Corporate Alliances and Derivative Lawsuit Risk

Chenchen Huang
University of Bristol
School of Economics, Finance and Management
15-19 Tyndalls Park Road, Bristol, BS8 1TU, UK
ch17572@bristol.ac.uk

Neslihan Ozkan
University of Bristol
School of Economics, Finance and Management
15-19 Tyndalls Park Road, Bristol, BS8 1TU, UK
N.ozkan@bristol.ac.uk

Fangming Xu
University of Bristol,
School of Economics, Finance and Management
15-19 Tyndalls Park Road, Bristol, BS8 1TU, UK
Fangming.Xu@bristol.ac.uk

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Abstract

This study investigates how shareholder litigation risk influences corporate alliances. We show that firms, which are incorporated in states that have adopted the universal demand (UD) laws, conduct more alliance deals. Further, alliance participants experience better immediate market reaction upon the announcement of a new alliance after the adoption of UD laws. These firms also have higher long-term (up to three years) operating performance and stock return performance. Our findings provide support for the view that UD laws reduce the derivative lawsuit risk for managers and, therefore, lead to more value-enhancing corporate alliances. Additionally, we find that the impact of UD law adoption on alliance performance is more pronounced for firms with higher compensation vega or are financially constrained. Overall, our results suggest that weakened shareholder litigation risk improves managerial decision making on alliance deals.

Keywords: Derivative lawsuits, corporate alliances, firm performance

JEL Classification: G30, G32, G34

1. Introduction

In recent years, firms have increasingly relied on corporate alliances to pool together their resources and enhance their competitive advantage (e.g., Kale and Singh, 2009).[1] KPMG's 2016 CEO Outlook survey shows that half of 1,300 CEOs worldwide believe partnerships and collaborative agreements take precedence over mergers and acquisitions (M&As), and such collaborative growth could improve shareholders' value. Similarly, PwC's 2016 CEO Survey indicates that around 50 percent of CEOs are expecting to make alliances. According to the alliances recorded in Securities Data Company (SDC) database, the number of alliance deals in the U.S. is above 50,000 since the 1980s.

The popularity of corporate alliance activities might be due to the fact that alliances can create substantial value for firms through various channels (Chan et al., 1997; Kale et al., 2002).[2] For instance, firms can reduce their risk and increase their market share by forming alliances (e.g., Kogut, 1989; Garcia-Canal et al., 2002). But corporate alliances also present some unique challenges for managers which increase the risk of cooperation. Prior studies argue that there might be some potential conflicts among alliance partners, governance gridlocks, and misallied operational targets (e.g., Lerner and Malmendier, 2010; Kale and Singh, 2009).[3] Consequently, alliances could end up being a major failure leading to shareholder wealth destruction (Kale et al., 2002).[4]

There is some anecdotal evidence on how some alliance-related failures can trigger shareholder litigation. For instance, shareholders in Coca-Cola Co. filed a derivative lawsuit which was related to its joint venture company. The shareholder

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[1] Corporate alliances typically refer to strategic alliances or joint ventures. Strategic alliances (as defined in Cao et al., 2016) is 'an agreement between two or more parties to pursue a set of agreed-upon objectives while remaining independent organizations.' Different from strategic alliances, firms engaging in joint ventures create a new entity with shared equity between partners (see Gulati, 1998).

[2] Typical sources consist of scale economies, costless market entries, network sharing, financial and knowledge support from partners.

[3] See '3 Areas of Litigation Risk in Joint Ventures', LexisNexis Website.

[4] Some researches indicate that the failure rate of corporate alliances is around 50-70% (see Duysters et al., 1999). The failure reason can be a lack of commitment of resources from the partners, a lack of--or underestimation of--necessary capital, and cultural differences and clashes of personalities (The Wall Street Journal, 2014).

plaintiff alleged that members of the board breached their fiduciary duties to Coca-Cola Co.'s shareholders through their gross mismanagement including their involvement in misreporting by a water company, which was a joint venture by Coca-Cola Co. and Swiss-based Nestle SA. Another case is the strategic alliance between United Airlines and Avianca Holdings SA held by Latin American Airlines. The shareholders of Avianca filed a lawsuit and alleged that the chairman rejected better offers but accepted United Airlines for his own business interests. These anecdotal stories suggest that managers face a shareholder litigation risk when they make decisions on alliances.

In this paper, we investigate whether unexpected changes in regulatory rules influence corporate alliance activities. Specifically, we consider regulatory rules related to shareholders' ability to file a suit against management. In the U.S., 23 states passed universal demand (UD) laws between 1989 and 2005 in a staggered manner. Following the prior literature, we view this staggered passage of UD laws as a source of exogenous variation in litigation risk (e.g., Appel, 2016; Bourveau et al., 2018). Our main research question is on whether an exogenous change in litigation risk influences corporate alliance activities. We examine the impact of litigation risk on corporate alliance performance, especially on the short-term and long-term performance of alliance partners, i.e., the performance of firms which form corporate alliances, and firms' likelihood of making alliance deals.

Shareholders' litigation rights are vital for disciplining managers and ensuring that their interests are aligned with that of shareholders (Velasco, 2006; Appel, 2016). On the one hand, if used appropriately, these litigation threats can impose significant disciplinary pressure on managers and help improve corporate governance, e.g., correcting the board's failure of oversight (e.g., Ferris et al., 2007). Bodnaruk et al. (2013) find that firms with good governance are more likely to engage in alliances, which create value for shareholders. Their results provide support for the theoretical model by Robinson (2008) showing that alliances can reduce inefficiencies in capital allocations. Consistent with these prior studies, we argue that shareholder litigation threats can lead to an increase in alliance activity and also improve performance of corporate alliances, i.e., the performance of alliance partners.

On the other hand, shareholder litigation threats can harm managers' initiative and desire for pursuing a value-enhancing but risky decision. When there are threats of shareholder lawsuits, managers may be more prone to take a conservative approach towards corporate financing and investment decisions (e.g., Lin et al., 2019; Nguyen et al., 2018; Chu and Zhao, 2019).[5] As documented by prior researchers, shareholder lawsuits can be costly for managers and their companies (e.g., Erickson, 2010). For example, shareholder lawsuits can lead to direct pecuniary costs and reputational damages. Directors can experience social shame from being named in a shareholder litigation (Cox, 1999). Thus, we predict that alliance activity, i.e., number of alliances a firm forms and alliance performance, can be negatively influenced by an increase in shareholder litigation risk. Overall, we might observe either a positive or negative effect of shareholder litigation threats on alliance performance depending on which effect, i.e., 'disciplinary pressure effect' or 'conservative approach effect', dominates.

Our empirical analysis relies on the staggered adoption of UD laws as a quasi-natural experiment (e.g., Appel, 2016; Bourveau et al., 2018). In general, identifying a causal relation between litigation risk and corporate policy decision making can be challenging. For instance, Ferris et al. (2007) examine the changes in board structure surrounding the filings of shareholder derivative lawsuits. However, since the lawsuit is an equilibrium outcome reflecting both the litigation risk and firm characteristics, it is difficult to quantify the level of litigation risk accurately. UD laws impose the requirement of "universal demand" so that shareholders must seek board approval prior to initiating derivative litigation. However, as derivative lawsuits normally name the directors as defendants, the board rarely grant this approval (Davis, 2008; Appel, 2016). Consequently, the adoption of UD laws significantly increases the difficulty for shareholders to file a derivative lawsuit and therefore reduce the threat of shareholder derivative litigation. Therefore, UD laws have been viewed as an exogenous shock to the risk of shareholder litigation rights.

[5] For example, Lin et al., (2019) show that threat of shareholder litigation impedes innovation. Nguyen et al. (2018) reveals the dark side of shareholder litigation, which induces firms to increase cash reserves. Similarly, Chu and Zhao (2019) show that the performance of corporate takeovers increase after the litigation threat is reduced.

We employ a difference-in-differences (DID) estimation method to examine the impact of reduced litigation risk on the performance of alliances. To estimate firms' responses to the lower litigation risk, we compare changes of alliance performance of the exposed and unexposed firms around the year of UD law adoption. Based on the approach of Gormley and Matsa (2011) and Appel (2016), we create our sample by using the "cohort" approach and keep alliances which are formed in a symmetric window of 5 years pre and post the event of UD law passage.

First, we investigate whether the adoption of UD law could influence firms' tendency for forming corporate alliances. We find that firms are more likely to form alliances during the post UD law period. This result suggests that managers are encouraged to take risk to make more alliance deals after the adoption of UD law. Next, we examine whether shareholder litigation risk can have an impact on alliance performance. Our results show that the three-day cumulative abnormal returns (CARs) is almost 3% higher for alliance partners incorporated in states that have passed the UD laws. This positive market reaction to the announcement of alliances is consistent with the view that weakened shareholder litigation risk encourages managers to take a less conservative approach towards alliance deals, e.g., they can pursue a wider range of deals; high-risk and high-value alliance deals, creating greater shareholder value.

Our findings complement the results documented in prior studies showing that the adoption of UD laws could reduce litigation threats and, therefore, lead to higher investment activities and better performance (Nguyen et al., 2018; Lin et al., 2019). Particularly, for M&A deals, which are viewed as an alternative for alliance deals, Chu and Zhao (2019) find that litigation risk has *ex ante* value destruction effect which could undermine shareholder wealth.[6]

To ensure the validity of our DID estimation, we also analyze the dynamic effect of UD law on short-term performance based on the model of Bertrand and Mullainathan (2003). Our results show that the treatment effect of UD laws only occurs during or following the year of UD laws adoption, which indicates that there is no pre-existing

[6]Wang and Zajac (2007) and Yin and Shanley (2008) argue that corporate alliances can be viewed as an alternative to M&As.

trend difference between alliance undertaken before and after the UD laws. Additionally, we examine the long-term premium over the (-1, +21) day time window around the announcement date. The results provide further support for the positive effect of UD law on the announcement premium.

Furthermore, we investigate whether changes in litigation risk have an impact on the long-run operating performance and stock performance of firms engaging in corporate alliances. Our results show that alliance participants experience higher returns on assets (ROA) during the 3-year post-alliance period if their incorporation state has adopted the UD laws. We employ calendar-time regressions, using the four factors of Fama and French (1992) and Carhart (1997), and the Barber and Lyon's (1997) buy-and-hold abnormal returns (BHARs) to examine the long-term stock returns of alliance partners and find similar results. Both approaches yield similar findings that post-event long-term abnormal returns of alliances are higher for participants incorporated in states that passed the UD laws. In sum, our findings suggest that the risk of shareholder derivative litigation indeed distorts managers' incentives and they make sub-optimal decisions on corporate alliances. Once shareholder litigation threats are weakened, the performance of alliances improves suggesting that managers are able to make more value-enhancing decisions about the alliance deals.

We undertake some robustness tests. First, we employ propensity score matching (PSM) approach, which includes both firms from the UD law states and non-UD law states. This method can address endogenous selection, as the difference in abnormal returns between the treatment and control groups of UD law adoption might be driven by some omitted variables which are correlated with the treatment group firms. The results of the matched sample are consistent with our baseline findings.

We also address the concern about the endogeneity problem between UD law and alliances. In other words, the adoption of UD law might be endogenous to the unobserved factors at state-level which could also affect corporate alliance. By using Chamberlain's Correlated Random Effects (CRE) probit model, we examine whether the aggregate factors at the state-year level are significantly related to the adoption of UD law. Our results show that the adoption of UD law is not endogenous to the

aggregate factors at the state-year level.

Moreover, we examine whether managerial incentives have impact on the sensitivity of alliance performance to UD law adoption. Specifically, we test whether executives with *ex ante* higher incentives for risk taking engage more in alliance deals once UD laws are passed. We estimate and employ vega of executive compensations as a proxy for measuring managerial incentives for risk-taking. Our results show that firms with high vega take risk to make more alliance deals and such deals have higher returns when the derivative lawsuits risk is reduced after the UD law adoption.

Finally, we test whether financial constraints can influence the relation between UD law adoption and alliance performance. We predict that financially constrained firms would be more willing to make alliance deals, which could help reduce their financial constraints and improve their performance. For our empirical analysis, we use firm size, free cash flow, dividend payment ratio, White-Wu index and Kaplan-Zingales index as the proxies for financial constraints (Kaplan and Zingales, 1997; Whited and Wu, 2006). We find that firms with more financial constraints are significantly affected by the adoption of UD law, and the performance of their alliances are significantly higher after the derivative lawsuit risk is reduced.

