
	(-0.559)	(-0.587)	(-2.677)	(-2.810)
PayoutRatio	0.708	0.708*	-0.074	-0.074
	(1.630)	(1.711)	(-0.329)	(-0.346)
Corr_CashInvestment	0.028**	0.028**	0.005	0.005
	(2.422)	(2.543)	(0.655)	(0.687)
ConvertibleDebt	-0.023**	-0.023**	-0.017**	-0.017**
	(-2.380)	(-2.498)	(-2.334)	(-2.450)
PreferredStock	-0.072	-0.072	0.143	0.143
	(-0.549)	(-0.576)	(0.835)	(0.876)
NO_BusiSeg	0.628	0.628	0.065	0.065
	(1.393)	(1.462)	(0.407)	(0.427)
Ln_Equityholdings	0.001	0.001	-0.006	-0.006
	(0.310)	(0.325)	(-1.317)	(-1.383)
CEO_Duality	-0.008	-0.008	0.001	0.001
	(-0.475)	(-0.499)	(0.143)	(0.150)
CorGov_Score	0.001	0.001	0.002	0.002
	(0.108)	(0.114)	(0.288)	(0.302)
Intercept	-0.053	-0.053	0.117*	0.117**
	(-0.573)	(-0.602)	(1.963)	(2.060)
Industry and Year fixed effects	yes	yes	yes	yes
Observations	563	563	563	563
Pseudo/adjusted R^2	0.417	-0.383	0.226	-0.113

This table presents the regression results on the effect of CEOs' sports risk (*SportsRisk*) on firms' use of hedging and non-hedging derivatives. Variable definitions are in the Appendix. Two-tailed t statistics are in parentheses based on standard deviations of the coefficient estimates clustered at the firm level. ***, **, * denote statistical significance at the $p < 0.01$, $p < 0.05$, and $p < 0.10$ levels, respectively.

Table 9: Including controls for CEO incentives, military experiences and duality

Independent variables	*Derivative* OLS	*Derivative TOBIT*
SportsRisk	-0.044*	-0.044*
	(-1.844)	(-1.931)
ForeignSale	0.065	0.065
	(1.356)	(1.420)
Size	0.022***	0.022***
	(2.831)	(2.965)
NOL	-0.065	-0.065
	(-1.429)	(-1.497)
Leverage	-0.061	-0.061
	(-1.362)	(-1.426)
CashRatio	-0.096**	-0.096***
	(-2.471)	(-2.588)
PayoutRatio	0.414	0.414
	(0.936)	(0.980)
Corr_CashInvestment	0.013	0.013
	(0.946)	(0.990)
ConvertibleDebt	-0.035***	-0.035***
	(-3.418)	(-3.579)
PreferredStock	-0.187**	-0.187**
	(-2.329)	(-2.439)
NO_BusiSeg	-0.708*	-0.708**
	(-1.963)	(-2.056)
Ln_Equityholdings	0.002	0.002
	(0.225)	(0.235)
CEO_Duality	-0.000	-0.000
	(-0.030)	(-0.031)
CorGov_Score	0.009	0.009
	(1.449)	(1.517)
Ln_CEO_Tenure	0.008	0.008
	(1.014)	(1.062)
Ln_Age	-0.062	-0.062
	(-1.067)	(-1.117)
Ln_Delta	-0.015	-0.015
	(-1.281)	(-1.341)
Ln_Vega	0.007*	0.007*
	(1.720)	(1.802)
Military_Experience	-0.052*	-0.052**
	(-1.897)	(-1.986)
Intercept	0.294	0.294
	(1.200)	(1.257)
Industry and Year fixed effects	yes	yes
Observations	725	725
Pseudo/adjusted R^2	0.370	-0.352

This table presents regression results on the association between CEOs' sports risk (*SportsRisk*) and firms' hedging (*Derivative*) incorporating additional control variables, including Ln_CEO_Tenure, Ln_Age, Delta, Vega and Military_Experience. Variable definitions are in the Appendix. Two-tailed t-statistics are in parentheses based on

standard deviations of the coefficient estimates clustered at the firm level. ***, **, * denote statistical significance at the $p < 0.01$, $p < 0.05$, and $p < 0.10$ levels, respectively.

