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Does policy uncertainty increase relational risks? Evidence from strategic alliances

Anand Jha

Mufaddal Baxamusa

Sudip Datta

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Mufaddal Baxamusa, Sudip Datta & Anand Jha*, ¥

Abstract

Prior studies on capital investments, including mergers and acquisitions, point to investment irreversibility as the primary factor behind diminished investments during periods of increased policy uncertainty. We show that increased relational risk, due to the potential for counterparty misbehavior or shirking and higher contracting costs, appears to be the primary driver behind the diminished propensity to undertake strategic alliances during enhanced policy uncertainty regimes. Alliances are even less likely during such times when they (a) involve more than two firms, (b) are in industries with greater counterparty risk, and (c) involve partners that require intense contracts.

Keywords: Strategic Alliances, Policy Uncertainty, Relational risk, Counterparty risk, Behavioral Finance, Investments, Corporate Collaborations

JEL Classification: G18, G11, G30

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* Mufaddal Baxamusa: St. Thomas University, Phone (651)-962-5845, E-mail mufaddalb@stthomas.edu; Sudip Datta: Wayne State University, Phone (313)-577-0408, E-mail sdatta@wayne.edu; Anand Jha: Wayne State University, Phone (313)-577-4539, E-mail anand.jha@wayne.edu.

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1. Introduction

Strategic alliances[1] have gained increasing prominence in the corporate landscape and now occupy a central place in corporate decision-making. Nevin (2014) notes that "strategic alliances are sweeping through nearly every industry and are becoming an essential driver of superior growth. The value of alliance is estimated to reach $30 trillion to $50 trillion in the next five years (p. 212)." A recent comprehensive white paper by KPMG's global strategy group emphasizes the growing importance of strategic alliances by stating "*M&A has long been considered one of the most important things a CEO, and her/his company, will ever be involved in. But the pace and diversity of disruption is turning the spotlight onto alliances as critical, strategic tools to address a wide range of competitive threats*."[2]

The focus of this study is to examine the link between policy uncertainty, which is the economic risk generated due to the uncertainty of government decisions, and strategic alliances. New measures of policy uncertainty have generated a number of studies that examine the effect of policy uncertainty on various corporate decisions relating to M&A (Nguyen and Phan 2017; Bonaime et al. 2018), capital investment (Gulen and Ion 2016), venture capital (Tian and Ye 2017), and initial public offerings (IPOs) (Çolak et al. 2017). However, despite the economic importance of strategic alliances as value-drivers for firms, the literature is silent on how policy uncertainty affects strategic alliance deals between firms.

[1] Strategic alliances are arrangements between two or more business entities to cooperate on products, technologies or services (Gulati 1995). These vehicles are used to enter new markets (Robinson 2008), share mutually beneficial knowledge (Gomes-Casseres et al. 2006), enhance their internal competencies (Lin and Darnall 2015), and pool financial resources (Ozmel et al. 2013).

[2] Strategic alliances: a real alternative to M&A? (KPMG, Jan 2018)
https://assets.kpmg/content/dam/kpmg/ie/pdf/2018/01/ie-strategic-alliances-a-real-alternative-to-ma.pdf
Based on a survey of 1,300 CEOs, over 92 percent of the CEOs consider strategic alliances as "extremely important" or "important" in their corporate strategy.

Strategic alliances involve less investment, and rely heavily on co-operation from another party providing a setting to investigate policy uncertainty's possible effect on cooperation incentives. In this study, we extend the analytical framework by contending that there is an alternative to the investment irreversibility argument in the form of 'relational risk'– "the probability and consequences of not having sufficient cooperation (Das and Teng 2001, 253)," which increases when policy is uncertain. This view has been previously ignored in this literature. Put differently, this study allows us to consider another significant factor at play, besides investment irreversibility, introducing tension in determining the net effect on strategic alliances under policy uncertainty.

Research shows that unethical practices are more likely in an unstable environment (Xie et al. 2019). When one partner in an alliance fails or behaves unethically, the other partner gets adversely affected (Boone and Ivanov 2012; Piercy and Lane 2007). To this end, the KPMG paper states that "Even though strategic alliances offer many advantages, success can be difficult to achieve due to the unique challenges this form of collaboration can present (KPMG 2018, 7)." Hence, strategic alliances offer a unique setting to examine the extent to which relational risk, the intrinsic risk when firms are in a transactional relationship with another firm(s), affects corporate capital investment activity.

In times of elevated policy uncertainty, strategic alliances are especially exposed to adverse selection problems where the partner might want to enter the alliance to alleviate their own (standalone) risk from policy uncertainty, which may lead to a lower chance of success for the alliance. The risk might also come from an increased risk of failure to meet regulators', suppliers' or customers' expectations. Relational risks increase during uncertain times, such as during periods of high policy uncertainty (Krishnan et al. 2016; Podolny 1994; Williamson 1985), as anticipated benefits from strategic alliances often fail to materialize (Gottschalg and Zollo 2007; Kale et al. 2002). During times of elevated policy uncertainty, the anticipated benefits are even less likely to be achieved as the parties

are more prone to act in their self-interest to navigate policy unpredictability rather than in the common interest of all parties. Hence, the free-rider problem may exacerbate during periods of high policy uncertainty. Further, increase in policy uncertainty is expected to result in higher contracting costs due to the need for greater detail in the contracts (Battigalli and Maggi 2008) and higher likelihood of testing the boundaries of incomplete contracts (Tirole 1999).

To study the association between policy uncertainty and strategic alliances, we collect data from multiple sources. Our measure for policy uncertainty is an index developed by Baker et al. (2016). This index uses three components: the number of times a term related to policy uncertainty appears in a major newspaper, the uncertainty about the changes to the tax code, and the dispersion in forecasts of the consumer price index and government spending. This measure is superior to the other measures of policy uncertainty used in the past, such as stock return volatility, dispersion of analyst forecasts, and uncertainties relating to social security, monetary and fiscal policies. These measures often focus on a certain aspect of policy uncertainty, and fail to capture the overall policy uncertainty. The measure developed by Baker et al. (2016) addresses these concerns. We collect data about how many strategic alliances were undertaken by a firm in a particular year from the Securities Data Company (SDC) platinum database. We obtain macro-economic controls from various other sources, such as consumer surveys conducted by the University of Michigan and the Chicago Board Options Exchange.

The univariate and multivariate results both demonstrate that higher policy uncertainty is associated with fewer strategic alliances. When we divide the sample into two groups based on the highest and lowest tercile of the level of policy uncertainty, we find that when policy uncertainty is low, 7.0 % of firms undertake alliances, but when it is high, only 3 % of firms undertake alliances. The difference is highly significant. A multivariate framework, which controls for a wide variety of firm-level and macro-economic controls, confirms that when policy uncertainty increases from 80 to 110,

by approximately one standard deviation, the probability of undertaking at least one alliance in a given year drops from 5.74% to 4.26%. Considering that only 5.2% of firms undertake an alliance in a given year, this drop is significant.

To verify that the association is not a simple correlation, but possibly causal, we conduct a difference-in-differences analysis using gubernatorial election at the State-level similar to Çolak et al. (2017). We conduct a state-year analysis where we use the gubernatorial election as a shock that creates policy uncertainty. For every State-year with an election, we identify a bordering State-year without an election and compare the change in the number of strategic alliances between the two groups. The idea being that the unobserved shock is the same in both states, but the observed shock only occurs in the state with an election. We find a significant drop in strategic alliances undertaken during times of high policy uncertainty for firms in States that had an election. Further, this effect of policy uncertainty is stronger when the election involves greater uncertainty such as a change in governor, or winning by a small margin.

Overall, we document strong evidence that the number of new strategic alliances decreases during times of high policy uncertainty, and that this association is not simply correlational. To understand the mechanism by which policy uncertainty affects strategic alliances we investigate further: First, we ask whether firms are particularly wary of undertaking alliances with multiple partners during politically uncertain times. The greater the number of partners in an alliance, the greater the likelihood that one of the partners will either behave opportunistically, or will end up unable to honor their contractual undertakings, and hence jeopardize the alliance. If policy uncertainty increases the partner-related risk, we expect fewer alliances with multiple partners. Our results support this idea. Second, based on similar logic, we ask whether policy uncertainty has a stronger effect for firms that have partners that can shirk relatively easily, for example, research-intensive firms or those belonging

to service industries (Erramilli and Rao 1993; Krishnan et al. 2016; Ulset 1996). We find results consistent with this notion. Third, we examine if policy uncertainty affects partnership in contract intensive industries to a greater extent. The idea being that cost of enforcing an intense contract might become higher as policy uncertainty increases. The results are consistent with the notion. The results of these four tests suggest that the possibility of increased opportunistic (mis)behavior of a partner is one of the key reasons firms are less likely to undertake an alliance during uncertain times.

It is also possible that although strategic alliances involve a smaller investment, there is still exposure to investment irreversibility risk. While this may be a possibility, the additional tests we conduct suggest that increased relational risk, rather than investment irreversibility might be the primary reason why firms are reluctant to undertake new alliances during times of increased policy uncertainty. To this end, we do not find that firms that involve greater investment and deeper commitments such as manufacturing and supply alliances are particularly less likely during times of policy uncertainty. We also do not find that policy uncertainty has a stronger effect on undertaking alliances with partners that have less redeployable assets.

Our study raises two related questions. One, how does the effect of policy uncertainty on undertaking strategic alliance compare with its effect on a firm's decision to acquire a target? Two, is the concern of investment's irreversibility and relational risk different for acquisition, compared to alliances? We find that the effect of policy uncertainty on undertaking a strategic alliance is slightly stronger than its effect on acquisition. Our tests also show that policy uncertainty limits alliance formation because of increases in relational risk, but limits acquisition because of irreversibility concerns.

2. Related literature and hypotheses development

2.1. Policy Uncertainty

Policy uncertainty is primarily rooted in politics. Increased political polarization can lead to higher political uncertainty. Hence, policy uncertainty is man-made, primarily emanating from anticipation of new government policies, or changes to existing policies that can potentially affect corporate decision-making. Political uncertainty is not fully diversifiable, as such elevated political uncertainty is accompanied by increases in risk premia and discount rates and thereby, adversely affecting the net present value (NPV) of future projects (Pástor and Veronesi 2013).