Our paper contributes to the current literature in several aspects. First, our study extends the literature on corporate alliances, i.e., strategic alliances and joint ventures (Chan et al., 1997; Boone and Ivanov, 2012; Bodnaruk et al., 2013). We provide novel evidence on how shareholder litigation risks influence managerial corporate alliance decisions and performance of firms engaging in alliances. Second, our findings contribute to the literature on shareholder litigation (Ferris et al., 2007; Erickson, 2009; Donelson and Yust, 2014). Although a growing body of literature investigates how the threat of shareholder litigation disciplines managerial behavior and affect corporate policy decision making, i.e. CEO compensation policy, board structure, managerial empire building, corporate innovation, we are the first to explore the impact of the threat of litigation on corporate alliance activities. We attempt to deepen our understanding of how shareholder litigation rights can influence corporate alliance performance. Third, we use UD law, an exogenous shock to the threat of shareholder litigation, and address

the endogeneity concerns between litigation risk and corporate alliance decisions. We find that the reduced litigation risk after UD law adoption could induce managers to make more value-enhancing decisions on corporate alliances. Our findings complement the results from Chu and Zhao (2019) documenting that reduced litigation threat improves deal outcomes. Finally, our findings have a policy implication suggesting that UD laws can be beneficial for alleviating managers' over-conservative approach leading to better performing corporate alliances, and ultimately more optimal allocation of resources across firms.

The remainder of the paper is organized as follows. Section 2 includes the literature review and hypotheses development. Section 3 describes sample and methodology, as well as summary statistics. Empirical results are presented in section 4. Additional tests are conducted in section 5. Section 6 concludes.

2. Literature review and hypothesis development

2.1. Corporate alliances and firm performance: Empirical evidence

Forming corporate alliances, i.e., strategic alliances and joint ventures, is viewed as a way for firms to expand their business operations, develop new investment opportunities, and increase knowledge flows (e.g., Chan et al, 1997; Gomes-Casseres, 2005). Through alliances, firms change their boundaries, which can have important implications for their value. Prior studies document that some corporate alliances create value for shareholders, while others lead to a loss of shareholder wealth (e.g.,Kale et al., 2002; Kogut, 1989).

McConnell and Nantell (1985) find that there are significant wealth gains for shareholders in joint ventures. They argue that such wealth effects arise from synergies, which are similar to those generated via M&A. Further, Chan et al. (1997) find that the stock market reaction is positive for both horizontal and non-horizontal alliances. They argue that alliances can be more cost-effective than the integrated corporation, especially by creating an organizational mechanism that can better align decision authority with decision knowledge. Further, more flexible organization of alliance and

less opportunistic behavior through mutual monitoring can add value to the firms (Robinson, 2008).

Despite positive shareholder wealth effects of corporate alliances, there might be some negative firm value effect under certain conditions (Lunnan et al., 2008). For instance, a party to a strategic alliance or joint venture suffers from spillover effects when the other partner files for bankruptcy. Boone and Ivanov (2012) provide evidence that, while strategic alliances lead to benefits, the loss of those benefits when one party files for bankruptcy can lead to a reduction of shareholder wealth and worsening performance for the non-bankrupt partner.

Contracting problems can also lead to failures in alliances and thus create a shareholder value loss. Lerner and Malmendier (2010) highlight the nature of the incentive and contracting problems in research alliances, i.e., the problem of project substitution and project cross-subsidization. Further, Campbell et al. (2014) provide a theoretical model showing that free riding and lack of communication lead to delays in joint projects. Lerner et al. (2003) argue that access to public equity markets influence the nature alliance contracts and distort alliance outcomes. Their results show that contracts signed at times when biotechnology firms have little access to external financing assign the most control rights to the financing pharmaceutical company. They find evidence that the alliances undertaken during these periods and assigning most of the control to the financing firm perform poorly.

2.2 Derivative lawsuits and Universal Demand (UD) laws

Directors and officers of public firms are required to exhibit prudent judgment and refrain from self-serving conduct when they serve their corporation. Their fiduciary duties include duties of care and loyalty to firms' shareholders. However, agency problems, which arise from the separation of ownership and control, can lead to the breach of fiduciary duties. To mitigate potential agency problems, shareholders are granted with litigation rights including the rights to file class action lawsuits and

derivative lawsuits (e.g., Erickson, 2017; Erickson, 2010).[7] Derivative lawsuits are different from class action lawsuits as shareholders bring a derivative lawsuit against directors and officers on behalf of a corporation when directors and offices break their fiduciary duties, such as illegal activities, mishandling of information or self-dealing. The actual plaintiff, the corporation rather than shareholders, can get the final compensation after derivative lawsuits.

Derivative lawsuits could benefit the corporation in various ways. For instance, derivative lawsuits can have a deterrence effect that prevents manager's misbehavior *ex ante*, imposing sanction and nonpecuniary costs such as reputational loss or managerial turnover (Cox, 1999; Erickson, 2010). Such *ex ante* deterrence effects can reduce managers' incentives for self-dealing and, therefore, diminish agency problems. Additionally, derivative lawsuits can lead to changes in corporate governance (Appel, 2016; Erickson, 2010), i.e., proportion of independent directors and compensation structure of top executives can change (Ferris et. al., 2007; Erickson, 2010). Given these potential benefits, derivative lawsuits are regarded as the 'most important procedure the law has yet developed to police the internal affairs of corporations' and 'the earliest and principal constraint on director mismanagement' (Rostow, 1959; Thompson, 2004).

To initiate a derivative lawsuit, firstly shareholders are required to make a demand on the board so that the board can decide whether to reject the demand or take remedial action against the wrongdoers. However, because the lawsuits always target the board members as defendants, the board "almost inevitably" reject such a demand and avoid further proceeding with the litigation (Appel, 2016; Swanson 1992). If so, courts generally follow the board's decision and dismiss the lawsuits according to the business judgement rule, which is based on the inference that directors make the decision in the best interest of the company due to their informed basis, good faith and honest belief . Since the rejected lawsuit might cover the truth, courts have developed the "futility exception." Such futility exception allows the shareholders to bypass the demand, if

[7] Class action lawsuits are filed by a member on behalf of a subset of stakeholders whose interests are damaged, and stakeholders can get monetary compensation after class action lawsuits settled (Jones, 1980).

they can prove that the board of directors cannot make fair decisions because the board of directors is involved in the wrongdoing (Kinney, 1994). In fact, shareholders prefer to argue that the demand is futile since the courts usually dismiss the demand which has been refused by the board already (Appel, 2016). Therefore, owing to futility demand, shareholders can bring lawsuits against the wrongdoers with rare limitation and obstacles.

Since futility exception increases onerous procedures of derivative lawsuit, the American Bar Association (ABA) eliminate futility exception to the demand requirement, and "universal demand" (UD) requirement are added in Model Business Corporation Act (MBCA) instead. The UD law requires that all shareholder plaintiffs should first make a demand on the board of directors and require the board itself to file the suit. Most lawsuits are rejected by the board, and UD requirement sets big hurdles for shareholders filing derivative lawsuits against directors and officers. Between 1989 and 2005, 23 states in the US implemented UD laws, such staggered adoption of UD law can make it difficult for shareholders to file derivative lawsuits, thus weaken shareholders' litigation rights in corporate governance (Appel, 2016). As a result, we observe that fewer derivative lawsuits are filed in the states that adopted the UD law (Davis, 2008; Appel, 2016).

2.3 Research hypotheses

In this paper we argue that threat of shareholder litigation can influence managerial decisions on corporate alliance activities. Derivative lawsuits can deter managers from making risky decisions and exploring innovative ideas (e.g., Kinney, 1994). Managers can be prone to stay safe and take a conservative approach in their corporate policy decision making while they try to avoid litigation risk (e.g., Lin et al., 2019). Also, in order to protect their private benefits, managers could be conservative in making decisions on corporate investment, even passing up value-enhancing risky projects (John et al., 2008). Low (2009) shows that managerial risk aversion leads to a reduction in risk and thus decreases firm values. As a result, under the conservative approach effect, managers avoid pursuing risky projects when forming corporate

alliances, even if the alliances might be highly value enhancing. Hence, following the adoption of UD laws, managers face lower litigation threats and are more willing to make decisions bearing appropriate risk. We would therefore expect better alliance performance following the adoption of UD laws.

Hypothesis 1: *Reduced derivative lawsuit risk (adoption of UD laws) leads to higher alliance performance as managers can act in a less restricted manner when considering alliance activities.*

Prior researchers argue that derivative lawsuits serve a deterrence function by imposing pecuniary and non-pecuniary penalties on managers (e.g., Donelson and Yust, 2014; Appel, 2016). The disciplinary pressure effect can reduce managers' incentives for improper conduct and thus elicit corrective behavior (Coffee and Schwartz, 1981; Kinney, 1994). Hence, we hypothesize that derivative litigation risk will deter managers from self-serving misconducts and incentivize them to pursue value-enhancing decisions. When such litigation threat is reduced after the adoption of UD laws, managers can act in a more self-serving manner. Thus, our second hypothesis is as follows:

Hypothesis 2: *Given that shareholder litigation risk can discipline managers and improves corporate governance, reduced risk of derivative lawsuits (adoption of UD laws) leads to lower alliance performance.*

3. Data and sample characteristics

3.1 Sample selection

Our initial sample of corporate alliances consists of strategic alliances and joint ventures announced between January 1984 and December 2010 in the U.S. We collect data for alliance transactions from the Securities Data Company (SDC) database with the following criteria:

(1) Participants are publicly traded on Amex, NYSE, or Nasdaq.

(2) Alliance deals are defined as 'completed' in the SDC.

(3) Utilities (SIC 4900-4999) and financials (SIC 6000-6999) are excluded as they are subject to additional regulation and reporting requirements.

(4) Participants' stock and financial data can be found on CRSP and Compustat annual databases by matching on CUSIP or ticker symbols.

Our empirical analyses rely on a sample of U.S. domestic corporate alliances related to the passage of universal demand (UD) laws by 23 U.S. states from 1989 to 2005. Appendix Table B1 reports the years and corresponding states that adopted UD laws. Although almost half of all U.S. states have passed UD laws (23 over 50), the number of firms affected due to their incorporation states is relatively small. For example, Appel (2016) and Bourveau et al. (2018) report, respectively, that only 16% and 16.9% of firms' incorporation states have adopted UD laws between 1989 and 2005. In our sample of corporate alliances, only 10% of alliance firms are incorporated in states that have passed UD laws (hereafter, UD states). Therefore, to better capture the dynamic effect of the passage of UD laws on alliance performance, we keep only the alliance participants from UD states.

The adoption of UD laws is staggered over 17 years. Our sample spans from 1984 to 2010, i.e., five years before/after the adoption of the first/last UD law, to ensure having sufficient number of alliances. But this also creates an unbalanced sample in the sense that for most states there are large differences in the number of years between pre- and post-UD laws adoption. This problem is more prominent for those early and late passage states.[8] Such unbalanced treatment and control groups could not properly capture the impact of a quasi-exogenous shock. Further, there might be some confounding effects. Therefore, our main analysis uses a symmetric window of -5 to +5 years surrounding the adoption of UD laws by each state. Essentially, we exclude transactions of corporate alliances initiated outside the (-5, +5) years window. Our method is based on the "cohort" approach applied in Gormley and Matsa (2011) and

[8] For example, the first states to adopt UD laws were Georgia and Michigan, in 1989. For them, the number of years before and after the passage of UD laws are 5 and 21, respectively.

Appel (2016). Our final sample consists of 870 observations. Appendix Table B2 summarizes the sample selection criteria and the number of remaining observations.

3.2 Variable definitions

Our main variable of interest is *UD Law*, which is an indicator that equals one if the state that the alliance participant incorporated in has passed the UD law in a given year between 1989 and 2005, and zero otherwise. We examine the effect of exogenous litigation shocks on corporate alliances. For our empirical analysis, we use abnormal announcement returns of alliance participants as one of our measures of alliance performance. Following Fich et al. (2014) we estimate the cumulative abnormal returns (CARs) from one day before to one day after the announcement date of corporate alliances. The three-day CARs are calculated using the modified market model with the CRSP equal-weighted return index as the market returns (Brown and Warner, 1985; Bouwman et al., 2009).