Table 10: Sports Risk versus Overconfidence

Independent variables	*Derivative* OLS	*Derivative TOBIT*	*Derivative* OLS	*Derivative TOBIT*
SportsRisk	-0.047**	-0.047**	-0.048**	-0.048**
	(-2.055)	(-2.135)	(-2.131)	(-2.213)
OC_options	0.009	0.009		
	(0.679)	(0.705)		
OC_firm			0.011	0.011
			(1.377)	(1.430)
ForeignSale	0.072*	0.072*	0.070	0.070*
	(1.667)	(1.731)	(1.630)	(1.693)
Size	0.015*	0.015*	0.014*	0.014*
	(1.758)	(1.826)	(1.705)	(1.771)
NOL	-0.053	-0.053	-0.053	-0.053
	(-1.184)	(-1.230)	(-1.213)	(-1.260)
Leverage	-0.044	-0.044	-0.051	-0.051
	(-0.995)	(-1.033)	(-1.117)	(-1.160)
CashRatio	-0.086**	-0.086**	-0.087**	-0.087**
	(-2.336)	(-2.426)	(-2.412)	(-2.505)
PayoutRatio	0.407	0.407	0.427	0.427
	(0.896)	(0.930)	(0.940)	(0.976)
Corr_CashInvestment	0.009	0.009	0.010	0.010
	(0.656)	(0.681)	(0.719)	(0.747)
ConvertibleDebt	-0.032***	-0.032***	-0.032***	-0.032***
	(-3.464)	(-3.598)	(-3.411)	(-3.543)
PreferredStock	-0.157*	-0.157**	-0.190**	-0.190**
	(-1.970)	(-2.046)	(-2.435)	(-2.529)
NO_BusiSeg	-0.237	-0.237	-0.336	-0.336
	(-0.617)	(-0.641)	(-0.903)	(-0.937)
Ln_Equityholdings	-0.006	-0.006	-0.005	-0.005
	(-1.201)	(-1.247)	(-1.090)	(-1.132)
CEO_Duality	-0.006	-0.006	-0.005	-0.005
	(-0.396)	(-0.411)	(-0.340)	(-0.354)
CorGov_Score	0.009	0.009	0.009	0.009
	(1.362)	(1.414)	(1.353)	(1.405)
Intercept	0.140*	0.140*	0.145*	0.145**
	(1.819)	(1.889)	(1.927)	(2.001)
Industry and Year fixed effects	yes	yes	yes	yes
Observations	836	836	836	836
Pseudo/adjusted R^2	0.313	-0.280	0.314	-0.281

This table presents regression results on the association between CEOs' sports risk (*SportsRisk*) and firms' hedging (*Derivative*) incorporating measures for CEO overconfidence (OC_options, OC_firm). Variable definitions are in the Appendix. Two-tailed t-statistics are in parentheses based on standard deviations of the coefficient estimates clustered at the firm level. ***, **, * denote statistical significance at the $p < 0.01$, $p < 0.05$, and $p < 0.10$ levels, respectively.

Table 11: Alternative Measures of Sports Risk

Independent variables	*Derivative* OLS	*Derivative TOBIT*
SportsRisk_Average	-0.075***	-0.075***
	(-2.839)	(-2.946)
ForeignSale	0.075*	0.075*
	(1.795)	(1.863)
Size	0.015*	0.015*
	(1.803)	(1.871)
NOL	-0.052	-0.052
	(-1.174)	(-1.219)
Leverage	-0.046	-0.046
	(-1.062)	(-1.102)
CashRatio	-0.088**	-0.088**
	(-2.458)	(-2.550)
PayoutRatio	0.434	0.434
	(0.966)	(1.003)
Corr_CashInvestment	0.009	0.009
	(0.651)	(0.675)
ConvertibleDebt	-0.031***	-0.031***
	(-3.406)	(-3.534)
PreferredStock	-0.157*	-0.157**
	(-1.933)	(-2.006)
NO_BusiSeg	-0.233	-0.233
	(-0.621)	(-0.644)
Ln_Equityholdings	-0.005	-0.005
	(-1.263)	(-1.311)
CEO_Duality	-0.006	-0.006
	(-0.405)	(-0.420)
CorGov_Score	0.008	0.008
	(1.242)	(1.289)
Intercept	0.177**	0.177**
	(2.435)	(2.526)
Industry and Year fixed effects	yes	yes
Observations	843	843
Pseudo/adjusted R^2	0.319	-0.284

This table presents regression results on the association between CEOs' sports risk (*SportsRisk_Average*) and firms' hedging (*Derivative*) using alternative measure of CEO risk preference reflected by sports hobbies. Variable definitions are in the Appendix. Two-tailed t-statistics are in parentheses based on standard deviations of the coefficient estimates clustered at the firm level. ***, **, * denote statistical significance at the $p < 0.01$, $p < 0.05$, and $p < 0.10$ levels, respectively.