2.2. Strategic Alliances

We define a strategic alliance as an agreement between two or more firms to achieve a common objective. Similarly, Yin and Shanley (2008) define strategic alliance as an "agreement between two or more firms to jointly manage assets and achieve strategic objectives" (p. 473). A strategic alliance can be either a joint venture or a contractual alliance. Appendix A presents an example of an alliance.

Because we want to understand the role of relational risk in curtailing investment, we focus only on contractual strategic alliances and not joint-ventures. [3] In a contractual alliance (i.e., non-equity alliance), firms craft a contract and pool resources to work together with a common objective. In a joint venture, firms set up a new entity owned by the two firms or a larger number of parties. Examples of contractual alliance include licensing, marketing, and R&D. Contractual alliances are significantly more susceptible to relational risk than joint ventures. For example, Boone and Ivanov (2012) find that the bankruptcy of a partner adversely affects another partner in a contractual alliance, but not in joint ventures.

[3] Including joint ventures does not change any of our conclusions. The results are similar.

2.3. Motivation for strategic alliances

The management literature examines factors that motivate firms to undertake strategic alliances (e.g., Gulati 1999; Eisenhardt and Schoonhoven 1996; Lin and Darnall 2015). The transaction cost view of strategic alliances suggests that firms try to minimize the cost of resources they need to meet their strategic initiatives. There are various options open to firms to acquire specific resources, such as developing the resources organically, acquiring the resources from another firm, or entering into a strategic alliance with another firm. Strategic alliances represent a compromise between the first two options.

The resource-based view (RBV) (e.g., Wernerfelt 1984; Barney 1986) offers an alternative view on why firms seek to undertake alliances. It argues that a firm may not have adequate expertise to produce what it needs in order to improve its competitive edge over its competitors. Strategic alliances (along with acquisitions) are tools for the firm to obtain these valuable resources from outside.

Sometimes strategic alliances are viewed as substitutes for acquisitions. The RBV also indicates when a strategic alliance might be more attractive than an acquisition. Acquisition can be costly and not viable when the resource that a firm is interested in acquiring is difficult to extricate from the remaining assets. Under such circumstances, a strategic alliance is a better option. The strategic alliance is also a tool to retain valuable resources. Occasionally, firms may have excess resources that need to be put to use, when a strategic alliance with another firm in need of these excess resources can be valuable to both parties. Strategic alliances can also be motivated simply to prevent a firm's know-how from decaying (Nelson and Winter 2009). Such a collaboration may be a cheaper option than laying off researchers or selling off currently underutilized parts of the firm.

Yin and Shanley (2008) examine industry determinants of the choice between acquisition and strategic alliance. They suggest that M&A will be more likely in physical-capital-intensive industries and those with a high level of tacit knowledge. Firms in capital-intensive industries have higher fixed

costs and depend upon economies of scale and scope for success. In these industries, acquiring a new firm can increase competitive advantage. A higher tacit knowledge means that most of the knowledge cannot be transferred in an alliance, and the costs of contracting are higher. They argue that an alliance will be more likely in industries characterized by a high level of specialized human assets. The reason for this is that it is hard to prevent employees from leaving, and if a firm were to buy another firm because of the employees, it is possible that the employees might leave the firm post-merger, particularly since M&As tend to create cultural clashes.

2.4. Does policy uncertainty affect the propensity to undertake strategic alliances?

The effect of policy uncertainty on a firm's propensity to undertake strategic alliances is unclear. Two opposing arguments can be made in this regard. Kulatilaka and Perotti (1998) argue that depending on the extent of strategic advantage an investment is likely to confer, it may be advantageous to invest more during times of uncertainty. They propose the concept of growth option rooted in the idea that uncertainty can provide an opportunity to indulge in risky activities, such as attempts to build up new capabilities and gain the upper hand among one's competitors because of the first-mover advantage. They state, "[W]hen strategic investment has a significant preemptive effect, it leads to higher market share, and thus a greater (relative) convexity of *ex post* profits relative to the case of no investment. As a result, even though the value of not investing increases with rising uncertainty, the value of the growth option increases even more" (p. 1022). Because strategic alliances constitute a low-cost approach to building new capabilities, firms may want to undertake more strategic alliances during times of high policy uncertainty.

Uncertainty also increases the risk for the firm (Pástor and Veronesi 2013), which prompts the need to reduce such risk. Strategic alliances can be regarded as a relatively low-cost strategy to hedge (Devlin and Bleackley 1988). A firm could undertake multiple alliances spanning different

geographic regions and industries, thereby reducing the turbulence created due to policy uncertainty. Harrigan (1988) argues that expected market turbulence increases the co-operative behavior of firms. Dickson and Weaver (1997) use survey data from 433 Norwegian firms to examine the effect of *perceived* environmental uncertainty of different sorts of strategic alliance. They find that perception of general uncertainty, volatility due to technology, and internationalization increased the propensity to undertake an alliance. If policy uncertainty affects managers the same way as general uncertainty in Dickson and Weaver (1997), we could expect it to encourage the number of strategic alliances.

Another reason strategic alliances could increase when policy uncertainty is high is that, compared to an acquisition, it is a low-cost way to acquire new skills and penetrate new markets. Unlike acquisition, which is a large irreversible investment and one that managers tend to avoid when policy uncertainty is high (Nguyen and Phan 2017), alliances are low-cost investments and not as costly to reverse as they are staggered, and managers have an option to abandon if they are not successful (McGrath et al. 2004; Smit and Trigeorgis 2012; Merton 1998). Insofar as managers view strategic alliances as a substitute for mergers, and consider it as a low cost investment, they might undertake more strategic alliances when policy uncertainty is high. Based on this line of reasoning, we propose the following hypothesis.

Hypothesis 1a: *Policy uncertainty is associated with more strategic alliances.*

Policy uncertainty can also reduce the likelihood of an alliance as the relational (counterparty) risk increases during such times. Strategic alliances, by design, are inherently exposed to the risk that a partner in the alliance might act opportunistically. High policy uncertainty will lead to high environmental uncertainty that "results from changes in the environment that are difficult to predict, such as volatility in the product market as well as regulatory changes" (Krishnan et al. 2016, 2523), which in turn reduces transparency and increases the benefits of opportunistic behavior (Krishnan et

al. 2016; Williamson 1985). For example, Stein and Wang (2016) find that during periods of uncertainty, managers manipulate earnings to a greater extent.

Further, in times of high policy uncertainty, strategic alliances can be even more exposed to adverse selection problems where one party enters the alliance to alleviate their own (standalone) risk from policy uncertainty leading to a lower chance of success for the alliance. Podolny (1994) argues that during periods of environmental uncertainty, consumer demand, input costs, and the competitive climate are difficult to assess, thereby making it hard to decipher the quality of the partner. Firms bear the negative spillover when their partners fail to meet regulators', suppliers' or customers' expectations (Boone and Ivanov 2012). These risks increase during uncertain times, such as during periods of high policy uncertainty (Krishnan et al. 2016; Podolny 1994; Williamson 1985).

The free-rider problem is another aspect of relational risk that is likely to exacerbate during periods of high policy uncertainty. Anticipated benefits from strategic alliances often fail to materialize (Gottschalg and Zollo 2007; Kale et al. 2002). During times of elevated policy uncertainty, the anticipated benefits are even less likely to be achieved as the parties are more likely to act in their self-interest to navigate policy unpredictability rather than in the common interest of all parties associated with the strategic alliance.

Besides relational risk, arguably, the irreversibility of investment could also adversely affect the incentive to undertake an alliance. We argue earlier that because strategic alliances are substitutes for M&A and require less investment, it could increase when policy uncertainty increases because managers may choose a substitute where the investment irreversibility is less severe. However, it can also be argued that although the investments involved in alliances are less compared to acquisitions, it still involves committing resources. Hence, managers may want to wait until policy uncertainty is

resolved before they undertake a strategic alliance. Based on the above discussion, we propose the following hypothesis.

Hypothesis 1b: *Policy uncertainty is associated with fewer strategic alliances.*

2.5. Why might policy uncertainty be associated with fewer strategic alliances?

2.5.1. The role of relational risk

In the preceding discussion, we hypothesized that firms would shy away from undertaking alliances during times when policy uncertainty is high because they fear greater relational risk such as an increased likelihood of counterparty risk, and greater incentives for the partners to misbehave during such times. If the probability of a partner misbehaving indeed goes up during times of policy uncertainty, then we should observe that strategic alliances where the risk of a partner misbehaving is higher are particularly sensitive to political uncertainty. For example, we should find that alliances that involve multiple partners are particularly unlikely during such times. The idea is that the greater the number of partners involved in an alliance, the greater the probability that one of the partners will behave opportunistically. Therefore, we hypothesize the following.

Hypothesis 2a: *When policy uncertainty is high, there will be fewer alliances with multiple partners.*

Counterparty (or relational) risk is also higher when the partner belongs to R&D-intensive industries or the service industry. Krishnan et al. (2016) note the following:

> ….the potential for opportunistic gains in the presence of behavioral uncertainty is higher in alliances belonging to R&D-intensive industries, where monitoring and evaluating intellectual activity is difficult (Ulset, 1996), and in alliances belonging to service industries, where monitoring performance is hard, owing to inseparability of production and consumption (Erramilli and Rao, 1993)…(p. 2523)

If our line of logic that increased relational risk is the reason firms shy away from undertaking new alliances is correct, then we should expect a negative association between policy uncertainty and the volume of strategic alliances undertaken to be stronger in industries where the probability of relational risk is higher. This leads us to the following hypothesis.

Hypothesis 2b: *The effect of policy uncertainty on the undertaking of strategic alliances is stronger when the partner in the alliance is R&D-intensive or belongs to the service industries.*

Relational risk is also likely to be higher in alliances with partners in contract intensive industries such as automobiles, aircraft, computer and electronic equipment. In these industries, inputs are customized and are not sold in thick markets. The relational risk will be less in industries that are less contract-intensive such as poultry processing, flour milling, petroleum refiners where inputs are not customized and they are sold in thick markets. Nunn (2007) finds that countries with low-quality law enforcement specialize in producing goods that require less intensive contracts, as they have cost disadvantage in producing goods that require a more intense contract. This line of thought can be extended to the way policy uncertainty affects alliance formation. When the expectation that a partner may not be able to fulfill their contract in the future increases, firms will shy away from forming alliances that involve more intense contracts. Therefore, we hypothesize the following.