In our regression analysis, we control for a set of variables, which are reported by the prior studies as having power to explain alliance performance. We have some alliance-specific variables including *Technology Transfer, Industry Relatedness, Alliance Industry,* and *High Technology. Technology Transfer* indicates whether one participant transfers technology to another participant or the formed alliance. Technology transfer can help firm's to access the partner's resources and thus leads to higher performance for alliance partners. *Industry Relatedness* indicates whether all partners of a given alliance have the same two-digit SIC code. Participants from the same industry might increase their market power and experience higher stock returns. *Alliance Industry* indicates whether a given participating firm has the same two-digit SIC code as that of the formed alliance activity. Chen et al. (2015) state that knowledge about the alliance business may help the partnering process to become more effective in realizing the benefits of synergy, which increases the market values of firms. *High Technology* indicates whether the firm is in a high-tech industry (SIC code of 283, 357, 361, 362, 366, 367, 382, 384, 386, and 387). Chan et al. (1997) find that alliances among

high-tech firms add more values to the partnering firms than alliances among low-tech counterparts.

We also include some firm-specific variables, *Ln(Assets), Book-to-Market , R&D-to-Sales, Cash Holdings, Capital Expenditures (Capex), Returns on Equity (ROE), Price-to-Earnings, Compound Returns,* and *Herfindahl Index,* which have been used by prior researchers, e.g., Bodnaruk et al. (2013) and Mantecon (2016). These firm-specific characteristics are measured at the fiscal year-end prior to the alliance announcement. *Ln(Assets)* is the natural logarithm of the total value of assets, capturing the absolute size of the alliances. McConnell and Nantell (1985) find that smaller partner in joint ventures experiences larger average excess returns. Similarly, Chan et al. (1997) document that smaller partners in strategic alliances experience a significant positive announcement day return. *Book-to-Market* measures growth opportunities. *R&D-to-Sales* is the ratio R&D expenses scaled by total sales. Firms with high R&D are likely to have high uncertainty and severe information asymmetry problems.

Cash Holdings is measured as the ratio of cash holdings to total assets, which can indicate the level of financial flexibility (Harford, 1999). *Capital Expenditures* (*Capex*) is the ratio of capital expenditures to total assets, whereas low capex is associated with riskier investment policy made by managers (Coles et al., 2006). *Sales Growth* is the percentage growth in sales from the past year. *Returns on Equity* (*ROE)* is the ratio of earnings before interests and tax to average equity over the fiscal year. *Leverage* is the ratio of long-term debt to the total equity of the firm. *Price-to-Earnings* is equal to the year-end stock price divided by earnings per share. *Compound Returns* is the continuously compound raw stock returns of trading days over a fiscal year. *Herfindahl Index* measures the level of industry concentration. All continuous variables are winsorized at 1% level. The detailed definitions of the above variables are available in Table B3 in the appendix.

3.3 Summary statistics

Panel A of Table 1 reports the summary statistics for alliance-specific and firm-

specific variables employed in our analyses. We observe that, on average, alliance participants experience positive CARs of 1.16% around the announcement date. This result is consistent with prior studies which mostly report positive CARs for alliance announcements. Our results also show that partnering firms have considerable sales growth (with an average value of 31.3%) and compounded returns (with an average value of 27.7%) in the fiscal year before their announcement of a new alliance deal.

Panel B of Table 1 we partition our sample into pre- and post-UD laws adoption and report the summary statistics for each sub-sample. On average CAR is higher for alliance deals announced after the passage of UD laws (i.e., 1.37% vs. 0.81%). Post-UD alliances seem to involve relatively less technology transfer and have lower proportion of participants from the high-tech industries. As for firm characteristics, partnering firms of post-UD alliances have lower book-to-market ratios and higher leverage.

[Table 1 about here]

Appendix Table A1 presents the correlation coefficients of the main variables. We observe that the correlation between the adoption of UD laws and the announcement CARs is positive.

4. Empirical model

To study the effect of shareholder litigation threats on corporate alliances, we use the quasi-natural experiment of the staggered adoption of UD laws and difference-in-difference (DID) regression framework. As explained in Section 3.1, our sample of corporate alliances includes the states which passed UD laws in a given year. Thus, the pre- and post-treatment in the model is whether or not an alliance deal is initiated prior to the UD law adoption (control group) or after the UD law adoption (treatment group). Given that we use the staggered passage of UD laws as a series of shocks, such multiple treatment or control groups can perform a difference-in-difference effect (Roberts and Whited, 2013). Specifically, we estimate the following baseline regression model:

$$Performance = \beta_0 + \beta_1 UD\ \ Law + \beta_i X_i + \beta_j Z_j + FEs + \varepsilon \quad (1)$$

The dependent variable $Performance$ in equation (1) is *CARs* or ΔROA. *CARs* is the three-day cumulative abnormal returns of alliance participants around the deal announcement date. ΔROA is the change of return on assets (ROA) from the year of announcement of a new alliance in year t to t+1, t+2, or t+3. We define the pre-UD law period as 5-year-period prior to the UD law adoption, and the post-UD law period is 5 years after UD law adoption. The main explanatory variable of interest is *UD Law*, which is an indicator that equals one if the state that alliance participant incorporated in has passed the UD law in a given year between 1989 and 2005, and zero otherwise. The coefficient β_1 captures the average changes of CARs around alliance announcement between the treatment group and the control group. X_i is a vector of deal characteristics, and Z_j is a vector of firm-specific variables. FEs stands for fixed effects including state, year, and industry fixed effects. The incorporation-state-fixed effects and industry-fixed effects capture the variation in state-level and industry-level (Fama-French 12 industries classification) variation that comes from the difference between the treatment and control groups. The year fixed effects controls for time-varying differences across years for both treatment and control groups.

Our model is based on the assumption that the state-level adoption of UD laws is exogenous, which means UD law adoption is not correlated with determinants of deal announcement returns. Moreover, since our sample includes only firms incorporated in UD law states, we exclude the variation which might come from UD law states and non-UD law states. We cluster standard errors at the incorporation state level to account for potential correlations in unobserved factors that affect different firms within the same industry.

Additionally, we examine whether the passage of UD laws influence the number of alliance deals. Thus, we estimate the following regression model:

$$Number = \beta_0 + \beta_1 UD\ \ Law + \beta_j Z_j + \beta_k Firm\ \ number_k + FEs + \varepsilon \quad (2)$$

The dependent variable, $Number,$ in equation (2) is the number of alliance activities, which is a total number of alliance deals that a firm has made in pre-UD law period or post-UD law period. We also control the Firm number, which is the total number of Compustat firms at state-year level. FEs stands for fixed effects including state and industry fixed effects.

4.1. UD law and alliance numbers

We begin our analysis by examining whether a shock to shareholder litigation risk (adoption of UD laws) influences firms' alliance activity. In particular, we focus on the 'number of alliance deals' a firm makes and test whether the adoption of UD laws has an impact on it. For our empirical analysis, we use an event study approach, that is, we focus on the change in the number of alliance activities for a firm around UD law adoption period. We use a symmetric window around UD law adoption year to capture the effect of UD law. We choose (-5,+5) years as a window around UD law adoption year in each UD law state, and the firm-year observations are distributed in the (-5,+5) year window around UD law adoption year. As a result, firm-year observations can be from both pre-UD law period and post-UD law period. We examine whether there is a change in the number of alliance activities after UD law adoption, so we compare the total numbers of the alliance activities at firm-level in pre-UD law period and post-UD law period. Specifically, we take the sum of number of alliance activities a firm conducts in pre-UD law period, that is, 5 years prior to UD law adoption. Then we use the firm-level observation with the sum number as one observation in pre-UD law period. Similarly, we can get another firm-level observation with the sum of alliance activities in post-UD law period. Finally, we get 1939 observations including 933 observations from pre-UD law period and 1006 observations from post-UD law period. Following Bodnaruk et al. (2016), we use the logarithm of one plus the number of alliance activities that a firm has done in pre-UD law period or post-UD law period as our dependent variable in OLS regression model. We use dummy dependent variable in Probit model, which equals to one if a firm has formed alliance in pre-UD law period

or post-UD law period. Other control variables are also measured at average level in pre-UD law and post-UD law period.

Table 2 shows the regression results for the 'number of alliance activities'. The OLS regression results and Probit results of the sample which are from 5-year symmetric window around UD law adoption year are presented in column (1) and column (2). The coefficient on the UD law dummy is around 0.06, which is positive and significant at 5% suggesting that reduced derivative lawsuit risk after UD law adoption encourage firm's managers to make more alliance deals in post-UD law. Column (3) and column (4) report the regression results for a 3-year symmetric window around UD law adoption year. The coefficient on the UD law dummy is again positive and statistically significant at 1% level. Based on these results, we conclude that the adoption of UD law, i.e., reduced derivative lawsuit risk, seems to encourage managers to engage in more alliance deals. This finding is consistent with the view that managers become less conservation in their approach towards deal making when there is relatively lower threat of litigation.

[Table 2 about here]

4.2. Announcement performance of alliance participants

Next we examine whether shareholder litigation risk affects the announcement performance of corporate alliances. Table 3 presents our estimation results based on equation (1). Column (1) of Table 3 includes only the *UD Law* indicator and fixed effects as explanatory variables. The coefficient on the *UD Law* dummy is 2.822 and statistically significant at the 5% level, suggesting that alliance participants with incorporation states that passed UD laws experience higher announcement CARs.

In column (3) we include deal and firm-specific characteristics in our regression model. We find that the coefficient on *UD Law* remains positive and significant (t-value=3.18). In particular, the adoption of UD laws leads to approximately 3% increase in participants' abnormal stock market reaction.

As for the control variables, we find that alliances involving technology transfer

experience higher CARs for participants. The effects of other firm-level explanatory variables on announcement CARs are generally in line with the literature. For example, higher participant CARs is associated with smaller partnering firms, higher book-to-market ratios, and higher Herfindahl index.

In sum, the regression results reported in Table 3 suggest that reduced derivative lawsuit risk following the adoption of UD laws induce managers to make more value-enhancing alliance deals. Our results provide support for the channel of "conservative approach effect" rather than "disciplinary pressure effect". The derivative lawsuit threats make managers more conservative and choose possibly suboptimal strategies in terms of their alliance activities.

[Table 3 about here]

Besides the main results of the baseline model, we also conduct some additional tests on the CARs. Firstly, we use dynamic model to examine the effect of UD law. Difference-in-difference (DID) approach assume that there is a "parallel trend" of samples in the absence of treatment. Thus, we need to examine whether there is any pre-treatment trend of increasing the CARs before UD law adoption (Robert and Whited, 2013; Chu and Zhao, 2019; Ni and Yin, 2018). We should exclude the possibility that the difference of stock performance in treatment group and control group has already existed before the treatment effect. To test the assumption, we follow Bertrand and Mullainathan (2003), Chu and Zhao (2019), and Ni and Yin (2018) and include 4 UD law dummies considering different time periods: *UD law (-1)* equals one if the firm forms alliance one year prior to UD law adoption in firm's incorporation state, zero otherwise. Similarly, *UD law (0)*, *UD law (+1)* and *UD law (2+)* equal to one if the year of alliance announcement is in the same year of UD law adoption, in one year after UD law adoption, and in two or more years after UD law adoption, respectively.

Table 4 shows the results of dynamic effects. The coefficient on *UD law (-1)* is small and insignificant, while the coefficient on *UD law (0)*, coefficient on *UD law (+1)* and coefficient on *UD law (2+)* are all positive and significant. Hence, we can conclude that the assumption of "parallel trend" is hold in the absence of the treatment, and there

is no pre-treatment difference of CARs before UD law adoption. Also, it is proved that UD law dummy in our model is exogenous and is not driven by ex-ante increase of CARs and reverse causality.

[Table 4 about here]

Secondly, we consider the effect of UD law on the long-term announcement premium of the alliance deals. The premium is measured as the cumulative abnormal stock return (CARs) over the (-1, +21) day time window around the alliance announcement date. Market return is the CRSP equal-weighted return index based on the market model. We use the baseline and dynamic model to test the effect on this premium. The results in Table 5 show that alliance deals enjoy a significantly higher premium when the derivative lawsuit risk is reduced from UD law adoption.

[Table 5 about here]

4.3. Long-term performance of corporate alliances

In this section, we investigate how the reduced litigation threats to managers influence the performance of corporate alliances over the long-term horizon post the announcement of alliances. In particular, we employ performance metrics reflecting the operating and stock performance of alliance partnering firms.