Table 12: The Effect of CEO Sports Hobbies Risk on Firms' Hedging

Independent variables	*Derivative* OLS	*Derivative* *TOBIT*
SportsRisk	-0.046**	-0.046**
	(-2.081)	(-2.155)
ForeignSale	0.063	0.063*
	(1.637)	(1.695)
Size	0.015*	0.015**
	(1.957)	(2.026)
NOL	-0.071	-0.071
	(-1.564)	(-1.619)
Leverage	-0.042	-0.042
	(-0.984)	(-1.019)
CashRatio	-0.087**	-0.087***
	(-2.559)	(-2.650)
PayoutRatio	0.523	0.523
	(1.368)	(1.417)
Corr_CashInvestment	0.011	0.011
	(0.893)	(0.924)
ConvertibleDebt	-0.027***	-0.027***
	(-3.121)	(-3.232)
PreferredStock	-0.115	-0.115
	(-1.557)	(-1.613)
NO_BusiSeg	-0.197	-0.197
	(-0.561)	(-0.581)
Ln_Equityholdings	-0.003	-0.003
	(-0.835)	(-0.865)
CEO_Duality	-0.010	-0.010
	(-0.782)	(-0.810)
CorGov_Score	0.011*	0.011*
	(1.849)	(1.915)
Intercept	0.118	0.118*
	(1.627)	(1.685)
Industry and Year fixed effects	yes	yes
Observations	921	921
Pseudo/adjusted R^2	0.312	-0.270

This table presents regression results on the association between CEOs' sports risk (*SportsRisk*) and firms' hedging (*Derivative*) including spectator sports. Variable definitions are in the Appendix. Two-tailed t-statistics are in parentheses based on standard deviations of the coefficient estimates clustered at the firm level. ***, **, * denote statistical significance at the $p < 0.01$, $p < 0.05$, and $p < 0.10$ levels, respectively.

Table 13: Derivative and Firm Value: Agency Cost and CEO Sports Hobbies Risk

Independent variables	Tobin's Q	Tobin's Q	
		High *SportsRisk*	Low *SportsRisk*
Derivative	0.009	-1.749	0.639
	(0.013)	(-1.557)	(0.831)
Agency Cost	-0.060	-0.090	0.021
	(-0.976)	(-0.755)	(0.280)
Derivative * Agency Cost	**-1.108****	**1.314**	**-1.815***
	(-2.052)	**(0.993)**	**(-1.805)**
Size	-0.134**	-0.020	-0.197**
	(-2.230)	(-0.235)	(-2.192)
LOSS	-0.239	-0.064	-0.288***
	(-1.496)	(-0.230)	(-2.740)
Leverage	-0.316	-0.063	-0.156
	(-1.096)	(-0.108)	(-0.473)
Dividend	0.181	0.030	0.249
	(1.054)	(0.098)	(1.090)
NO_BusiSeg	-0.172**	-0.334***	0.041
	(-2.065)	(-2.806)	(0.352)
Capex	3.263***	3.334***	2.966**
	(4.604)	(4.638)	(2.635)
Intercept	3.974***	3.324***	2.008*
	(6.704)	(4.821)	(1.924)
Industry and Year fixed effects	yes	yes	yes
Observations	841	397	444
Pseudo/adjusted R^2	0.449	0.546	0.428
Coefficient Difference		P value = 0.0358	

This table presents regression results on the association between derivative and firm value, conditional on agency cost and CEOs' Sports risk. The dependent variable is Tobin's Q, defined as the market value of equity plus the book value of assets minus the book value of equity divided by the book value of assets. Agency Cost takes the negative value of CorGov_Score. LOSS is an indicator variable take value 1 if the firm experiences a negative net income, zero otherwise. Dividend is an indicator variable takes value 1 if the firm pays dividend, zero otherwise. Capex is defined as the capital expenditure scaled by total assets. Other variable definitions are in the appendix. Two-tailed t-statistics are in parentheses based on standard deviations of the coefficient estimates clustered at the firm level. ***, **, * denote statistical significance at the $p < 0.01$, $p < 0.05$, and $p < 0.10$ levels, respectively.