Hypothesis 2c: *The effect of policy uncertainty on the undertaking of strategic alliances is stronger when the partner belongs to an industry involving high contract-intensity.*

2.5.2. The role of investment's irreversibility

A significant body of theoretical and empirical literature supports the view that firms delay investments during periods of increased policy uncertainty. Indeed, research that examines the effect of policy uncertainty on investments shows that the effect of policy uncertainty is stronger for investments with greater degree of irreversibility. For example, Bonaime et al. (2018) find that the adverse effect of policy uncertainty on the acquisition of a target is much stronger if the target belongs to an industry with higher PPE-to-assets ratio, which is a proxy for the degree of irreversibility of the acquisition, or to an industry with lower asset redeployability. A similar line of argument would suggest that, although the amount of investments in strategic alliances is considerably less than that in an acquisition, firms would prefer to delay strategic alliances with greater irreversible investment.

Compared to licensing and marketing alliances, alliances involved in manufacturing, and supply are likely to involve deeper commitments and more irreversible investments. Hence, we expect policy uncertainty to have a stronger effect on manufacturing and supply alliances, compared to licensing and marketing alliances[4]. Therefore, we propose the following hypothesis.

> **Hypothesis 3a:** *The adverse effect of policy uncertainty on alliances associated with a greater degree of irreversibility (e.g., manufacturing) is stronger compared to that for alliances associated with more reversible investments (e.g., licensing and marketing).*

Bonaime et al. (2018) find that firms are even less likely to acquire a target in industries that have less redeployable assets as they are less reversible. If irreversibility is a concern in the formation of alliances, it is possible that managers may shy away from forming alliances with partners in industries with a lower level of asset redeployability as those alliances may be less reversible. Hence, we make the following hypothesis.

> **Hypothesis 3b:** *The negative effect of enhanced policy uncertainty on strategic alliance creations is stronger when the prospective partner belongs to an industry that has assets with lower redeployability.*

2.6. The effect of policy uncertainty on strategic alliance formations vis-a-vis acquisitions

As discussed earlier, investment irreversibility, as a determining factor, is more important for mergers and acquisitions, while relational risk is of greater prominence for strategic alliance formations because they necessitate continued cooperation of the partners involved throughout the alliance period. Hence we hypothesize the following.

> **Hypothesis 4:** *Increase in policy uncertainty adversely affects strategic alliance formations to a greater extent when they are associated with greater relational risk (e.g., greater contracting intensity), but not when they are less reversible (e.g., lower asset redeployability), while the adverse effect of enhanced policy uncertainty on acquisitions is expected to be greater with increased asset irreversibility, but not with increased relational risk.*

[4] R&D alliances are also relatively irreversible, but we do not include them as these alliances also have higher growth options and many are attractive during policy uncertainty. Hence, the inclusion of these alliances would mask the effect of irreversibility and make it difficult to interpret the result.

3. Data, variables, and sample formation process

3.1. Measuring policy uncertainty

We use the policy uncertainty index developed by Baker et al. (2016). These data are constructed monthly and is publically available.[5] They develop an index for economic uncertainty by constructing a weighted average of (i) the frequency of keywords such as "economy", "uncertain", "deficit", "regulation" etc. in 10 leading newspapers in the U.S[6]., (ii) the uncertainty associated with changes in tax code, which is the dollar-weighted federal tax code provision, set to expire in 10 years, reported by the Congressional Budget Office, and (iii) disagreement in forecasting monetary policy and fiscal policy constructed using the government spending uncertainty index, and the inflation uncertainty index. The overall index is constructed by weighting these indexes, 1/2, 1/6, and 1/3 respectively. Their measure peaks near tight presidential elections, wars, terror attacks such as 9/11, and during battles over fiscal policy and the debt-ceiling.

Because our analysis is at the firm-year level, we construct a yearly index using the monthly data. The measure of policy uncertainty is the weighted average policy uncertainty in the past 12 months. Policy uncertainty in the immediate past is going to affect the undertaken of strategic alliances. In other words, compared to uncertainty in January 2010, the uncertainty in December 2010 is going to have a greater impact on strategic alliances undertaken in 2011. Thus, we attach much more weight to the policy uncertainty in December 2010. We construct the yearly policy uncertainty index as follows.

[5] http://www.policyuncertainty.com/us_monthly.html

[6] These newspapers include *The New York Times*, *The Wall Street Journal*, *The Washington Post*, *USA Today*, *The Boston Globe*, *The Dallas Morning News*, the *Los Angeles Times*, the *San Francisco Chronicle*, the *Chicago Tribune*, and the *Miami Herald*.

$$Policy\ Uncertainty_{t} = ((Policy\ Uncertainty)_{(y-12)}*12 + Policy\ Uncertainty_{(y-11)}*11 + Policy\ Uncertainty_{(y-10)}*10 + Policy\ Uncertainty_{(y-9)}*9 + Policy\ Uncertainty_{(y-8)}*8 + Policy\ Uncertainty_{(y-7)}*7 + Policy\ Uncertainty_{(y-6)}*6 + Policy\ Uncertainty_{(y-5)}*5 + Policy\ Uncertainty_{(y-4)}*4 + Policy\ Uncertainty_{(y-3)}*3 + Policy\ Uncertainty_{(y-2)}*2 + Policy\ Uncertainty_{(y-1)}))/\ 78$$

where, $Policy\ Uncertainty_{(y-12),}$ refers to the policy uncertainty in December, $Policy\ Uncertainty_{(y-11)}$ refers to the policy uncertainty in November and so on. Our approach is similar to Nguyen and Phan (2017). The only difference between our approach and theirs is that instead of taking the weighted average of the last three months, we take the weighted average of the last 12 months.[7]

3.2. Measuring the number of strategic alliances

We retrieve the alliance data over the twenty-nine years between 1990 and 2019 from the SDC Platinum database. This database is regarded as one of the most comprehensive databases for strategic alliances (Anand and Khanna 2000). The SDC obtains alliances from newspapers and corporate press releases. We count the number of strategic alliances a firm undertakes each year. From this dataset, we obtain the six-digit CUSIP of the firm, the year of the alliance, and the total number of alliances that the firm initiated that year. We include all types of contractual alliances, including licensing agreements, marketing or distribution agreements, research and development agreements, technology transfer agreements, and others.

3.3. Control variables

The literature on strategic alliances and policy uncertainty motivates our choice of control variables. Because our goal is to examine how policy uncertainty affects the propensity to undertake a

[7] Our results are similar if we follow the procedure as in Nguyen and Phan (2017). They calculate policy uncertainty as follows: $Policy\ Uncertainty_{t} = (Policy\ Uncertainty_{(t-1)}*3 + Policy\ Uncertainty_{(t-2)}*2 + (Policy\ Uncertainty)_{(t-3)})/6$. Our results are also qualitatively similar if we use the arithmetic mean rather than the weighted average.

strategic alliance, the dependent variable is whether the firm engaged in a strategic alliance in a given year, and the key independent variable is the measure for policy uncertainty in the preceding year. The control variables we use are largely based on prior studies that examine either the propensity to undertake a strategic alliance (Gulati 1995; Kim and Higgins 2007) or the effect of policy uncertainty on investment decisions (Bonaime et al. 2018; Gulen and Ion 2016; Nguyen and Phan 2017).

At the firm level we control for the size of total assets, the age of the firm, the market-to-book ratio, the cash-to-assets ratio, and the ratio of R&D expense to total assets. We also use an indicator variable that measures whether the firm has any R&D expenses, income, gross profit margin, the ratio of debt to assets, the ratio of PPE to assets, and sales growth. A large firm with high R&D expenditures and more cash is likely to be more aggressive at entering into strategic alliances.

At the macroeconomic level, we control for the dispersion in sales growth, volatility of real earnings, an index that measures future economic activity, a measure that captures consumer expectations, an index that captures the real earnings of firms in the U.S., the current economic conditions, consumer sentiment, an index that measures consumer sentiments using surveys, the cyclically adjusted price-to-earnings index, and a measure of liquidity in the economy. These controls are used because they capture the current economic condition and provide a view of future economic conditions. These measures can affect the policies that politicians put forward, and they can also affect a firm's incentive to undertake an alliance. For example, during a downturn, politicians debate economic policies more frequently and therefore increase policy uncertainty, and firms are more cautious about their investment decisions such as forming an alliance. We also control for the time trend because research indicates that CEOs are increasingly leaning toward undertaking strategic alliances. In Appendix B we summarize all the variables we use in the study.

3.4. Sample formation process

The sample covers 170,117 firm-years, 17,567 firms, and 43 different industries based on Fama-French's 48 industry classification spanning the period 1990 to 2019. Panel A of Appendix C summarizes the sample selection process. The sample selection is as follows: We start with the entire Compustat dataset that covers the period from 1990 to 2019 and consists of 336,243 firm-years. We remove firms that are not headquartered in the U.S. (42,317), and firms with missing data on total assets or total sales (46,385). Next, using the SDC Platinum Database we obtain the number of alliances in a firm-year. When there is no mention of the firm undertaking any alliance in a year, we consider the firm to have formed zero alliances that year. Next, sequentially, we remove firm-years that belong to the finance or utility industry (56,303); and that have missing values for *Market-to-Book* (9,490), *Sales growth* (8,417), *PPE* (2,625), and other controls (589).

Panel B of Appendix C tabulates the number of observations by industry. Most observations in our sample are from business services, electronic equipment, pharmaceutical products, and retail industries. Together, these industries account for approximately one-third of the sample. Panel C tabulates the number of observations, the number of alliances, and the number of firms that undertake alliances by year. This panel shows that the 1990s witnessed more strategic alliances than the 2000s. Panel D indicates frequency of the number of alliances a firm undertook in a year, if they did form at least one alliance, 74% of firms undertook only one alliance, approximately 16% undertook two alliances, and the rest undertook three or more alliances. Panel E indicates that about 93% of the alliances had only one partner, while about 5% had two additional partners. Only approximately 0.42% of the firms undertook an alliance that involved six other partners. Panel F tabulates the number of the alliances by their types. The most common type of strategic alliance is a marketing alliance, and the least common is a funding alliance.

3.5. Summary statistics and correlations

Table 1 presents the summary statistics of the data used in our baseline regression. The mean of *Alliance Dummy* is 0.052. This number means that every year, on average, 5.2% of firms in our sample undertook at least one new alliance. The mean of *Policy Uncertainty* is about 103, and the standard deviation is approximately 25.

Table 2 presents the correlation matrix. The correlation between *Alliance Dummy* and *Policy Uncertainty* is -0.07 and significant at 0.1% (p-value < 0.001). *Policy Uncertainty* is also negatively and significantly correlated with macroeconomic factors such as the current economic conditions and leading business cycle indicators.