First, we estimate the change of return on asset (ROA) from the year of alliances over 1, 2, or 3 years post-completion of corporate alliances to capture the dynamic of long-term operating performance. Results reported in Table 6 indicate that participants from states that adopted UD laws are associated with significantly higher long-term ΔROA. The correlation between reduced litigation threats and higher operating performance is stronger for a longer post-alliance window. Overall, our results indicate that the reduced derivative lawsuit risk after UD law adoption could bring a significant increase in long-term operating performance.

[Table 6 about here]

Second, we examine the effect of UD laws on the long-term abnormal stock performance of participants. We apply Fama and French (1992) and Carhart (1997)

four-factor model to test the excess monthly returns of allied firms in the pre- and post-alliance periods. Specifically, the excess returns of alliance firms, measured as the equal-weighted monthly returns of the portfolio of alliance firms minus the monthly risk-free returns, is regressed on the excess market returns (*MKTRF*), small size portfolios minus big size portfolios (*SMB*), value portfolios minus growth portfolios (*HML*), and winner portfolios minus loser portfolios (*UMD*). In order to test the dynamic changes of abnormal returns, we consider the post-alliance horizons of 12, 24, and 36 months. The regression intercept, α, captures the abnormal performance of alliance participants during the post-event periods.

Panel A of Table 7 presents the coefficients of calendar-time regressions. Column (1) shows that alliance participants with incorporation states that passed UD laws experience significantly positive abnormal returns (α=1.3% monthly) over the 12 months following corporate alliances. On the contrary, the monthly abnormal returns of pre-UD laws partnering firms are indifferent from zero, only 0.2% monthly. In Columns (2) and (3), the abnormal returns are calculated for the 24 and 36 months post-event horizon, respectively. Results remain qualitatively similar – only the UD laws affected alliance participants have positive and statistically significant long-term abnormal returns following alliances. In sum, based on the calendar-time regression analyses, we can conclude that firms which form alliances after UD law adoption will have better abnormal returns compared with those before UD law adoption.

As an alternative to the calendar-time approach, we follow the literature on long-term stock performance, e.g., Barber and Lyon (1997) and Kothari and Warner (1997), to estimate the buy-and-hold abnormal returns (BHAR). We calculate the differences of buy-and-hold returns between alliance firms and the characteristic-based matched portfolios over 12, 24, and 36 months following the completion of alliances. Matched portfolios are constructed on the basis of firm size and book-to-market ratio. Once the matched firms are selected, we use the equal-weight approach to calculate the average returns of the matched portfolios. Panel B of Table 7 shows the regression results on buy-and-hold returns of alliance firms. The *UD Law* indicator is positive for both 12-months and 24-months BHAR, both significant at the 5% level. All regressions include

various deal and firm characteristics and year, state, and industry fixed effects. Our results suggest that UD law adoption can increase alliance firms' long-term stock returns by 19 percent and 40 percent in the following one year and two years.

Overall, results of long-term operating and stock performance of alliance participants show that the alliances that are affected by UD law can also bring higher long-term performance for the firm. More importantly, the coherent influence of passage of UD laws on both the short- and long-term performance of the participants of corporate alliances indicates that the reduced shareholder litigation risk encourages managers to seek for and undertake value-enhancing corporate partnerships.

[Table 7 about here]

4.3 Robustness tests

In this section we conduct some robustness tests to check our main results. Our main sample only contains corporate alliances in the states which passed UD laws in a given year. Therefore, we change our cohort sample size by considering the alliance firms from both UD law states and non-UD law states. One concern is that the difference of abnormal return between treatment and control group of UD law adoption might be driven by some omitted variables which are correlated with the treatment group firms. For instance, the firms which form alliances under the impact of UD law are fundamentally different from the firms which form alliance without the impact of UD law. Hence, to address this problem, we apply another cohort sample which includes the alliance firms from UD law states and non-UD law states. Detailly, we follow Ni and Yin (2018) and Bourveau et al. (2018), and within each cohort of UD laws, we consider both alliance firms from the given UD law states and other states which do not have a UD law throughout the (-5, +5) year window. In other words, the control states include the states which will adopt UD law after the 5 years and the states which never adopt UD law. Take the 1990 cohort as an example: Florida passed UD law in 1990, so alliance firms from Florida are in the treatment group. The control groups are the alliance firms in the other states which without the impact of UD law in

the period of 1985-1995. After we sum up all cohorts, we get alternative cohort sample. Next, in order to address endogeneity concern, we use propensity score matching (PSM) approach to select comparable firms by firm characteristics from treatment group (firms in UD law states) and control group (firms in non-UD law states). Based on the selection basis from Bodnaruk et al. (2013), we use firm asset(in billion), ratio of operating income before debt(OIBD) to asset, profit margin and industry concentration as matching variables. We firstly use a probit model to estimates the propensity score of the treatment on the above four variables. We then match the treated firms with control firms using the nearest propensity scores.

Table 8 reports the PSM results. There are 538 observations in treatment group and 605 observations in control group. In panel A, we firstly test whether our matching procedure is successful before estimating baseline regression on the propensity score matched sample. That is, the means of the matched variables should not be significantly different between treatment group and control group. The results indicate that firms in treatment group and control group are comparable, and the matched sample is reliable. Column (1) in panel B shows the results of the baseline regression on the propensity score matched sample. The coefficient on the UD law dummy is still positive and significant, and the adoption of UD law leads to around 3.8 percent point higher in the firm's CARs around alliance announcement. The results are consistent with the earlier findings in table 4. Column (2), (3), (4) in panel B show the results of long-term operating performance. The adoption of UD law improves the ROA growth about 0.1 percent in the post alliance period. Therefore, based on the regression results of short-term stock performance and long-term operating performance, we can conclude that the observed positive effect of reduced derivative lawsuit risk from UD law adoption is not driven by observable differences in firm characteristics.

[Table 8 about here]

Next, we explore the concern about endogeneity problem. Some other UD law papers found that there is no endogenous selection for firms to incorporate in the state where UD law is passed (Appel, 2016; Lin et al., 2017). In order to mitigate the concern that some firms have changed incorporate states, we exclude such firms in our main

sample if we find the firm's historical state of incorporation is different from the latest state. We use the historical state of incorporation data from Bill McDonald's website. Bill McDonald extracted and compiled historical state of incorporation data from the firm's 10-K reports on SEC Edgar. Because the data are only available from 1994, we fill the missing historical states by using the records in Compustat before 1994. We found that in our main sample only several firms have changed their incorporate states. The regression results for such robustness test are in appendix Table A2. The results suggest that our main findings are still consistent even if we exclude the firms which have changed incorporate states.

Another argument about endogeneity problem is that the adoption of UD law and alliances might be driven by some unobserved factors, and the adoption of UD law is endogenous to the unobserved factors at the state level which could affect alliance. For example, the lobbies might face the pressure or have an incentive to attract businesses, and the adoption of UD law is one of their means to make a business-friendly environment. As a result, the business-friendly environment in turn affects firm's alliances. In order to mitigate the concern that the adoption of UD law is endogenous with the state-level business environment, we follow the approach of Bourveau et al. (2018). Since the firm's fundamentals are the determinants of alliance performance, we use the aggregate of firms' fundamentals at the state-year level as the proxy for the business environment, and then regress the passage of UD laws on these aggregate factors at state-year level.

Specifically, following Bourveau et al. (2018), we use the samples in UD states but in the preceding period until the adoption of UD laws. The dependent variable is an indicator of UD law, which equals to one if a state passes a UD law in a given year. The Chamberlain's Correlated Random Effects (CRE) probit model is used due to the small sample size and the concern of inconsistent estimates when adding fixed effects in a probit model (Wooldridge, 2010). In this CRE probit model, we use the aggregate of firms' fundamentals at the state-year level as the variables of interest, and add the state means of firm's fundamentals as the control variables to control unobservable state fixed effects. Column (1) in appendix Table A3 shows the regression results. None of

the state-year level fundamentals has significant coefficient, which suggests that the adoption of a UD law is not endogenous to the aggregate state-year level business environment which drives the good alliance performance. Additionally, we also consider the impact of macroeconomic conditions on UD law adoption. We use real GDP and GDP growth rate at state-year level as the proxies. The results in column (2) and (3) also imply that the adoption of UD law is not driven by the macroeconomic conditions.

Finally, we conduct placebo test on the UD law adoption. Among the UD law states, we randomly assign a pseudo-event year during the pre-UD law adoption periods. We construct a placebo variable, *Pseudo_UD*, which equals to one if the alliance is formed in the post pseudo-event year and zero otherwise. Appendix Table A4 reports the results that the coefficients on the *Pseudo_UD* is not statistically significant, which indicates that the fake shocks has no effect on the alliance performance.

5. Additional analyses

5.1 Managerial incentives

As discussed above, firms conduct more alliance deals after the passage of UD law. This finding can be interpreted as managers tend be less conservative when they face lower derivative lawsuit risk. In this section, we further investigate whether the relation between alliance activity and UD law adoption would be affected by the managerial incentives ex ante.

Risk-related agency problems point out that risk-averse managers may pass up risky but value-enhancing investment opportunities, even though such opportunities can increase shareholder wealth (Guay, 1999). They abandon some projects with positive expected net present value since such projects entail too much risk (Park and Verttos, 2015). Managerial compensation incentives have been commonly used to mitigate the effect of managers risk aversion and encourage them to take risky projects (Guay, 1999; Coles et al., 2006). Managers with higher compensation vega (sensitivity of CEO wealth to stock return volatility) are more likely to be encouraged to make risk

decisions. Coles et al. (2006) find that higher vega incentivizes managers to make riskier decisions leading to an increase in riskier investment and higher volatility of stock return. Chen et al. (2014) find that executive stock option vega provides executives with an incentive to undertake risky innovative activities, including increasing R&D activities and forming new alliances. UD law makes it difficult for shareholders to file derivative lawsuits because UD law requires all shareholder plaintiffs to make a demand firstly on the board of directors. Therefore, the adoption of UD law reduces the threat of being sued for executives. Since there is a change of derivative lawsuits risk after UD law adoption, executives with higher compensation vega might perform differently before and after UD law. We predict that the impact of UD law adoption on alliance activities can be more pronounced for firms with higher vega, as executives are more likely to engage in alliance deals and possibly make riskier but more value-enhancing alliance deals.

To test our prediction, we collect top executives' compensation data from Execucomp database. Then, we follow Coles et al. (2006) to calculate top executives' compensation vega. Next, we use the mean value of top executives' vega to represent compensation vega of a firm in a given year. To test the impact of UD law adoption on firm's cumulative abnormal return for firms with higher executive compensation vega, we create a dummy variable Vega to show whether executives have higher vega in an alliance firm in a prior year before alliance announcement. Vega equals to one if the value of vega is above the median value of total observations, and vice versa. We conduct two subtests, where one is the regression with interactions between UD law and vega, and the other one is the regression in higher vega group and low vega group.

Table 9 shows the regression results. The results in Panel A suggest that managers with higher vega conduct more alliance deals after the UD law adoption. It suggests that manager tend to become less conservative during the post-UD law period. In Panel B, the coefficient of UD law is significantly positive, and the coefficient of interaction term between UD law and vega is also significantly positive at 5 percent level. It indicates that the effect of UD law on firm's stock return becomes stronger if executives in the alliance firms have higher compensation vega. In Panel C, the

subgroup tests also suggest that UD law adoption only has significantly positive effect on announcement return in the group with higher compensation vega. As for the regression results on ROA growth, although there is no significant coefficient in the group with higher compensation vega, the coefficient in the group with lower compensation vega is significantly negative. Overall, we could conclude that in the firms with higher executive compensation vega ex ante, the passage of UD law seems to encourage executives to make decisions in a less conservative manner.

[Table 9 about here]

5.2 Financial constraints

In this section, we investigate whether financial constraints could influence firm's decisions on alliance activities when there is less threat of shareholder litigation. Prior studies show that strategic alliance and joint ventures can help alleviate financial constraints for the participating firms (Fang et al., 2012; Chen et al., 2015). Ni and Yin (2018) show that weakened shareholder litigation threats cause a significant increase in the cost of debt. We therefore predict that when derivative lawsuit risk is weakened after the UD law passage, financially constrained firms are more likely to make alliance deals in their effort to alleviate their financial constraints and reduce their cost of debt. Hence, the impact of UD law adoption on alliance activity will be more pronounced for financially constrained firms.