<Insert Table 1>

<Insert Table 2>

4. Results

The results are organized as follows: First, we test Hypotheses 1a and 1b under univariate and multivariate settings. We also use a difference-in-differences analysis. In all of these tests, we do not find support for Hypothesis 1a. We find support for Hypothesis 1b, namely, the greater the policy uncertainty, the lower the likelihood that the firm undertakes a strategic alliance.

Next, we focus on Hypotheses 2a, 2b, 2c, 3a, and 3b to understand better why we find a negative association between policy uncertainty and strategic alliances: Does the number of strategic alliances decline due to an increase in relational (counterparty) risk (Hypotheses 2a, 2b and 2c)? Or, because of investment irreversibility (Hypotheses 3a and 3b)? We find support for Hypotheses 2a, 2b, and 2c consistent with the idea that the effect of policy uncertainty is stronger for alliances where relational risk matters more. We do not find support for Hypotheses 3a and 3b. In other words, in contrast to the reason documented in previous studies related to mergers and acquisitions, it does not

appear that investment irreversibility is a primary driver of why firms undertake fewer strategic alliances when policy uncertainty increases.

In Hypothesis 4, we find further evidence that policy uncertainty affects corporate alliance formations via the relational (or counterparty) risk channel, while acquisitions are affected due to investment irreversibility.

4.1. Policy uncertainty and strategic alliances

4.1.1. Univariate tests

In Figure 1 we plot a graph of *No. of Alliances* and *Policy Uncertainty* over the sample period. The X-axis depicts the month and year, and the Y-axis (left) has the rolling sum of the number of alliances in the preceding 12 months, with policy uncertainty shown on the right axis. This figure indicates that fewer strategic alliances are undertaken during periods of high policy uncertainty.

<Insert Figure 1>

To conduct a formal test, we divide the sample into three groups based on the level of *Policy Uncertainty* and calculate the mean of *Alliance Dummy*. The results, presented graphically in Figure 2, demonstrate that when policy uncertainty is in the lowest tercile 7% of firms undertake an alliance, and when it is in the highest tercile, only 3% of the firms undertake at least one alliance. A two-tailed t-test shows that the difference is statistically significant due to a p-value of less than 0.001%.

<Insert Figure 2>

4.1.2. Multivariate test

To estimate the effect of policy uncertainty on the undertaking of strategic alliances in a multivariate setting, we use the following logit model:

$$Alliances\ Dummy_{it} = a + \beta \times Policy\ Uncertainty_{t-1} + \delta \times X_{it} + \lambda \times M_t + Time\ trend_t + Industry\ Indicators_i + \varepsilon_{it} \quad (1)$$

where i refers to the firm and t is the year. *Alliances Dummy* $_{it}$ is an indicator variable that is equal to one if a firm undertakes a strategic alliance that year. *Policy Uncertainty* $_{t-1}$ is the policy uncertainty in the preceding year. X_{it} is a set of firm-level control variables as follows: *Ln(assets)* is the natural logarithm of the total assets; *Age* is the age of the firm; *Market-to-book* is the ratio of the market value to the book value; *Cash* is the ratio of cash and cash equivalents of the firms to the total assets; *R&D* is the ratio of R&D expenditure to the total assets of the firm; *R&D dummy* is a dummy variable that indicates whether the firm's R&D expenditure in that year is missing; *EBIT* is the ratio of earnings before income and taxes (EBIT) to total assets; *Gross margin* is the sales revenue minus its cost of goods sold (COGS) that is divided by total sales revenue; *Debt* is the ratio of total liabilities to total assets; *PPE* is the ratio of net property, plant, and equipment to total assets; and M_t is a set of year-level control variables.

The year-level controls are as follows: *Sales growth* is the log of sales divided by previous year's sales; *Sales growth dispersion* is the cross-sectional standard deviation in the sales growth of all firms for that year; *Real earnings volatility* is the 12-month rolling standard deviation in real earnings; *business cycle indicator* is an index that measures the future economic activity that is based on 11 leading economic indicators that appear to have significant predictive power over future GDP growth; *Real earnings index* is an index of the real earnings of publicly traded firms in the US; *Current economic conditions* is an index that measures the current economic condition through surveys; *CAPE Shiller index* is Shiller's cyclically adjusted price-to-earnings index; *BAA-Fed fund rate* is the difference in the yields of the Moody's seasoned corporate Baa-rated bonds and the Fed's fund rate; and *Time trend* is the numerical value of the year. To account for the possibility that errors might be correlated by firm and year, we cluster the

standard errors by firm and year[8]. We provide the details of the variables and their sources in Appendix B.

The results of the logit model are consistent with Hypothesis 1b, that is, when policy uncertainty is high, a firm has a lower probability of undertaking a strategic alliance. The results are reported in Table 3. The table shows the coefficients from the logit model. The coefficient for *Policy Uncertainty* is negative and significant at a p-value < 0.001 regardless of whether we use a full set of controls that include the firm level, year level, and the time trend (column 1), only the firm level (column 2), or no controls (column 3). Moreover, the coefficient for *Policy Uncertainty* continues to be significant at a p-value < 0.001 even when we use a firm fixed effect (column 4). A firm fixed effect controls for all time-invariant firm characteristics. A fixed-effect test, by construction, does not use firms that did not undertake any strategic alliance during the sample period; hence the sample reduces by approximately 65%, from 170,117 to 59,617.

The economic significance of the coefficient is quite large based on column 1 of Table 3. For example, holding the other variables constant at their mean, an increase in *Policy Uncertainty* of 30 points (from 80 to 110) reduces the probability of undertaking a strategic alliance from 0.0522 to 0.0392 (see Figure 3)[9]— a drop of approximately 25%. A 30-point increase in policy uncertainty is only slightly above an increase of one standard deviation. The standard deviation in *Policy Uncertainty* is 25.257.

<Insert Table 3>

<Insert Figure 3>

[8] The coefficient of *Policy Uncertainty* continues to be highly significant (p-values< 0.001) when we use alternative clustering (by firm, year, industry, or industry and year).

[9] We use the command "margins" in STATA to obtain the marginal probability of forming an alliance when other variables are held at the mean and "marginsplot" to plot a graph.

4.1.3. Robustness checks

Table 4 reports the results of robustness tests. Rather than use a logit model, we use a linear probability model (i.e., OLS) and confirm that the association between *Policy Uncertainty* and the *Alliance Dummy* remains significant. These results are reported in column 1 of Panel A of Table 4. The results reported in column 2 show that the results are also robust when we use *No. of Alliances* as the dependent variable, replacing *Alliance Dummy*. The advantage of using *No. of Alliances* is that it accounts for the firms that reduced their number of strategic alliances but did not reduce them to zero. This contrasts with the use of *Alliance Dummy*, which does not consider the firm that reduces its number of alliances from, for example, two to one. The results reported in column 3 indicate that this association is also robust when we use a negative binomial regression.

The results reported in Panel B indicate that the Hypothesis 1b holds for different types of alliances. The results reported in Panel C indicate that this hypothesis also holds for each individual component of the policy uncertainty measure (i.e. *News component*, *Government Spend component*, *CPI component*, and *Tax component*).[10]

<Insert Table 4>

4.1.4. Difference-in-differences analysis

To address the issue of causality, we follow Çolak et al. (2017) and use neighboring-states, difference-in-differences method.[11] As in their study we use an election in the state as a measure of policy uncertainty. For every state-year, we identify the states that did not have an election but that shared a border with the state that had an election. Next, we compare the number of strategic

[10] In unreported tests, we also verify that the results hold when we remove observations from 2008, 2008 and 2009, 2007-2009, or 2007-2010.

[11] Çolak et al. (2017) use this method to examine the effect of political uncertainty on an IPO offering.

alliances. Because the neighboring states face the same unobserved shocks, when we take the difference in the dependent variable, the effect of the unobserved shocks cancels out, and the difference therefore, in the number of strategic alliances, can be attributed to the uncertainty due to the election.

The model we use can be summarized in the following equation:

$$\Delta \text{ No. of Alliances}_{i,j,t} = \beta \times \text{Election Year}_{i,t} + \delta \times \Delta X_{i,j,t} + \varepsilon_{it} \quad (2)$$

where Δ *No. of Alliances* $_{i,j,t}$ is the total number of strategic alliances that occurred in a state with an election (i) minus the total number of alliances that occurred in a neighboring state without an election (j) in year t. *Election Year* is a dummy variable that is equal to one if year t is an election year in the state the firm is headquartered as in Çolak et al. (2017). By design, our dependent variable can only be constructed if State *i* has an election. Therefore, the *Election Year* variable will always be one. That is, it is a constant. $X_{i,j,t}$ is the difference in the observable state characteristics. We use the following measures: the lagged value of the average number of firms in the two states (based on COMPUSTAT), the lagged value of the number of strategic alliances in the state, the lagged value of growth in state GDP per capita, the lagged value of the unemployment rate, and year dummies to control for time-invariant macroeconomic factors that might affect the strategic alliance in a given year.

States without neighboring states (Alaska and Hawaii) are automatically dropped from this sample. In our sample, on average there are three neighboring states. Thirty-six of the states with elections share a border with at least one state without an election. Tennessee and Missouri have eight neighboring states.

If the coefficient for *Election Year* is negative, it indicates that during an election year, the number of new strategic alliances decreases. Put differently, policy uncertainty reduces the likelihood of a strategic alliance. We can also easily interpret the economic significance. The magnitude of this

coefficient indicates how many fewer alliances were undertaken in a state with an election, compared to a neighboring state where there was no election.

The results of this difference-in-differences analysis are reported in Panel A of Table 5. The dependent variable in this regression is the difference in the number of alliances in a state with an election minus the number of strategic alliances in a neighboring state without an election. The results reported in column 2 show that the coefficient for *Election Year* is -0.0558 and significant at 1%. That is, during an election year there are 0.0558 fewer alliances undertaken. This number is significant, because the average of the difference in the number of alliances between the two states is -2.045, and therefore a reduction is equivalent to a drop of 2.72%.

In Panel B, we report the results of tests that ask if the difference-in-differences results are stronger for elections when policy uncertainty is higher. Following Çolak et al. (2017) we consider an election to be more uncertain when (i) the election leads to a change in the governor and if she wins by less than 5% margin, or (ii) the incumbent is not a candidate for governor on the election for reasons other than expiration of term limit, (iii) the difference in the percentage of winning margin is less than the median. In each of these instances, we find that the results are stronger when elections are uncertain.