To test the impact of financial constraints on the relation between alliance activity and UD law, we use several measures of financial constraints: free cash flow, dividend payment ratio, firm size, Kaplan and Zingales (1997) index and Whited and Wu (2006) index. Free cash flow can be used to indicate whether the firm is financially constrained. Firms with less free cash should be more financially constrained (e.g., Harford, 1999). Lower free cash flow, smaller firm size, lower dividend payment ratio, higher White-Wu index and Kaplan-Zingales index are likely to indicate that firms are financially constrained. We classify our sample into financially constrained and financially unconstrained firms and test the impact of UD law on the alliance performance. Table

10 reports our regression results. Our results show that UD law has significantly positive impact on alliance performance for financially constrained firms.

[Table 10 about here]

5.3 Other sub-sample test

We also do some other additional tests. First, we explore whether corporate governance could influence the sensitivity of alliance performance to the change of shareholder litigation risk. We apply institutional ownership and entrenchment index (E-index) as the proxies for internal corporate governance (Hartzell and Starks, 2003; Bebchuk et al. 2008; Aggarwal et al., 2011). Firms with dispersed ownerships are subject to weaker shareholder monitoring (Bourveau et al., 2018). High entrenchment index implies that managers are more entrenched and would use antitakeover provisions that are normally opposed by shareholders. Table A5 in appendix shows the results of sub-group test based on institutional ownership and E-index. The results indicate that firms in the group with lower institutional ownership and higher E-index gains higher announcement returns and higher ROA growth than the alliances made in the pre-UD law period. It seems that poor-governed firms are more likely to be affect by UD law on the decision of alliance.

Second, we investigate whether the UD law could influence the manager's decisions on partner selection. Alliance initiators have the discretionary power to choose their alliance counterparties, so alliance initiators are more likely to be affected by the derivative lawsuit risk. Due the discretionary power the alliance initiators have, we regard the initiators as dominant partners in alliance deals. Following Bodnaruk et al. (2013), we define the dominant partner is the one which has largest firm asset in the deal, while the other partners are junior partners. We test whether there are some differences of partner-specific characteristics before and after UD law adoption. The detailed results are shown in appendix Table A6, which partly indicate that managers are plausibly inclined to take more risky junior partners after the adoption of UD law.

6. Conclusion

In this paper, we examine the impact of shareholders litigation risk on alliance

performance. By using staggered adoption of UD law in 23 U.S. states as exogenous shocks to derivative lawsuit risk, we find that reduced derivative lawsuit risk after UD law adoption improves stock market response to alliance announcements. Further, we find that long term operating performance of firms engaging in alliances increases after the UD law adoption. These findings of both higher short-term and long-term performance of alliances suggest that weakened derivative lawsuit risk can encourage managers to make more value-enhancing alliances decisions while taking appropriate risk. We provide evidence consistent with the view that managers' over-conservative approach possibly driven by potential litigation threats might indeed distort their incentives for pursuing optimal alliance deals, and thus resulting in lower shareholder wealth.

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Table 1: Summary statistics

This table reports the summary statistics of the main variables. *CAR (-1, +1)* measures the 3-day cumulative abnormal returns surrounding the announcement date of alliances. *UD Law* is an indicator that equals one if the participant's incorporation state has previously passed the UD law. *Technology Transfer* is an indicator that equals one if the participant transfers technology to another participant or to the alliance. *Industry Relatedness* is an indicator that equals one if all participants of a corporate alliance have the same two-digit SIC code. *Alliance Industry* is an indicator that equals one if a given participant and the formed alliance activity has the same two-digit SIC code. *High Technology* is an indicator that equals one if the participant is in the high-tech industry. *Ln (Assets)* is the natural logarithm of total assets. *Book-to-Market* is the ratio of book value of equity to market value of equity. *R&D-to-Sales* is the ratio of R&D to total sales. *Cash Holdings* equals the cash and cash equivalents scaled by total assets. *Capital Expenditures* equals the capital expenditures scaled by total assets. *Sales Growth* is the growth of annual sales. *Returns on Equity* is the ratio of earnings to average equity values. *Leverage* is the ratio of long-term debt to the total equity. *Price-to-Earnings* equals the year-end stock price divided by the earnings per share. *Compound Returns* is compounded raw daily returns over the fiscal year. *Herfindahl Index* measures the participant's industry concentration.

Panel A: Full sample

Variables	Obs	Mean	SD	P25	P50	P75
CAR (-1, +1)	870	1.163	6.983	-2.255	0.275	3.608
UD Law	870	0.628	0.484	0	1	1
Technology Transfer	870	0.140	0.347	0	0	1
Industry Relatedness	870	0.400	0.490	0	0	1
Alliance Industry	870	0.369	0.483	0	0	1
High Technology	870	0.334	0.472	0	0	1
Ln (Assets)	870	19.535	2.393	17.724	19.282	21.487
Book-to-Market	870	0.441	0.350	0.222	0.366	0.576
R&D-to-Sales	870	0.161	0.550	0	0.033	0.127
Cash Holdings	870	0.178	0.190	0.023	0.096	0.290
Capital Expenditures	870	0.065	0.054	0.027	0.051	0.082
Sales Growth	870	0.313	0.840	0.004	0.113	0.316
Returns on Equity	870	-0.039	0.502	-0.022	0.096	0.169
Leverage	870	0.399	1.384	0.005	0.193	0.572
Price-to-Earnings	870	17.867	75.446	-3.172	16.550	26.136
Compound Returns	870	0.277	0.935	-0.211	0.071	0.412
Herfindahl Index	870	0.132	0.091	0.065	0.108	0.170

Panel B: Pre- vs. Post-UD laws adoption

	Obs.		Mean		Median	
	Pre	Post	Pre	Post	Pre	Post
CAR (-1, +1)	324	546	0.810	1.372	0.320	0.247
Technology Transfer	324	546	0.164	0.126	0	0
Industry Relatedness	324	546	0.435	0.379	0	0
Alliance Industry	324	546	0.395	0.353	0	0
High Technology	324	546	0.448	0.267	0	0
Ln (Assets)	324	546	19.924	19.305	20.248	19.116
Book-to-Market	324	546	0.409	0.460	0.329	0.379
R&D-to-Sales	324	546	0.255	0.105	0.071	0.014
Cash Holdings	324	546	0.190	0.170	0.098	0.093
Capital Expenditures	324	546	0.070	0.062	0.064	0.046
Sales Growth	324	546	0.208	0.375	0.063	0.165
Returns of Equity	324	546	-0.042	-0.038	0.089	0.101
Leverage	324	546	0.377	0.413	0.167	0.226
Price-to-Earnings	324	546	14.448	19.895	14.898	17.177
Compound Returns	324	546	0.231	0.305	0.086	0.070
Herfindahl Index	324	546	0.117	0.141	0.086	0.120

Table 2: Alliance activities and the UD laws effect

This table shows the results of regressing the number of alliance activities on the adoption of UD laws. The dependent variable in OLS regression model is the logarithm of one plus the number of alliance activities that a firm has done in pre-UD law period or post-UD law period. We use dummy dependent variable in Probit model, which equals to one if a firm has formed alliance in pre-UD law period or post-UD law period. Columns (1) and (2) reports results of OLS and Probit regressions using the sample of -5 to +5 years centering on the year of UD law adoption, respectively. Columns (3) and (4) reports results of OLS and Probit regressions using the sample of -3 to +3 years centering on the year of UD law adoption, respectively. The control variables are the average values over pre-UD or post-UD law periods, which include firm characteristics and the total number of Compustat firms at state-year level. All regressions control for the state and industry fixed effects. Standard errors are clustered at the state level, and robust *t*-statistics are reported in parentheses. ***, **, and * indicate statistically significance at the 1%, 5%, and 10%, respectively.

	(-5, +5) year window		*(-3, +3) year window*	
	OLS	Probit	OLS	Probit
	(1)	(2)	(3)	(4)
UD law	0.060***	0.269**	0.067***	0.375***
	(3.12)	(2.53)	(7.05)	(4.91)
Ln (Assets)	0.042***	0.165***	0.030***	0.162***
	(4.84)	(5.72)	(4.62)	(6.16)
Book-to-Market	-0.028***	-0.084	-0.022*	-0.080
	(-3.31)	(-1.36)	(-2.05)	(-0.80)
R&D-to-Sales	0.157***	0.437***	0.229*	0.740*
	(3.66)	(3.30)	(1.88)	(1.81)
Cash Holdings	0.073	0.111	0.106*	0.479*
	(1.40)	(0.50)	(1.94)	(1.82)
Capital Expenditures	0.006	-0.140	0.051	-0.134
	(0.06)	(-0.26)	(0.52)	(-0.22)
Sales Growth	0.002	0.005	0.013	0.068*
	(0.16)	(0.12)	(1.48)	(1.77)
Returns of Equity	-0.019	-0.089	-0.017*	-0.105***
	(-1.46)	(-1.28)	(-2.05)	(-2.78)
Leverage	-0.005	-0.032	-0.007	-0.039
	(-0.65)	(-0.92)	(-1.40)	(-1.25)
Price-to-Earnings	0.0003	0.002*	0.0005***	0.003***
	(0.98)	(1.68)	(3.90)	(5.50)
Compound Returns	0.057*	0.255**	0.013	0.039
	(1.72)	(2.37)	(0.79)	(0.54)
Herfindahl Index	-0.080	-0.261	-0.075	-0.306
	(-1.32)	(-0.81)	(-1.34)	(-0.79)
Firm number	-0.0002	-0.001	-0.00004	0.001
	(-0.52)	(-0.31)	(-0.36)	(0.90)
Constant	0.140***	-1.084***	0.107*	-1.304***
	(2.87)	(-5.40)	(1.76)	(-3.86)
State fixed effect	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES
Observations	1,939	1,920	1,750	1,718
Adjusted (or Psuedo) R^2	0.096	0.117	0.091	0.134

Table 3: The effect of UD laws on the alliance announcement performance

This table reports the baseline regression results of the effect of UD laws on alliance participants' short-term announcement return. The dependent variable is the three-day cumulative abnormal returns, CAR (-1, +1), around the alliance announcement date, which is estimated with the market-adjusted model and the equal-weighted CRSP index return. The main explanatory variable is *UD Law*, which is an indicator that equals one if the participant's incorporation state has previously passed the UD law. Control variables are summarized and defined in appendix Table B3. All regressions control for the year, state, and industry fixed effects. Standard errors are clustered at the state level, and robust *t*-statistics are reported in parentheses. ***, **, and * indicate statistically significance at the 1%, 5%, and 10%, respectively.

	CAR (-1, +1)		
	(1)	(2)	(3)
UD Law	2.822**	2.968**	3.014***
	(2.72)	(2.58)	(3.18)
Technology Transfer		2.507***	2.308***
		(4.13)	(3.90)
Industry Relatedness		-0.537	-0.439
		(-1.55)	(-1.26)
Alliance Industry		0.185	0.230
		(0.29)	(0.43)
High Technology		1.309	1.196
		(1.10)	(1.01)
Ln (Assets)			-0.617***
			(-3.89)
Book-to-Market			2.119***
			(3.04)
R&D-to-Sales			0.489
			(0.82)
Cash Holdings			-3.442**
			(-2.81)
Capital Expenditures			-8.808
			(-1.38)
Sales Growth			-0.461
			(-0.73)
Returns of Equity			-1.515***
			(-3.33)
Leverage			-0.176
			(-1.72)
Price-to-Earnings			0.003
			(0.97)
Compound Returns			0.268
			(0.64)
Herfindahl Index			7.025***
			(3.16)
Constant	-0.742	-0.613	10.660***
	(-0.41)	(-0.32)	(3.40)
Year fixed effect	YES	YES	YES
State fixed effect	YES	YES	YES
Industry fixed effect	YES	YES	YES
Observations	870	870	870
Adjusted R^2	0.034	0.050	0.109

Table 4: The dynamic effect of UD laws on the announcement performance

This table reports the dynamic effect of UD law adoption on alliance participants' short-term announcement return. The dependent variable is the three-day cumulative abnormal returns, CAR (-1, +1), around the deal announcement, which is estimated with the market-adjusted model and the equal-weighted CRSP index return. Main variables of interests are *UD Law (-1), UD Law (0), UD Law (+1),* and *UD Law (2+)*, which represent the corresponding year relative to the year of UD law adoption. Control variables are summarized and defined in appendix Table B3. All regressions control for the year, state, and industry fixed effects. Standard errors are clustered at the state level, and robust *t*-statistics are reported in parentheses. ***, **, and * indicate statistically significance at the 1%, 5%, and 10%, respectively.