In Panel C, we report the results of the dynamic difference-in-differences analysis. In this panel, the dependent variable is *# of Alliances in a state with election*. The results show that pre-election years are not associated with an increase or decrease in alliances, but after the election is over there is a jump in the number of strategic alliances formed. This suggests that some managers would rather wait for the election to be over to get into an alliance.

<Insert Table 5>

4.2. The role of relational (or counterparty) risk in strategic alliance formations

4.2.1. Strategic alliances with multiple partners

We find results consistent with Hypothesis 2a indicating that firms are less likely to undertake alliances that have more than two partners during times of increased policy uncertainty. This finding means that increased relational risk may be a reason why firms prefer to not undertake strategic alliances during times of enhanced policy uncertainty. The results are based on a subsample of firms that undertake at least one alliance during our sample period. Using this subsample, we examine whether firms are less likely to undertake alliances that have more than two partners. The results are reported in Panel A of Table 6.

The dependent variable in these tests is *More than two partners in alliance*, an indicator variable that equals one if the number of partners in the alliance is more than two.[12] Regardless of whether we use an extensive set of controls (column 1), control only for firm characteristics (column 2), or no controls (column 3), the coefficient for *Policy Uncertainty* continues to be negative and statistically significant. When *Policy Uncertainty* increases from 80 to 110, a change of approximately one standard deviation, the probability of having multiple partners drops from 10.39% to 8.48%, holding all other variables at the mean.

<Insert Table 6>

4.2.2. The effect of policy uncertainty when partners are in R&D-intensive or in service industries

Consistent with Hypothesis 2b, we find that the adverse effect of policy uncertainty on alliance formation is much stronger when the partner is R&D intensive or when it belongs to a service industry. We examine two subsamples of firms in: (a) R&D intensive, and (b) service industries.

[12] Rarely does a firm undertake two or more alliances. In such cases, if any one of the alliances has multiple partners, we consider the indicator variable to be one.

In Table 6 (Panel B) column 1, we examine cases where the firm allied with prospective partners that reported some R&D expenditures and where the firm did not form any alliance. In column 2, the sample consists of instances where the firm allied with partners that did not report any R&D expenditure, or where the firm did not form any alliance. We find that the coefficient of *Policy Uncertainty* is negative in both columns, but significantly larger in magnitude in column 1 indicating that *Policy Uncertainty* has a greater adverse effect on forming alliances with a research-intensive firm. The results of the pooled analysis in column 3 also echo the same findings.

Panel C's column 1 reports results for strategic alliances formed with partners in the service industry[13] or that did not form any alliance. Column 2 reports the results of the subsample that consists of alliances formed when the alliances involve all industries except services and instances where the firm did not form any alliance. The results show that the coefficient of *Policy Uncertainty* is significantly larger when alliances are with partners in the service industry indicating that policy uncertainty reduces the likelihood of alliance formation with partners in the service industry to a greater extent. Column 3, which reports the pooled analysis, also demonstrates that alliance formation decreases to a greater extent when the partner is from a service industry. Overall, the findings in this section support the notion that strategic alliances that are exposed to a greater degree of relation risk are affected more adversely from increased policy uncertainty.

4.2.3. Strategic alliance and contract intensity

Panel D of Table 6 reports the results consistent with Hypothesis 2c. Policy uncertainty affects the likelihood of alliance formation to a greater extent when the partner is from a contract- intensive industry. Nunn (2007) provides a list of the twenty most and least contract intensive industries. We

[13] We consider the partner as belonging to the service industry if based on Fama-French industry classifications, it is classified as household services (33), or business service (34).

use this data to classify the partners.[14] We find that in a subsample of firm-years where a partner belongs to a most contract-intensive industry, the effect is much stronger (column 1), compared to the subsample of where the partner belongs to an industry with lower contract intensity (column 2). A pooled analysis reported in column 3 also reports the same finding. The coefficient of *Policy Uncertainty*Contract Intensive Industry* is negative and highly significant. *Contract Intensive Industry* is one when the partner belongs to an industry that is ranked among the top twenty industries requiring the most intense contracts. Similar to the findings in the preceding section, these results reinforce the notion that relation risk plays a significant role in determining the effect of increased policy uncertainty on strategic alliances.

4.3. The role of investment irreversibility on strategic alliances

4.3.1. Alliances that involve deeper commitments

To examine to what extent investment irreversibility plays a role in affecting strategic alliances under enhanced policy uncertainty regimes we create two subsamples. The two groups are created based on the type of alliance. In one group, we consider manufacturing, supply alliances, and funding alliances. These are the types that are much more costly to reverse. In another group, we consider licensing and marketing alliances, ones where the cost of reversing is lower. The results reported in Panel A of Table 7 show that the coefficient of *Policy Uncertainty* is not significantly different between the two groups. The p-value for the test that they are equal is 0.7106. A pooled test that uses both the subsample and an interaction term also shows that the effect of policy uncertainty is not significantly different between the two groups. Hence, the results are inconsistent with Hypothesis 3a. In other

[14] Nunn (2007)'s Table II lists the 20 least and most contract intensive industries. We take this list and code these same industries to be the least and most contract intensive industries for all the years in our sample. The least contract intensive industries have a median value of 0.132, while most contract intensive industries have a median value of 0.872. The least contract intensive industry is poultry processing with an intensity score of 0.024, and the most contract- intensive is the automobile and light truck manufacturing industry with an intensity score of 0.98.

words, we do not find that the effect of policy uncertainty on undertaking strategic alliances is stronger for those alliances that involve deeper commitments and are difficult to reverse.

<Insert Table 7>

4.3.2. Alliances with partners in irreversible industries

We do not find that partnering with firms that belong to industries that have lower asset redeployability is less likely. Panel B of Table 7 reports the results. We use the measure of asset redeployability as in Kim and Kung (2016) and divide the sample into two groups based on whether the partners belong to industries with high or low asset redeployability. The coefficient of *Policy Uncertainty* is not significantly different between the two groups. The p-value for the test that the coefficients are equal is 0.3573. We also construct an indicator variable *Asset Redeployable* that is one if the asset redeployability of the partner is above the median and zero otherwise, and interact it with *Policy Uncertainty* and conduct a pooled analysis (column 3). Hence, these results are also inconsistent with Hypothesis 3b.

4.4 Policy uncertainty's effect on undertaking strategic alliances vis-a-vis acquisitions

Relational risk does not appear to be the channel by which policy uncertainty affects the decision to acquire a target. In results reported in Panel A of Table 8, where the dependent variable is the *Acquisition Dummy*, we do not find that policy uncertainty affects the likelihood of an acquisition to a greater extent when the target belongs to contract-intensive industries, which is a proxy for instance when relational risk might matter more. However, consistent with prior literature, investment irreversibility appears to be a reason why firms avoid acquisitions when policy uncertainty increases. The results we report in Panel B show that *Policy Uncertainty* affects the likelihood of mergers much more strongly when the target's assets are less redeployable, consistent with Bonaime et al. (2018).

We reach the same conclusion when we introduce *Policy Uncertainty*Contract Intensive Industry* and *Policy Uncertainty*Asset Redeployable* in the same regression with *Acquisition Dummy* as the dependent variable. The coefficient of *Policy Uncertainty*Contract Intensive Industry* is insignificant. In contrast, the coefficient of *Policy Uncertainty*Asset Redeployable* is positive and significant (Panel C column 1), suggesting that the decision to acquire may not be affected by relational risk, but is affected by the cost of irreversibility of investment. In contrast, when *Alliance Dummy* is the dependent variable, the coefficient of *Policy Uncertainty*Contract Intensive Industry*, is negative and significant, while the coefficient of *Policy Uncertainty*Asset Redeployable* is insignificant (column 2) suggesting that relational risk matters for strategic alliances, whereas investment irreversibility is not a significant factor driving strategic alliances. These results are consistent with Hypothesis 4. These findings reveal that, under enhanced policy uncertainty, the primary channel affecting strategic alliance formations is quite different from that influencing corporate acquisitions.

<Insert Table 8>

4.5. Additional analysis

We examine if the probability of abandoning a strategic alliance increases under enhanced policy uncertainty. Additionally, we examine the stock market reaction to strategic alliance announcements during enhanced policy uncertainty, and compare the relative effect of policy uncertainty on alliances vis-à-vis acquisitions

4.5.1. Are firms more likely to abandon corporate alliances during increased policy uncertainty regimes?

A key argument in our study is that forming an alliance becomes less attractive during times of increased policy uncertainty because of the increased likelihood of counterparty misbehavior. If that is indeed the case, a firm should be more likely to withdraw from an alliance already in place during

such times because as the uncertainty increases the expected net present value to continue with the alliance falls and, in some instances, may even become negative.

Our data allow us to examine these questions. Some of the alliances that are announced are broken off even before they start. The dates when these alliances were broken off are retrieved from the SDC Platinum Database. To examine whether firms are more likely to withdraw from an alliance during times of uncertainty, we construct the variable *Withdrawn*. For each firm-year, this variable equals one when there is a strategic alliance abandonment announcement, and zero otherwise.

When we divide the sample into two groups based on whether the period involves high or low policy uncertainty, we find that the mean of the variable *Withdrawn* is 0.027 when policy uncertainty is low, and 0.032 when it is high. This is a 18% increase. The multivariate results reported in Table 9 are largely consistent with our prediction in columns 2 and 3, where we do not control for macro-economic variables. However, when we control for macroeconomic factors, we find that the *Policy Uncertainty* is not significant.

In unreported tests, we investigate if *Policy Uncertainty* is associated with a higher likelihood of withdrawals in subsamples where relational risks are high (e.g., the partner is R&D intensive, or from the service industry, or belongs to a contract-intensive sector). We find that the coefficient is positive, and t-statistics are higher, but the coefficients are still not statistically significant. From these tests, we conclude that there isn't convincing evidence that firms are likely to abandon already formed strategic alliances when policy uncertainty increases.

<Insert Table 9>

4.5.2. Policy uncertainty and market response to strategic alliance announcements

We contend that strategic alliances undertaken during high policy uncertainty regimes pass a higher bar and investors recognize them as higher quality ventures. A similar argument is made in

two studies that find that firms are less likely to acquire another firm during times of high policy uncertainty (Bonaime et al. 2018; Nguyen and Phan 2017). Both these studies report more positive investor reaction to acquisitions undertaken during times of high policy uncertainty. In this vein, we expect the CAR for alliances undertaken during times of uncertainty also to be higher.

Our empirical evidence supports this notion. We divide the sample into two groups based on whether the alliance was undertaken in the years with high policy uncertainty separated by the median *Policy Uncertainty*. Next, we test whether the CAR (-1, +1) and CAR (-2, +2)[15] are greater for alliances undertaken during periods of high policy uncertainty vis-à-vis those announced at other times. The results indicate that CAR (-1, +1) is approximately 38% greater (0.0113/0.0082), and CAR (-2, +2) is 33 % (0.0118/0.0089) greater for high policy uncertainty periods. These differences in the CARs are statistically significant due to a two-tailed t-test with a p-value <0.005. These univariate results also hold in a multivariate framework. We continue to find that *Policy Uncertainty* is positively associated with CAR (-1, +1) and CAR (-2, +2), after controlling for firm-level characteristics and macro-economic conditions. Panels A and B of Table 10 present the univariate and multivariate results, respectively.

<Insert Table 10>

4.5.3. The relative economic effect of policy uncertainty on alliance formations compared to acquisitions

Our final analysis compares the economic impact of policy uncertainty on the likelihood of alliance formation with the impact on the likelihood of acquisitions. We know that firms delay acquisitions during high policy uncertainty periods because these investments are difficult to reverse.

[15] Following Brown and Warner (1985), we use a market model to obtain CAR. The CAR is the difference between the return observed in the market and the return expected from the value-weighted market model. We estimate parameters of the market model over a 225-day range starting 31 calendar days before the event. MacKinlay (1997) provides details of this the event study method. Our results are robust if we use the equally weighted index.

We also know that investments involved in strategic alliances are significantly smaller and staggered. So, if investment irreversibility is the only factor at play, then one would expect an increase in policy uncertainty to have a relatively weaker impact on alliance formations vis-à-vis the previously documented effect on acquisitions. If, however, both investment irreversibility and relational risk are at play, then the net effect of policy uncertainty increase on strategic alliances may be equally strong or stronger vis-à-vis acquisitions, depending on the relative impacts of the two effects on these two very different types of corporate capital investment deals.

Our analysis shows that the economic impact is somewhat stronger on strategic alliance formations. Recall from our discussion in Section 4.1.2, and Figure 3, that when *Policy Uncertainty* increases from 80 to 110, the probability of undertaking a strategic alliance drops by about 25%, from 5.22% to 3.92%. In contrast, an increase in *Policy Uncertainty* from 80 to 110 is associated with a reduction in the probability of acquisition from 3.64% to 2.88%—a drop of about 21%, 4% smaller than its effect on strategic alliances. In column 1 of Table 11 we report the logit regression on which this result is based. The dependent variable in this regression is the *Acquisition Dummy*, which assumes a value of one when the firm acquires at least one target and zero otherwise.[16] For brevity, we do not report the figure as we do for the effect of policy uncertainty on strategic alliance formations. A comparison of the coefficient of *Policy Uncertainty* in column 1 of Panel A of Table 3 and column 1 of Panel A of Table 8 shows that they are statistically different with a p-value of 0.033. This p-value is based on a two-tailed t-test that compares the coefficient and standard error of *Policy Uncertainty* in Column 1 of Table 3 and Column 1 of Table 8. We reach the same conclusion when we compare the coefficient of OLS regression analysis (Column 1 of Panel A of Table 4, and Column 2 of Table 11),

[16] The mean of *Acquisition Dummy* is 0.07059 and the median is 0. The standard deviation is 0.18937. The filters we use to obtain the acquisition data are similar to Moeller et al. (2004). We require that (i) acquirer controls less than 50% of the shares of the target at the announcement date and obtains 100% of the target shares, (ii) the deal value exceeds or equals $1 million, (iii) the transaction size is more than 1% of the value of the acquirer, and (iv) completion time is less than one thousand days.

instead of logit coefficients. A 30-point increase in policy uncertainty is associated with a 7% decrease in the standard deviation of the *Alliance Dummy* ((30*-0.0005)/0.224), and with 5% decrease in the standard deviation of *Acquisition Dummy* ((30*-0.0003)/ 0.18937). The p-value of a two-tailed t-test for equality of coefficient is 0.004.

<Insert Table 11>

5. Conclusions

We contribute to the literature on corporate capital investments under policy uncertainty. Our study suggests that relational risk is another factor, besides investment irreversibility, why firms reduce investments during times of increased policy uncertainty. Often investments, particularly strategic alliances, involve contracts. These contracts are typically incomplete and imperfect (Tirole 1999). Our analysis suggests that with increase in policy uncertainty, the costs of writing and implementing these contracts also increase as relation (counterparty) risk increases. Overall, policy uncertainty deters investments that involve relational contract with another party, such as for strategic alliances. This is an important contribution because an emerging strand of literature examines the effect of policy uncertainty on investments, and the key argument, in all of these studies, has been that the investment irreversibility feature makes it more attractive to delay investments during times of high uncertainty.

Our study shows that relation (counterparty) risk plays a dominant role in determining the effect on strategic alliances during times of elevated policy uncertainty. As strategic alliances have increased in prominence in recent years, the difference between the effects of policy uncertainty on M&A and strategic alliances take on an increased significance in the literature. While our study highlights the dominance of 'relation risk' for strategic alliances, previous studies on the effect of policy uncertainty on M&As conclude that investment 'irreversibility' is the primary factor playing a role in the decline in such deals during elevated policy uncertainty regimes.

We also find that alliances that involve greater relational risk, such as those with multiple partners, partners with characteristics where the counterparty misbehavior is more likely, and industries that require intense contracts, decrease to a greater extent when policy uncertainty increases. Further, the economic impact of policy uncertainty on the likelihood of undertaking a corporate alliance is much stronger than its effect on the likelihood of an acquisition. Lastly, we find that the stock market reaction to strategic alliance announcements is significantly greater when they are undertaken during enhanced policy uncertainty regimes.

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Appendix A

An example of a strategic alliance

Seattle Genetics and Millennium: The Takeda Oncology Company formed an agreement to globally develop and commercialize brentuximab vedotin, an antibody-drug conjugate that is in the late-stage clinical trials. Seattle Genetics is a clinical stage biotechnology company and does not have experience marketing a drug worldwide. Takeda is the largest pharmaceutical company in Japan and one of the global leaders of the industry. Seattle Genetics benefits from the marketing experience of Takeda. Moreover, Takeda benefits by getting an opportunity to market a drug that it did not have the expertise to develop but can market globally. The following quote is illustrative of the mutual benefit, "Under the collaboration, Seattle Genetics will receive an upfront payment of $60 million and retains full commercialization rights for brentuximab vedotin in the United States and Canada. The Takeda Group will have exclusive rights to commercialize the product candidate in all countries other than the United States and Canada. Seattle Genetics is entitled to receive progress- and sales-dependent milestone payments in addition to tiered double-digit royalties based on net sales of brentuximab vedotin within the Takeda Group's licensed territories. Milestone payments to Seattle Genetics could total more than $230 million. Seattle Genetics and the Takeda Group will jointly fund worldwide development costs on a 50:50 basis. Development funding by the Takeda Group over the first three years of the collaboration is expected to be at least $75 million. In Japan, the Takeda Group will be solely responsible for development costs."

Source: http://investor.seattlegenetics.com/phoenix.zhtml?c=124860&p=irol-newsArticle&ID=1365794

Appendix B

Variables	Descriptions
Dependent variables	
Alliance Dummy	An indicator variable that is 1 if the firm undertakes an alliance in that year, and 0 otherwise. Source: SDC Platinum
No. of Alliances	The number of strategic alliances announced by the firm in the year. Source: SDC Platinum
Acquisition Dummy	An indicator variable that is 1 if the firm undertakes an acquisition in that year, and 0 otherwise. Source: SDC Platinum
CAR (-2,+2)	The five-day cumulative abnormal return around the announcement of a strategic alliance. Source: SDC Platinum & Eventus
Withdrawn	An indicator variable that is equal to one when an alliance that was already announced is withdrawn. Source: SDC Platinum
# of Alliances in a state with election - # of alliances in a state without election	The difference in the number of alliances in a state with an election, and a bordering state without an election. Source: SDC Platinum
# of Alliances in a state with election	The total number of alliances in the state with an election. Source: SDC Platinum
Research Variable	
Policy Uncertainty	The level of policy uncertainty. A higher value indicates higher policy uncertainty. Source: http://www.policyuncertainty.com/us_monthly.html
Firm-level control variables	
Ln(assets)	The logarithm of Total Assets. Source: Compustat
Age	Year - Birth Year. Birth year is the year of IPO or the first year Compustat reports data for the firm. Source: Compustat
Market-to-Book	The market capitalization of the firm's stock divided by the total assets of the firm. Source: Compustat
Cash	The cash and cash equivalents of the firm divided by the total assets. Source: Compustat

R&D	The R&D expenditure divided by the total assets of the firm. If R&D expenditure is missing, the value is set to zero. Source: Compustat
R&D dummy	A dummy variable that takes the value of 1 if the R&D expenditure for that year is missing, and 0 otherwise. Source: Compustat
Cashflow	Earnings before income and taxes (EBIT) divided by total assets. Source: Compustat
Gross margin	Sales minus cost of goods sold divided by sales. Source: Compustat
Debt-to-assets	The ratio of total liabilities and total assets. Source: Compustat
Capital	The ratio of net property plant and equipment and total assets. Source: Compustat
Sales Growth	The log of the ratio of current year sales to previous year's sales assets. Source: Compustat
Macro-economic controls	
Sales growth dispersion	The cross-sectional standard deviation of the sales growth of all firms for that year. Source: Compustat
Real earnings volatility	The 12-month rolling standard deviation of real earnings. Source: http://www.econ.yale.edu/~shiller/data.htm
Leading indicators	An index that measures the leading indicators to predict the future of the business cycle. Source: https://www.conference-board.org/data/bci/chartdatagrid.cfm?cid=1&dataseries=G0M920&series=US_Series
Real earnings index	The index of the real earnings of the publicly traded firms in the U.S. Source: http://www.econ.yale.edu/~shiller/data.htm
Current economic conditions	The economic index that measures the current economic conditions by means of surveys: Source: http://www.sca.isr.umich.edu/charts.html
CAPE Shiller index	The Shiller's CAPE Index: Source: http://www.econ.yale.edu/~shiller/data.htm
BAA-Fed fund rate	The difference in the yields of the Moody's seasoned corporate BAA rated bonds and the Fed Fund rate. Source: https://fred.stlouisfed.org