	CAR (-1, +1)		
	(1)	(2)	(3)
UD Law (-1)	1.169	1.229	1.035
	(1.01)	(1.10)	(0.88)
UD Law (0)	2.968	3.091	3.238*
	(1.68)	(1.66)	(1.98)
UD Law (+1)	4.292***	4.575***	4.177***
	(4.19)	(4.10)	(3.71)
UD Law (2+)	3.742**	3.966***	3.848***
	(2.78)	(3.17)	(3.08)
Technology Transfer		2.539***	2.330***
		(4.34)	(3.98)
Industry Relatedness		-0.512	-0.422
		(-1.53)	(-1.20)
Alliance Industry		0.209	0.246
		(0.32)	(0.45)
High Technology		1.305	1.207
		(1.11)	(1.02)
Ln (Assets)			-0.608***
			(-3.78)
Book-to-Market			2.115***
			(3.09)
R&D-to-Sales			0.480
			(0.78)
Cash Holdings			-3.458**
			(-2.80)
Capital Expenditures			-8.957
			(-1.40)
Sales Growth			-0.433
			(-0.69)
Returns of Equity			-1.532***
			(-3.33)
Leverage			-0.166
			(-1.65)
Price-to-Earnings			0.004
			(0.99)
Compound Returns			0.252
			(0.60)
Herfindahl Index			7.155***
			(3.23)
Constant	0.078	0.303	11.200***
	(0.04)	(0.15)	(3.04)
Year fixed effect	YES	YES	YES
State fixed effect	YES	YES	YES
Industry fixed effect	YES	YES	YES
Observations	870	870	870
Adjusted R^2	0.032	0.048	0.106

Table 5: The effect of UD laws on the long-term announcement premium

This table reports the regression results of the effect of UD laws on alliance participants' long-term announcement return. The dependent variable is the long-term announcement premium over the (-1, +21) day time window around the announcement date, which is estimated with the market model and the equal-weighted CRSP index return. Panel A reports the regression results of the baseline model. Panel B reports the regression results of the dynamic model. The main explanatory variable is *UD Law*, which is an indicator that equals one if the participant's incorporation state has previously passed the UD law. Control variables are summarized and defined in appendix Table B3. All regressions control for the year, state, and industry fixed effects. Standard errors are clustered at the state level, and robust *t*-statistics are reported in parentheses. ***, **, and * indicate statistically significance at the 1%, 5%, and 10%, respectively.

Panel A: baseline model

	CAR(-1,+21)		
	(1)	(2)	(3)
UD Law	5.011**	4.897**	6.635***
	(2.21)	(2.22)	(3.34)
Deal characteristics	NO	NO	YES
Firm characteristics	NO	YES	YES
Year fixed effect	YES	YES	YES
State fixed effect	YES	YES	YES
Industry fixed effect	YES	YES	YES
Observations	832	832	832
Adjusted R2	0.020	0.022	0.071

Panel B: dynamic model

	CAR(-1,+21)		
	(1)	(2)	(3)
UD law(-1)	-0.730	-0.882	-0.017
	(-0.28)	(-0.32)	(-0.01)
UD law(0)	2.331	1.835	4.292*
	(0.84)	(0.65)	(1.94)
UD law(+1)	11.768*	11.958**	14.205***
	(2.07)	(2.21)	(3.31)
UD law(2+)	9.685	9.401	12.215**
	(1.35)	(1.37)	(2.27)
Deal characteristics	NO	NO	YES
Firm characteristics	NO	YES	YES
Year fixed effect	YES	YES	YES
State fixed effect	YES	YES	YES
Industry fixed effect	YES	YES	YES
Observations	832	832	832
Adjusted R2	0.024	0.026	0.076

Table 6: The effect of UD laws on the long-term operating performance

This table reports the regression results of the effect of UD laws on alliance participants' long-term operating performance. The dependent variables, ΔROA_1, ΔROA_2, and ΔROA_3, which measures the change of returns on assets (ROA) from the year of corporate alliances to the corresponding year-1, year-2, and year-3 in the post-alliance horizon. The main explanatory variable is *UD Law*, which is an indicator that equals one if the participant's incorporation state has previously passed the UD law. Other control variables are summarized and defined in appendix Table B3. All regressions control for the year, state, and industry fixed effects. Standard errors are clustered at the state level, and robust *t*-statistics are reported in parentheses. ***, **, and * indicate statistically significance at the 1%, 5%, and 10%, respectively.

	Return on Assets (ROA)		
	ΔROA_1	ΔROA_2	ΔROA_3
	(1)	(2)	(3)
UD Law	0.065**	0.114**	0.093**
	(2.19)	(2.60)	(2.24)
Technology Transfer	-0.033	-0.063*	-0.036
	(-0.77)	(-2.02)	(-1.00)
Industry Relatedness	-0.009	-0.024	-0.007
	(-0.97)	(-1.69)	(-0.34)
Alliance Industry	-0.013	-0.027**	-0.017
	(-0.86)	(-2.22)	(-0.88)
High Technology	0.016	-0.007	-0.056
	(0.43)	(-0.26)	(-1.16)
Ln (Assets)	-0.007*	-0.005	-0.007
	(-1.90)	(-1.15)	(-1.35)
Book-to-Market	-0.006	0.018	-0.047
	(-0.20)	(0.59)	(-1.00)
R&D-to-Sales	-0.027	0.013	0.045
	(-1.24)	(0.53)	(1.49)
Cash Holdings	0.053	-0.187	0.009
	(0.49)	(-1.17)	(0.06)
Capital Expenditures	0.309	0.098	0.179
	(1.02)	(0.30)	(0.49)
Sales Growth	-0.092**	-0.014	-0.043
	(-2.61)	(-0.83)	(-1.37)
Returns of Equity	-0.079***	-0.068*	-0.084
	(-2.91)	(-1.76)	(-1.60)
Leverage	-0.016	-0.009	-0.010
	(-1.14)	(-1.28)	(-1.09)
Price-to-Earnings	0.0002	0.0001	0.0001
	(1.05)	(0.39)	(0.41)
Compound Returns	-0.052*	-0.017	-0.047**
	(-1.85)	(-1.55)	(-2.44)
Herfindahl Index	-0.004	0.054	0.124
	(-0.03)	(0.43)	(1.33)
Constant	0.061	0.295**	0.278***
	(0.54)	(2.56)	(3.11)
Year fixed effect	YES	YES	YES
State fixed effect	YES	YES	YES
Industry fixed effect	YES	YES	YES
Observations	684	684	684
Adjusted R^2	0.264	0.095	0.163

Table 7: The effect of UD laws on the long-term stock performance

This table reports results of the long-term stock performance of alliance participants in relation to the UD laws. Panel A reports the regression results of firms' excessive monthly returns on the Fama and French (1992) three factors and the Carhart (1997) momentum factor, which are the excess market returns (*MKTRF*), small size portfolios minus big size portfolios (*SMB*), value portfolios minus growth portfolios (*HML*), and winner portfolios minus loser portfolios (UMD). *Pre-UD* (*Post-UD*) indicates alliances formed in the five-year period before (after) the adoption of UD laws. Panel B reports the regression results of the effect of UD laws on alliance participants' long-term buy-and-hold abnormal returns over 12, 24, and 36 months following the corporate alliances. BHAR is calculated based on the difference between buy-and-hold returns of alliance firms and the characteristic-based matched portfolios, where the firms in matched portfolios are selected on the basis of their market size and book-to-market ratio. Deal and firm characteristics are the same as those employed in Table 3, and all regressions control for the year, state, and industry fixed effects. Standard errors are clustered at the state level, and robust *t*-statistics are reported in parentheses. ***, **, and * indicate statistically significance at the 1%, 5%, and 10%, respectively.

Panel A: Calendar-time regressions

	12 months		24 months		36 months	
	Pre-UD	Post-UD	Pre-UD	Post-UD	Pre-UD	Post-UD
α	0.002	0.013**	0.006	0.010**	0.008**	0.011***
	(0.43)	(2.13)	(1.64)	(2.43)	(2.38)	(3.24)
MKTRF	0.663***	0.855***	0.880***	0.915***	0.950***	0.861***
	(5.31)	(6.22)	(9.70)	(9.29)	(12.25)	(10.48)
SMB	0.775***	0.811***	0.710***	0.899***	0.805***	0.951***
	(5.03)	(4.66)	(6.30)	(7.12)	(8.42)	(8.92)
HML	-0.749***	-0.517***	-0.629***	-0.515***	-0.481***	-0.399***
	(-3.77)	(-2.70)	(-4.32)	(-3.75)	(-3.88)	(-3.43)
UMD	-0.481***	-0.401***	-0.443***	-0.459***	-0.524***	-0.460***
	(-4.35)	(-3.50)	(-5.43)	(-5.51)	(-7.52)	(-6.54)
Observations	233	229	248	253	260	272
Adjusted R^2	0.405	0.362	0.572	0.534	0.655	0.590
F statistics	40.42	33.35	83.63	73.22	123.8	98.47

Panel B: Buy-and-hold abnormal returns (BHARs)

	12 months	24 months	36months
	(1)	(2)	(3)
UD Law	0.189**	0.402**	-0.051
	(2.39)	(2.17)	(-0.21)
Deal Characteristics	YES	YES	YES
Firm Characteristics	YES	YES	YES
Year fixed effect	YES	YES	YES
State fixed effect	YES	YES	YES
Industry fixed effect	YES	YES	YES
Observations	736	736	736
Adjusted R^2	0.080	0.066	0.117

Table 8: Alliance performance and UD laws: Propensity score matching

This table reports regression results of the effect of UD laws on alliance participants' short-term announcement performance and long-term operating performance using a propensity-score-matched sample based on alliance participants' total assets, profit margin, OIBD/Sales, and HHI. The control group consists of alliance participants that its incorporate state has not passed the UD laws at the time of alliances. Panel A reports results of post-match diagnostic tests and Panel B reports the regression results. Columns (1) and (2) in Panel B reports results of OLS and Probit regressions using the sample of -5 to +5 years centering on the year of UD law adoption, respectively. Columns (3) shows the regression results on *CAR (-1, +1),* which measures the three-day cumulative abnormal returns around the deal announcement. Column(4) to (6) shows the regression results on ΔROA_X, which measures the change of returns on assets (ROA) from the year of corporate alliances to the corresponding year-1, year-2, and year-3 in the post-alliance horizon. Deal and firm characteristics are the same as those employed in Table 3, and all regressions control for the year, state, and industry fixed effects. Standard errors are clustered at the state level, and robust *t*-statistics are reported in parentheses. ***, **, and * indicate statistically significance at the 1%, 5%, and 10%, respectively.

Panel A: Post-matching diagnostic test

	Treated		Control			
	Mean	Obs.	Mean	Obs.	*t*-value	*p*-value
Assets ($ bil)	2.860	538	2.757	605	0.254	0.799
Profit margin	-0.298	538	-0.412	605	0.745	0.456
OIBD/sales	-0.116	538	-0.291	605	1.345	0.179
HHI	0.142	538	0.144	605	-0.333	0.739

Panel B: UD law effect on CARs of PSM matched sample

	(-5, +5) year window		*CAR (-1, +1)*	ΔROA_1	ΔROA_2	ΔROA_3
	(1)	(2)	(3)	(4)	(5)	(6)
UD Law	0.115***	0.659***	3.802***	0.110***	0.101*	0.092
	(5.69)	(3.24)	(2.93)	(4.88)	(1.82)	(1.33)
Deal characteristics	NO	NO	YES	YES	YES	YES
Firm characteristics	YES	YES	YES	YES	YES	YES
Year fixed effect	NO	NO	YES	YES	YES	YES
State fixed effect	YES	YES	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES	YES	YES
Observations	4,240	4,135	1,143	907	907	907
Adjusted R^2	0.081	0.136	0.062	0.109	0.087	0.049

Table 9: Vega and the UD law effect

This table reports the regressions of the effect of UD laws and vega on alliance participants' short-term announcement return. In column (1) and (2) of Panel A the dependent variable in OLS regression model is the logarithm of one plus the number of alliance activities that a firm has done in pre-UD law period or post-UD law period, which is (-5,+5) year window. The dependent variable in Probit model is a dummy variable, which equals to one if a firm makes alliance in pre-UD law period of post-UD law period. In column (2) and (3), the dependent variable is an indicator variable equal to 1 if a firm makes an alliance deal in a given year, and zero otherwise. In column (1) and (2) of Panel B the dependent variable is CAR(-1,+1) and ΔROA_2 . *CAR (-1, +1) is* the three-day cumulative abnormal returns around the deal announcement, which is estimated with the market-adjusted model and the equal-weighted CRSP index return. ΔROA_2 is the two years ROA growth, which are the changes from year of corporate alliances to the corresponding year-2 in the post-alliance period. *Vega* is an indicator that equals to one if the executives' vega is higher than the median value of total observations. Executives' Vega measures the average compensation vega of top executives in a firm in the fiscal year before the alliance announcement. The median value of *Vega* is used to partition the sample. Panel A shows the regression results on the number of alliance activities. All regressions control for the year, state, and industry fixed effects. Standard errors are clustered at the state level, and robust *t*-statistics are reported in parentheses. ***, **, and * indicate statistically significance at the 1%, 5%, and 10%, respectively.

Panel A: Alliance activities

	Number of alliances: OLS		Likelihood of an alliance	
	High vega	Low vega	High vega	Low vega
UD law	0.151**	0.017	0.589***	0.095
	(2.20)	(0.19)	(3.72)	(0.19)
Firm characteristics	YES	YES	YES	YES
Firm number	YES	YES	YES	YES
State fixed effect	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES
Observations	209	209	198	165
Adjusted (or Psuedo) R^2	0.069	0.141	0.168	0.309

Panel B: Alliance performance

	CAR(-1,+1)		$\boldsymbol{\Delta ROA_2}$	
	High vega	Low vega	High vega	Low vega
UD law	7.156**	1.320	-0.097	-0.079*
	(2.66)	(0.34)	(-1.50)	(-1.93)
Deal characteristics	YES	YES	YES	YES
Firm characteristics	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
State fixed effect	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES
Observations	176	176	154	147
Adjusted R^2	0.351	0.246	0.705	0.537

Table 10: Financial constraints and the UD law effect

This table presents the results of regression of CAR(-1,+1) on UD law adoption for firms with higher financial constraints. Financial constraints are measured by firm characteristics. The sample is grouped by the median value for each proxy. The lower group means the value of the proxy is less than the median of total sample, vice versa. Panel A and panel B are the effect of UD law on the CAR(-1,+1) around alliance announcement date and two years ROA growth in the post-alliance period, respectively. The three-day cumulative abnormal returns CAR (-1, +1) is around the deal announcement, which is estimated with the market-adjusted model and the equal-weighted CRSP index return. The two years ROA growth are changes from year of corporate alliances to the corresponding year-2 in the post-alliance period. Standard errors are clustered at state level, and robust t-statistics are reported in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Panel A: UD law effect on CARs

	Firm Size		**Dividend Payout**		**FCF-to-Assets**		**WW index**		**KZ index**	
CAR(-1,+1)	Lower	Higher	Lower	Higher	Lower	Higher	Lower	Higher	Lower	Higher
UD Law	4.416**	1.259	5.366***	1.166	4.395*	2.114	0.579	4.282***	3.529	3.839*
	(2.69)	(1.26)	(3.63)	(1.42)	(2.08)	(1.68)	(0.49)	(3.59)	(1.71)	(2.04)
Deal characteristics	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm characteristics	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
State fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	433	437	421	449	420	450	440	430	437	433
Adjusted R^2	0.118	0.134	0.148	0.119	0.134	0.045	0.091	0.122	0.068	0.171

Panel B: UD law effect on ROA growth

	Firm Size		**Dividend Payout**		**FCF-to-Assets**		**WW index**		**KZ index**	
$\boldsymbol{\Delta ROA_2}$	Lower	Higher	Lower	Higher	Lower	Higher	Lower	Higher	Lower	Higher
UD Law	0.138***	0.014	0.076	0.025	0.111*	-0.004	0.003	0.133***	0.017	0.101*
	(2.99)	(0.55)	(1.05)	(0.73)	(1.92)	(-0.14)	(0.12)	(3.05)	(0.40)	(1.85)
Deal characteristics	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm characteristics	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
State fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	309	350	303	356	299	360	334	325	308	351
Adjusted R^2	0.171	0.456	0.140	0.265	0.271	0.313	0.295	0.196	0.307	0.062

Appendix A1: Correlation matrix

This table reports the Pearson correlation coefficients of the main variables used in the following analysis, including CAR (-1, +1), UD Law, Technology Transfer (TechT), Industry Relatedness (IndR), Alliance Industry (AInd), High Technology (HTech), Ln (Assets), Book-to-Market (B/M), R&D-to-sales (R&D), Cash Holdings (Cash), Capital Expenditures (Capex), Sales growth (SalesG), Returns of Equity (ROE), Leverage (Lev), Price-to-Earnings (P/E), Compound Returns (CRets), and Herfindahl Index (HHI). Variables are summarized and defined in appendix Table B3.

	CAR	UD Law	TechT	IndR	AInd	HTech	LnA	B/M	R&D	Cash	Capex	Sales G	ROE	Lev	P/E	CRets	HHI
CAR	1																
UD Law	0.039	1															
TechT	0.117	-0.052	1														
IndR	-0.050	-0.055	0.028	1													
AInd	0.022	-0.042	0.082	0.188	1												
HTech	0.075	-0.185	0.163	0.038	0.008	1											
LnA	-0.180	-0.125	-0.032	0.048	-0.027	-0.074	1										
B/M	0.095	0.070	-0.068	-0.045	-0.022	-0.101	-0.070	1									
R&D	0.063	-0.132	0.069	-0.017	-0.047	0.174	-0.198	-0.097	1								
Cash	0.023	-0.050	0.057	0.045	-0.022	0.238	-0.372	-0.150	0.380	1							
Capex	-0.052	-0.068	-0.034	0.040	0.003	-0.057	0.009	-0.014	-0.023	-0.144	1						
SalesG	-0.018	0.097	0.028	0.002	0.021	0.008	-0.167	-0.188	0.195	0.158	0.040	1					
ROE	-0.175	0.004	-0.032	0.016	-0.008	-0.123	0.294	0.079	-0.378	-0.254	0.017	-0.185	1				
Lev	-0.050	0.013	-0.053	0.005	0.026	-0.081	0.124	0.062	0.002	-0.119	-0.005	-0.033	-0.017	1			
P/E	0.048	0.035	0.039	-0.035	0.025	-0.032	-0.014	0.066	-0.094	-0.023	0.053	-0.123	0.131	-0.031	1		
CRets	0.026	0.038	-0.031	-0.006	-0.004	0.063	-0.089	-0.266	0.111	0.082	-0.117	0.361	0.012	-0.022	-0.022	1	
HHI	0.064	0.130	-0.089	-0.120	-0.166	-0.322	-0.072	0.154	-0.150	-0.164	-0.007	-0.077	0.100	-0.052	0.091	-0.038	1

Appendix A2: Robustness test for firms which didn't change incorporation states

This table reports regression results of the effect of UD laws on alliance performance by using firms which didn't change incorporate states. Columns (1) and (2) report results of OLS and Probit regressions using the sample of -5 to +5 years centering on the year of UD law adoption, respectively. Columns (3) shows the regression results on *CAR (-1, +1),* which measures the three-day cumulative abnormal returns around the deal announcement. Column(4) to (6) shows the regression results on ΔROA_X, which measures the change of returns on assets (ROA) from the year of corporate alliances to the corresponding year-1, year-2, and year-3 in the post-alliance horizon. Deal and firm characteristics are the same as those employed in Table 3, and all regressions control for the year, state, and industry fixed effects. Standard errors are clustered at the state level, and robust *t*-statistics are reported in parentheses. ***, **, and * indicate statistically significance at the 1%, 5%, and 10%, respectively.

	(-5, +5) year window		*CAR(-1,+1)*	ΔROA_1	ΔROA_2	ΔROA_3
	(1)	(2)	(3)	(4)	(5)	(6)
UD Law	0.059***	0.262**	3.222***	0.064**	0.114**	0.093**
	(3.03)	(2.44)	(3.60)	(2.16)	(2.61)	(2.22)
Technology Transfer			2.309***	-0.036	-0.064*	-0.037
			(3.95)	(-0.84)	(-2.06)	(-1.03)
Industry Relatedness			-0.455	-0.012	-0.026*	-0.008
			(-1.32)	(-1.14)	(-1.79)	(-0.39)
Alliance Industry			0.190	-0.012	-0.029**	-0.018
			(0.36)	(-0.75)	(-2.36)	(-0.90)
High Technology			1.182	0.017	-0.007	-0.055
			(0.99)	(0.46)	(-0.23)	(-1.16)
Ln (Assets)	0.041***	0.161***	-0.623***	-0.007	-0.005	-0.007
	(4.87)	(5.79)	(-4.24)	(-1.73)	(-1.19)	(-1.36)
Book-to-Market	-0.031***	-0.106*	2.205***	-0.006	0.021	-0.047
	(-3.27)	(-1.76)	(3.27)	(-0.20)	(0.67)	(-1.00)
R&D-to-Sales	0.158***	0.446***	0.468	-0.029	0.011	0.044
	(3.59)	(3.32)	(0.78)	(-1.30)	(0.44)	(1.46)
Cash Holdings	0.066	0.064	-3.520**	0.066	-0.184	0.009
	(1.29)	(0.30)	(-2.78)	(0.59)	(-1.13)	(0.06)
Capital Expenditures	-0.006	-0.221	-8.911	0.346	0.142	0.219
	(-0.06)	(-0.39)	(-1.38)	(1.13)	(0.43)	(0.59)
Sales Growth	0.001	0.001	-0.464	-0.092**	-0.014	-0.043
	(0.10)	(0.02)	(-0.75)	(-2.60)	(-0.83)	(-1.38)
Returns of Equity	-0.018	-0.085	-1.565***	-0.077**	-0.069*	-0.084
	(-1.45)	(-1.22)	(-3.28)	(-2.81)	(-1.76)	(-1.58)
Leverage	-0.004	-0.027	-0.179*	-0.016	-0.009	-0.010
	(-0.54)	(-0.78)	(-1.75)	(-1.15)	(-1.31)	(-1.08)
Price-to-Earnings	0.0004	0.002*	0.003	0.0002	0.0001	0.0001
	(1.15)	(1.95)	(0.96)	(1.20)	(0.52)	(0.53)
Compound Returns	0.055	0.242**	0.297	-0.052*	-0.016	-0.047**
	(1.68)	(2.24)	(0.71)	(-1.83)	(-1.48)	(-2.42)
Herfindahl Index	-0.076	-0.246	6.930***	-0.001	0.053	0.125
	(-1.27)	(-0.76)	(3.20)	(-0.01)	(0.43)	(1.36)
Firm number	-0.0001	-0.001				
	(-0.38)	(-0.21)				
Constant	0.142***	-1.047***	10.968***	0.043	0.289**	0.271***
	(3.06)	(-5.42)	(3.80)	(0.37)	(2.53)	(3.05)
Year fixed effect	NO	NO	YES	YES	YES	YES
State fixed effect	YES	YES	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES	YES	YES
Observations	1,931	1,912	865	680	680	680
Adjusted R^2	0.096	0.117	0.111	0.267	0.097	0.165

Appendix A3: Adoption of UD laws and state-level alliance environment

This table shows the results of endogeneity test regarding the state-level alliance determinants for the adoption of UD laws. The independent variables are the average determinates within each state at incorporation-year level. The state mean of each independent variables is also included in column (1) but not reported for brevity. Real GDP and GDP growth rate are added in column (2) and column (3). Standard errors are clustered at the state level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistically significance at the 1%, 5%, and 10%, respectively.

	UD LAW		
	(1)	(2)	(3)
Ln (Assets)	0.365		0.132
	(1.63)		(1.38)
Book-to-Market	0.110		-0.146
	(0.09)		(-0.19)
R&D-to-Sales	-1.869		-1.078
	(-1.58)		(-1.59)
Cash Holdings	-0.401		-0.399
	(-0.53)		(-0.35)
Capital Expenditures	-6.282		-6.463
	(-1.28)		(-1.41)
Sales Growth	0.544		0.450
	(0.81)		(0.89)
Returns of Equity	-1.104		-0.532
	(-1.10)		(-0.86)
Leverage	-0.408		-0.196
	(-1.20)		(-0.79)
Price-to-Earnings	0.000		0.0001
	(0.66)		(0.18)
Compound Returns	1.036		0.772
	(1.41)		(1.34)
Herfindahl Index	-4.593		-0.545
	(-1.31)		(-0.23)
Real GDP		0.001	0.001
		(1.45)	(0.63)
GDP growth rate		-0.987	-0.041
		(-0.62)	(-0.02)
Constant	-1.447	-1.103***	-3.140*
	(-0.80)	(-5.62)	(-1.67)
Observations	71	71	71
Pseudo R^2	0.280	0.011	0.180

Appendix A4: Placebo test

This table presents the placebo test results. The dependent variables are the alliance performance, including CAR(-1,+1) around announcement date and ROA growth in the post-UD law period. In the placebo test, we randomly assign a pseudo-event year during the pre-UD law adoption periods. We use Pseudo_UD as the indicator variable for the pseudo-event, which equals one for the post pseudo-event year, and zero otherwise. We keep other control variables and fixed effects as the same as the baseline model. Standard errors are clustered at the state level, and robust t-statistics are reported in parentheses. ***, **, and * indicate statistically significance at the 1%, 5%, and 10%, respectively.