Time trend	The numerical values of the year.
Other variables	
Asset Redeployable	An indicator variable that is equal to 1 when the partner in the strategic alliance has assets redeployability score higher than the median. The scores are based on Kim and Kung (2016).
Contract Intensive Industry	An indicator variable that is equal to 1 when the partner in the strategic alliance is from an industry that is among the twenty most contract intense industries. Sources: Nunn (2007)

Appendix C

Panel A: Sample selection

	Observations
Total Compustat firm-years	336,243
Less firms not headquartered in the U.S	(42,317)
Less firm-years with no Total Assets and Sales data	(46,385)
Less firms that belong to Finance and Utility Industries	(56,303)
Less firm-years with missing *Market-to-Book*	(9,490)
Less firm-years without the *Sales growth*	(8,417)
Less firm-years with no *PPE*	(2,625)
Less firm-year with missing other control variables	(589)
	170,117

Panel B: Number of observations in our sample by industry

	Industries	Observations	Alliances
1	Agriculture	708	41
2	Food Products	3,155	123
3	Candy & Soda	593	46
4	Beer & Liquor	701	45
5	Tobacco Products	241	3
6	Recreation	1,585	146
7	Entertainment	3,347	207
8	Printing and Publishing	1,443	93
9	Consumer Goods	3,276	176
10	Apparel	2,472	159
11	Healthcare	3,848	166
12	Medical Equipment	6,386	592
13	Pharmaceutical Products	10,058	1,764
14	Chemicals	3,826	205
15	Rubber and Plastic Products	1,753	54
16	Textiles	936	31
17	Construction Materials	3,610	65
18	Construction	2,263	49
19	Steel Works Etc.	2,626	38
20	Fabricated Products	655	14
21	Machinery	6,013	291
22	Electrical Equipment	2,993	151
23	Automobiles and Trucks	2,893	148
24	Aircraft	843	66
25	Shipbuilding, Railroad Equipment	370	12
26	Defense	306	13
27	Precious Metals	941	12
28	Non-Metallic and Industrial Metal Mining	697	11
29	Coal	384	3
30	Petroleum and Natural Gas	8,460	210
31	Utilities	-	-
32	Communication	8,208	555
33	Personal Services	2,332	66
34	Business Services	25,085	3,287
35	Computers	7,772	1,347
36	Electronic Equipment	11,338	1,166
37	Measuring and Control Equipment	3,914	330
38	Business Supplies	2,255	70
39	Shipping Containers	573	13
40	Transportation	5,572	206
41	Wholesale	7,257	420
42	Retail	9,811	440
43	Restaurants, Hotels, Motels	3,949	104
44	Banking	-	-
45	Insurance	-	-
46	Real Estate	-	-
47	Trading	-	-
48	Not available	4,669	49
	Total	170,117	12,987

Panel C: Number of observations, alliances and firms undertaking alliances in our sample by year

Year	Observations	Alliances	Firms Undertaking Alliances
1990	5,479	292	152
1991	5,484	438	251
1992	5,617	959	251
1993	5,949	758	445
1994	6,253	841	494
1995	6,558	847	532
1996	7,313	664	448
1997	7,564	952	610
1998	7,445	883	588
1999	7,609	979	630
2000	7,585	583	416
2001	7,274	309	237
2002	6,708	269	214
2003	6,274	362	296
2004	5,989	282	245
2005	5,729	309	264
2006	5,551	490	352
2007	5,370	440	344
2008	5,077	365	293
2009	4,926	39	40
2010	4,784	40	42
2011	4,645	88	82
2012	4,512	128	114
2013	4,605	137	123
2014	4,627	161	149
2015	4,538	13	12
2016	4,176	168	144
2017	4,293	351	301
2018	4,212	402	345
2019	3,971	438	376
Total	170,117	12,987	8,790

Panel D: The frequency of the number of alliances a firm undertook in a year, if they did form at least one alliance

The frequency of # of alliances in a year	% of the sample
1	74.38%
2	15.89%
3	5.63%
4	0.21%
5	0.10%
6 or greater	3.79%
Total	100.00%

Panel E: The breakdown of alliances based on the number of partners

# of partners in Alliance	% of the sample
1 partner	92.71%
2 partners	5.15%
3 partners	0.81%
4 partners	0.58%
5 partners	0.33%
6 or more partners	0.42%
Total	100.00%

Panel F: The number of alliances by alliance type

Alliance Type	% of Alliances	Number
License_alliance	19.67%	2,554
R&D_alliance	17.06%	2,216
Funding_alliance	1.75%	227
Manufacturing_alliance	9.42%	1,224
Marketing_alliance	22.49%	2,922
Supply_alliance	4.28%	555
Not Specified	25.33%	3,289
Total	100.00%	12,987

Table 1: Summary statistics of the sample used in baseline logit regression

Variable	Mean	Std.Dev.	Min	Max
Nos. of Alliances	0.076	0.506	0.000	36.000
Alliance Dummy	0.052	0.224	0.000	1.000
Policy Uncertainty	103.448	25.257	69.475	164.317
Ln(assets)	4.955	2.644	-2.577	11.696
Age	7.181	5.992	0.000	67.000
Market-to-Book	2.019	5.048	0.019	59.886
Cash	0.191	0.227	0.000	0.969
R&D	0.068	0.153	0.000	1.096
R&D dummy	0.414	0.493	0.000	1.000
EBIT	-0.135	0.813	-7.403	0.391
Gross margin	-0.054	3.105	-21.825	0.966
Debt	0.540	0.273	0.027	1.000
PPE	0.272	0.242	0.000	0.920
Sales growth	-0.005	3.296	-18.154	18.159
Sales growth dispersion	0.950	0.181	0.524	1.189
Real earnings volatility	0.024	0.060	0.000	0.358
Leading business cycle indicators	114.399	35.215	70.463	252.102
Real earnings index	69.566	27.581	30.549	134.389
Current economic conditions	99.140	12.158	68.100	114.200
CAPE Shiller index	25.555	6.430	14.818	40.553
BAA-Fed fund rate	3.864	1.783	0.980	8.270
Time trend	2003.520	8.365	1990.000	2019.000

Table 2: Correlations of the sample used in baseline regression

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
[1]	*Nos. of Alliances*	1.00								
[2]	*Alliance Dummy*	**0.66**	1.00							
[3]	*Policy Uncertainty*	**-0.05**	**-0.07**	1.00						
[4]	*Ln(assets)*	**0.08**	**0.07**	**0.11**	1.00					
[5]	*Age*	**-0.03**	**-0.01**	**0.18**	**0.21**	1.00				
[6]	*Market-to-Book*	**0.02**	**0.02**	**-0.01**	**-0.28**	**-0.01**	1.00			
[7]	*Cash*	**0.08**	**0.11**	**0.02**	**-0.22**	**-0.04**	**0.18**	1.00		
[8]	*R&D*	**0.06**	**0.08**	**0.00**	**-0.3**	**-0.03**	**0.23**	**0.38**	1.00	
[9]	*R&D dummy*	**-0.08**	**-0.11**	**-0.01**	**0.05**	**-0.05**	**-0.05**	**-0.26**	**-0.35**	1.00
[10]	*EBIT*	**0.01**	**0.01**	**-0.02**	**0.43**	**0.03**	**-0.55**	**-0.13**	**-0.43**	**0.05**
[11]	*Gross margin*	0.01	**0.00**	0.00	**0.17**	**0.02**	**-0.18**	**-0.26**	**-0.32**	**0.06**
[12]	*Debt*	**-0.04**	**-0.06**	**0.02**	**0.01**	**0.00**	**0.04**	**-0.38**	**0.02**	**0.13**
[13]	*PPE*	**-0.06**	**-0.08**	**-0.02**	**0.19**	**-0.03**	**-0.1**	**-0.39**	**-0.2**	**0.28**
[14]	*Sales growth*	**0.08**	**0.08**	**-0.48**	**-0.13**	**0.09**	**-0.19**	**-0.13**	**-0.14**	**-0.03**
[15]	*Sales growth dispersion*	**0.03**	**0.04**	**0.43**	**0.13**	**0.16**	0.02	**0.03**	**0.01**	**-0.02**
[16]	*Real earnings volatility*	**-0.04**	**-0.05**	**0.41**	**0.04**	**0.07**	**-0.01**	**0.02**	0.01	**-0.01**
[17]	*Leading business cycle indicators*	**-0.04**	**-0.02**	**-0.17**	**0.1**	**0.16**	**0.03**	**0.03**	**0.01**	**-0.01**
[18]	*Real earnings index*	**-0.02**	**-0.01**	**-0.03**	**0.21**	**0.26**	**0.07**	**0.1**	**0.04**	**-0.04**
[19]	*Current economic conditions*	**0.05**	**0.08**	**-0.72**	**-0.05**	**-0.11**	**0.01**	**-0.01**	**0.01**	0.00
[20]	*CAPE Shiller index*	0.03	**0.05**	**-0.37**	**0.03**	**-0.03**	**0.05**	**0.04**	**0.03**	**-0.02**
[21]	*BAA-Fed fund rate*	**-0.03**	**-0.04**	**0.54**	**0.06**	**0.11**	0.00	**0.02**	**0.01**	-0.01
[22]	*Time trend*	**-0.04**	**-0.03**	**0.37**	**0.26**	**0.34**	**0.07**	**0.11**	**0.05**	**-0.05**

		[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
[10]	*EBIT*	1.00												
[11]	*Gross margin*	**0.31**	1.00											
[12]	*Debt*	**-0.22**	**0.02**	1.00										
[13]	*PPE*	**0.07**	**0.06**	**0.14**	1.00									
[14]	*Sales growth*	**0.29**	**0.21**	**0.01**	**0.04**	1.00								
[15]	*Sales growth dispersion*	**0.00**	-0.01	**0.01**	**-0.04**	0.01	1.00							
[16]	*Real earnings volatility*	**-0.01**	0.00	**0.01**	**-0.01**	**0.01**	**-0.06**	1.00						
[17]	*Leading business cycle indicators*	**-0.02**	**-0.03**	**-0.03**	**-0.1**	0.00	**0.31**	**-0.18**	1.00					
[18]	*Real earnings index*	**-0.04**	**-0.02**	**-0.02**	**-0.08**	**-0.01**	**0.5**	**-0.25**	**0.48**	1.00				
[19]	*Current economic conditions*	**0.01**	0.01	**-0.02**	**0.03**	**0.00**	**0.27**	**-0.52**	**-0.1**	**0.24**	1.00			
[20]	*CAPE Shiller index*	**-0.03**	**-0.02**	**-0.02**	**-0.04**	0.00	**0.2**	**-0.24**	**-0.13**	**0.34**	**0.72**	1.00		
[21]	*BAA-Fed fund rate*	**-0.03**	**-0.01**	**0.02**	**-0.01**	**0.01**	**-0.15**	**0.37**	**0.18**	**-0.3**	**-0.74**	**-0.48**	1.00	
[22]	*Time trend*	**-0.07**	**-0.04**	**0.01**	**-0.1**	0.01	**0.45**	**0.15**	**0.45**	**0.79**	**-0.17**	**0.14**	**0.24**	1.00

Notes on Table 2: Panel A reports the summary statistics of the sample used in the baseline regression. Panel B presents the Pearson correlations. Detailed variable definitions are in Appendix A. The bolded correlations are significant at 5 percent.