	CAR(-1,+1)			ΔROA_1	ΔROA_2	ΔROA_3
	(1)	(2)	(3)	(4)	(5)	(6)
Pseudo_UD	0.187	0.050	-0.501	-0.044	-0.050	-0.052
	(0.18)	(0.04)	(-0.40)	(-1.70)	(-1.03)	(-1.33)
Deal characteristics	NO	YES	YES	YES	YES	YES
Firm characteristics	NO	NO	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES
State	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES
Observations	663	663	663	538	538	538
Adjusted R^2	0.0364	0.0374	0.0782	0.146	0.140	0.174

Appendix A5: Corporate governance and the UD laws effect

This table reports the regressions of the effect of UD laws and the corporate governance on alliance deals. The dependent variables in panel A and panel B are the three-day cumulative abnormal returns and two years ROA growth in post-alliance period, respectively. The three-day cumulative abnormal returns *CAR (-1, +1)* is around the deal announcement, which is estimated with the market-adjusted model and the equal-weighted CRSP index return. The two years ROA growth are changes from year of corporate alliances to the corresponding year-2 in the post-alliance period. *IO* is the year-end fraction of shares outstanding owned by institutional fund managers. *EI* is the annual entrenchment index. All regressions control for the year, state, and industry fixed effects. Standard errors are clustered at the state level, and robust *t*-statistics are reported in parentheses. ***, **, and * indicate statistically significance at the 1%, 5%, and 10%, respectively.

Panel A: Institutional ownership, Entrenchment index and CARs

	CAR(-1,+1)			
	IO High	*IO* low	*EI* High	*EI* low
UD law	2.828	3.472**	2.608*	-1.995
	(1.35)	(2.17)	(1.83)	(-0.86)
Deal characteristics	YES	YES	YES	YES
Firm characteristics	YES	YES	YES	YES
Year	YES	YES	YES	YES
State	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Observations	435	435	194	127
Adjusted R^2	0.102	0.137	0.116	0.190

Panel B: Institutional ownership, Entrenchment index and ROA growth

	$\boldsymbol{\Delta ROA_2}$			
	IO High	*IO* low	*EI* High	*EI* low
UD law	0.007	0.276*	0.030**	-0.027
	(0.23)	(1.98)	(2.32)	(-1.62)
Deal characteristics	YES	YES	YES	YES
Firm characteristics	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
State fixed effect	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES
Observations	338	340	159	104
Adjusted R^2	0.346	0.160	0.458	0.953

Appendix A6: Dominant partners and risk-taking

This table shows the dominant partners with risk-taking. Dominant alliance partner is the firm with largest book value of assets among all partners in alliance deals, otherwise are junior partners. As for the deal which has only one partner available in the sample, we treat such partner also as dominant partner. Panel A shows the difference between dominant partner and junior partner. The sample only includes the dominant and junior partners in alliance where the dominant partners are incorporated at UD law states. Column (1) presents the mean value of junior partners, and column (2) present the mean value of dominant partners. Column (3) shows the t-statistics from t-tests that compare the mean value between two groups. Panel B shows the difference of junior partners in alliance deals which were formed before UD law adoption and after UD law adoption. The observations in the sample are the junior partners where dominant partners are incorporated at UD law states. Column (1) and Column (2) present the mean value of junior partners in post-UD law period and pre-UD law period, respectively. Pre UD indicates that their dominant partners announce alliance before UD law adoption in dominate partner's states. Post UD indicates that their dominant partners announce alliance after UD law adoption in dominate partner's states. Column (3) shows the t-statistics from t-tests that compare the mean value between two groups. Panel C shows the difference of deal characteristics which were formed before and after UD law adoption. Panel D is the regression results on cumulative abnormal returns by using the subgroup of dominant and junior partner. Column (1) and column (2) are the dominant partner sample and junior partner sample, respectively. Panel E is the regression results on the change of ROA. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Panel A: Dominant partners and junior partners

	(1) Dominant partner		**(2) Junior partner**		**(3) Diff**
	Mean	**Obs.**	**Mean**	**Obs.**	
Asset(million)	2,849.200	672	758.020	122	2091.181***
ROE	-0.037	672	-0.215	122	0.178***
Cash holding	0.165	672	0.317	122	-0.152***
R&D/sales	0.179	672	0.917	122	-0.738***
Leverage	0.393	672	0.419	122	-0.025

Panel B: Deal characteristics

	(1)		(2)		(3)
	Post UD		**Pre UD**		**Diff**
	Mean	**Obs.**	**Mean**	**Obs.**	
Industry relatedness	0.363	416	0.395	256	-0.032
Alliance industry	0.351	416	0.383	256	-0.032
Technology transfer	0.118	416	0.152	256	-0.035
High tech	0.245	416	0.449	256	-0.204***
Private partner	0.740	416	0.680	256	0.061*
					(1.698)

Panel C: Junior partners

	(1)		(2)		(3)
	Post UD		**Pre UD**		**Diff**
	Mean	**Obs.**	**Mean**	**Obs.**	
Asset(million)	848.365	73	623.423	49	224.942
ROE	-0.280	73	-0.118	49	-0.162

Cash holding	0.281	73	0.369	49	-0.088*
R&D/sales	0.677	73	1.798	49	-1.122**
Leverage	0.443	73	0.382	49	0.061

Panel D: CAR in dominant and junior partner

CAR(-1,+1)	(1) Dominant	(2) Junior
UD law	3.026**	2.835
	(2.76)	(0.40)
Deal characteristics	YES	YES
Firm characteristics	YES	YES
Year	YES	YES
State	YES	YES
Industry	YES	YES
Observations	672	122
Adjusted R^2	0.116	0.223

Panel E: ROA growth in dominant and junior partner

	Dominant			Junior		
ROA growth	ΔROA_1	ΔROA_2	ΔROA_3	ΔROA_1	ΔROA_2	ΔROA_3
UD law	0.083*	0.122*	0.100*	0.420*	0.315	0.493
	(1.82)	(1.96)	(1.85)	(1.81)	(1.61)	(1.35)
Deal characteristics	YES	YES	YES	YES	YES	YES
Firm characteristics	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES
State	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES
Observations	520	520	520	91	91	91
Adjusted R^2	0.178	0.069	0.105	0.141	-0.145	-0.217

Appendix B1: Adoption of the universal demand (UD) laws

This table reports in chronological order the staggered adoption of the universal demand (UD) laws by 23 U.S. states between 1989 and 2005. The adoption years, states, and citations are reported.

Year of adoption	State	Citation
1989	GA	Georgia Code Ann. § 14-2-742
	MI	Michigan Comp. Laws Ann. § 450.1493a
1990	FL	Florida Stat. Ann. § 607.07401
1991	WI	Wisconsin Stat. Ann. § 180.742
1992	MT	Montana Code. Ann. § 35-1-543
	VA	Texas Bus. Org. Code. Ann. 607.07401
	UT	Utah Code. Ann. § 16-10a-740(3)
1993	NH	New Hampshire Rev. Stat. Ann. § 293-A:7.42
	MS	Mississippi Code Ann. § 79-4-7.42
1995	NC	North Carolina Gen. Stat. § 55-7-42
1996	AZ	Arizona Rev. Stat. Ann. § 10-742
	NE	Nebraska Rev. Stat. § 21-2072
1997	CT	Connecticut Gen. Stat. Ann. § 33-722
	ME	Maine Rev. Stat. Ann. 13-C, § 753
	PA	Cuker v. Mikalauskas (547 Pennsylvania. 600, 692 A.2d 1042)
	TX	Texas Bus. Org. Code. Ann. 607.07401
	WY	Wyoming Stat. § 17-16-742
1998	ID	Idaho Code § 30-1-742
2001	HI	Hawaii Rev. Stat. § 414-173
2003	IA	Iowa Code Ann. § 490.742
2004	MA	Massachusetts Gen. Laws. Ann. Ch. 156D, § 7.42
2005	RI	Rhode Island Gen. Laws. § 7-1.2-710(C)
	SD	South Dakota Codified Laws 47-1A-742

Appendix B2: Sample selection and remaining observations

This table reports the sample selection criteria and the number of remaining observations.

Steps	Sample selection criteria	Number of observations
U.S. domestic corporate alliances	(1) Alliance participants are U.S. firms publicly traded on Amex, NYSE, or Nasdaq. (2) The status of alliance deals is defined as 'completed' in SDC. (3) Exclude utilities (SIC 4900-4999) and financials (SIC 6000-6999). (4) Alliance participants can be found on the CRSP and Compustat annual databases.	22,867
No missing variables	(5) Exclude observations with missing variables required for the main analyses.	21,518
UD law states only	(6) Keep alliance participants incorporated in the U.S. states that have passed UD laws, including GA, MI, FL, WI, MT, VA, UT, NH, MS, NC, AZ, NE, CT, ME, PA, TX, WY, ID, HI, IA, MA, RI, and SD.	2,145
The "cohort" approach	(7) Following Gormley and Matsa (2011) and Appel (2016), keep corporate alliances announced within the (-5, +5) years window surrounding the adoption of UD laws.	870

Appendix B3: Variable Definitions

Variables	Definition
Main variable of interests	
UD Law	An indicator that equals one if the state that alliance participant incorporated in has passed the UD law in a given year between 1989 and 2005, and zero otherwise
Dependent variables	
CAR (-1, +1)	Cumulative abnormal returns from -1 day to +1 day of the announcement date of corporate alliances, calculated with the market-adjusted model and the equal-weighted CRSP index
ΔROA	Changes of return on assets (ROA) from the year of corporate alliances to the corresponding year-1, year-2, and year-3 in the post-alliance horizon
BHAR	Buy-and-hold abnormal returns in the post alliance period. Calculation method is following Barber and Lyon (1997) and Kothari and Warner(1997)
Deal Characteristics	
Technology Transfer	An indicator that equals one if one participant transfers technology to another participant or to the formed alliance, and zero otherwise
Industry Relatedness	An indicator that equals one if all participants of a given alliance have the same two-digit SIC code, and zero otherwise
Alliance Industry	An indicator that equals one if a given participant and the formed alliance activity has the same two-digit SIC code, and zero otherwise
High Technology	An indicator that equals one if the participant is in a high-tech industry (SIC code of 283, 357, 361, 362, 366, 367, 382, 384, 386, and 387), and zero otherwise.
Firms characteristics	
Ln (Assets)	Natural logarithm of the total value of assets
Book-to-Market	Book value of equity divided by market value of equity, where Market value of equity = Close price of fiscal annual end × common shares outstanding
R&D-to-Sales	R&D expenditures divided by total sales (missing R&D is set to zero)
Cash Holdings	Cash holding (cash and short-term investments) divided by total assets
Capital Expenditures	Capital expenditures divided by total assets
Sales Growth	Year-on-year growth of annual total sales
Returns on Equity	Earnings before interests and tax divided by average value of equity of a fiscal year
Leverage	Long-term debt divided by the market value of equity
Price-to-Earnings	Stock price at the fiscal year end divided by earnings per share
Compound Returns	Compounded raw daily stock returns of all trading days over a fiscal year
Herfindahl Index	The level of industry concentration, measured as the sum of squared market shares of each firm in the same industry during a year. Market share is calculated as the total sales of the firm in a given year divided by the total sales of the industry in that year. The industry is at the three-digit SIC code level.
FCF-to-Assets	Free cash flow (FCF) divided by total assets, where FCF is equal to cash flow of operating activities minus dividends of common shares and plus dividends of preferred share.
Dividend Payout	Sum of dividends of common shares, dividends of preferred shares, and purchase of common and preferred shares, divided by income before extraordinary items
Institutional Ownership	Year-end fraction of share outstanding owned by institutional fund managers: Thomson Reuters Institutional (13f) Holdings
Private partner	An indicator that equals one if the partner is private, and zero otherwise