Table 3: Policy uncertainty reduces the likelihood that a firm will undertake a strategic alliance

	(1)	(2)	(3)	(4)
		Dependent Variable = *Alliance Dummy*		
Policy Uncertainty	-0.0102	-0.0148	-0.0124	-0.0101
	(-12.1137)***	(-14.2131) ***	(-14.1993) ***	(-5.1096)***
Ln(assets)	0.2917	0.2353		0.2031
	(27.4043) ***	(10.3696) ***		(0.0085)
Age	-0.0071	-0.0175		-0.0220
	(-2.9569) ***	(-3.2946) ***		(-0.0035)
Market-to-Book	0.0193	0.0178		0.0130
	(8.1741) ***	(6.6995) ***		(0.0116)
Cash	0.7842	0.6199		0.1509
	(7.8116) ***	(5.7444) ***		(0.0148)
R&D	1.2351	1.1911		0.2544
	(9.7734) ***	(10.4490) ***		(0.0057)
R&D dummy	-0.5499	-0.5478		-0.1699
	(-10.8023) ***	(-10.7221) ***		(-0.1204)
EBIT	-0.0442	-0.0123		-0.0176
	(-1.3923)	(-0.3130)		(-0.0006)
Gross margin	0.0230	0.0197		0.0017
	(5.3492) ***	(4.5491) ***		(0.0033)
Debt	-0.3279	-0.3696		-0.2015
	(-3.667) ***	(-3.509) ***		(-0.005)
PPE	-0.7154	-0.3265		-0.0411
	(-6.4361) ***	(-1.9577) *		(-0.0003)
Sales growth	0.0129	0.0285		0.0006
	(2.6584) ***	(3.5780) ***		(0.0001)

Sales growth dispersion	0.0000			0.0000
	(2.1575) **			(0.0504)
Real earnings volatility	-6.3197			-7.0413
	(-2.481) **			(-0.004)
Leading_indicators	0.0033			0.0041
	(1.3323)			(0.0058)
Real_earnings	-0.0185			0.0029
	(-1.5513)			(0.0009)
Current_economic_conditions	0.0082			-0.0208
	(0.4302)			(-0.0017)
CAPE Shiller index	0.0020			0.0065
	(0.1082)			(0.0016)
BAA-Fed fund rate	-0.0402			-0.0039
	(-0.4288)			(-0.0022)
Time trend	-0.0101			-0.0581
	(-0.2667)			(-0.0009)
Firm Fixed Effects	No	No	No	Yes
Inds. fixed effect	Yes	Yes	Yes	No
Wald Chi2	4,104.6865	3,734.2515	890.5402	1,237.9218
Pseudo R2	0.1342	0.1013	0.0626	0.1366
N	170,117	170,117	170,117	59,617
Groups				4,015

Notes on Table 3: This table reports the logit coefficients. *Alliance Dummy* is an indicator variable that takes the value of 1 if the firm undertakes a strategic alliance and 0 otherwise. *Policy Uncertainty* measures the extent of policy uncertainty. The industry fixed effects are based on Fama and French's 48 industry grouping. Detailed variable definitions are in Appendix A. In parentheses are the t-statistics based on standard errors based on double cluster by firm and year for all coefficients except those reported in column 4 where the t-statics are based on clustering by year. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table 4: Robustness of baseline results
Panel A: The main results are robust when using OLS, or when using the number of alliances undertaken as a dependent variable

	(1)	(2)	(3)
	DV= *Alliance Dummy*	DV= *Number of Alliances*	DV= *Number of Alliances*
	OLS	OLS	Negative Binomial
Policy Uncertainty	-0.0005	-0.0008	-0.0091
	(-5.1942)***	(-7.5361)***	(- 8.8158)***
Firm-level controls	Yes	Yes	Yes
Macro economic controls	Yes	Yes	Yes
Time trend	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes
Wald Chi2			3,9081.4213
Adjusted R-squared	0.0616	0.0525	
N	170,117	170,117	170,117
Groups			18,165

Panel B: Main results are robust when we analyze different subsamples based on the type of alliance

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable = *Alliance Dummy*					
	Subsample= *Supply alliance*	Subsample = *License alliance*	Subsample = *Manufacturing alliance*	Subsample = *Marketing alliance*	Subsample = *R&D alliance*	Subsample = *Funding alliance*
Policy Uncertainty	-0.0140	-0.0200	-0.0150	-0.0183	-0.0221	-0.0507
	(-5.0389)***	(-3.8165) ***	(-1.9657) **	(-3.6207) ***	(-4.7418) ***	(-3.1022)***
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Wald Chi2	1,056.5627	2,472.0139	1,035.0069	1,964.7006	2,409.8943	1,6425.8355
Pseudo.- R Sqd	0.1599	0.1372	0.1490	0.1588	0.1948	0.1579
N	170,117	170,117	170,117	170,117	170,117	170,117

Panel C: Robustness test using individual components of policy uncertainty index

	(1)	(2)	(3)	(4)
	Dependent Variable = *Alliance Dummy*			
News component	-0.0053			
	(-7.7942) ***			
Government Spend. component		-0.0005		
		(-3.1441) ***		
CPI component			-0.0074	
			(-8.7813) ***	
Tax component				-0.0002
				(-2.5586) **
Firm-level controls	Yes	Yes	Yes	Yes
Macro economic controls	Yes	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Wald Chi2	4,105.2211	3,657.2910	4,037.1039	3,801.2180
Pseudo R-squared	0.1312	0.1367	0.1317	0.1218
N	170,117	170,117	170,117	170,117

Notes on Table 4: The results of Panel A indicate that the main results continue to hold when we use OLS instead of logit, and when we use *No. of Alliances,* the number of strategic alliances in a firm-year, as the dependent variable. Panel B reports the results of subsamples of different types of the alliance. Panel C reports the results when we use the individual components of policy uncertainty that is used to construct the overall policy uncertainty index. *Alliance Dummy* is an indicator variable that takes the value of 1 if the firm undertakes a strategic alliance and 0 otherwise. Firm-level controls, Macro-economic controls, and Time trend represent the control variables that we use in our main model (i.e., Table 3, Column 1). In parentheses are the t-statistics based on standard errors based on double clustering by firm and year for all coefficients except those reported in and Panel A's column 3 where the t-statics are based on clustering by year.

Table 5 Difference-in-differences test
Panel A: Baseline test

	(1)	(2)
	Dependent variable = # of *Alliances in a state with election - # of alliances in a state without election*	
Election Year	-0.0054	-0.0558
	(-1.9304)*	(-4.0012)***
⊿ *Lag Alliances*		0.0023
		(7.013)***
⊿ *Lag GDP/Capita Growth*		-0.0000
		(-1.472)
⊿ *Lag Unemployment Rate*		-0.0047
		(-4.143)***
Year fixed effects	Yes	Yes
Adj R-squared	0.1384	0.2561
N	618	618

Panel B: Difference-in-differences results for high versus low uncertainty elections

	(1)	(2)	(3)	(4)	(5)	(6)
Sample						
	Dependent variable = # of *Alliances in a state with election- # of alliances in a state without election*					
	Governor Change		Incumbent Governor		Close Election	
	Yes	No	Yes	No	Yes	No
Election Year	-0.0696	-0.0061	-0.0567	-0.0166	-0 .04635	-0.0186
	(-3.1615)***	(-0.2422)	(2.9403)***	(-0.6858)	(-2.0312)**	(-0.2114)
⊿ *Lag Alliances*	0.0016	0.0021	0.0011	0.0015	0.0015	0.0011
	(3.2532)***	(4.8517)***	(2.0750)**	(3.8516)***	(5.0117)***	(5.0730)***
⊿ *Lag GDP/Capita Growth*	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(-0.1456)	(-1.072)	(-1.9875)**	(-2.1721)**	(-2.3203)**	(0.8729)
⊿ *Lag Unemployment Rate*	-0.0039	-0.0062	-0.0047	-0.0072	-0.0016	-0.0012
	(-1.4925)	(-3.6221)***	(-1.8919)*	(-4.3629)***	(-2.0781)**	(-1.8318)*
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-squared	0.3578	0.3169	0.3436	0.3026	0.3328	0.3257
N	209	409	204	414	309	309

Panel C: Corporate alliances before and after an election

	(1)
	Dependent variable = # of *Alliances in a state with election*
Election Year (T= +1)	0.0042
	(2.5922)**
Post-Election Year (T= +2)	0.0021
	(2.0321)**
Pre-Election Year (T= -1)	-0.0004
	(-0.8924)
Lag Alliances	0.0005
	(2.5806)**
Lag GDP/Capita Growth	-0.0002
	(-0.5618)
Lag Unemployment Rate	-0.0012
	(-1.5434)
Lag S&P 500 Returns	0.0002
	(2.2015)**
Lag Interest Rate	0.0021
	(2.2427)**
State fixed effects	Yes
Adj R-squared	0.6218
N	618

Notes on Table 5: Panel A of this table reports the difference-in-difference test. The dependent variable is the difference in the number of alliances in a state with an election, and a bordering state without an election. ⊿ *Lag Alliances* is the difference in the number of alliances last year. ⊿ *Lag GDP/capita Growth* is the difference in the GDP growth, ⊿ *Lag Unemployment Rate* is the lag of the difference in the unemployment rate between the two states. Panel B reports the test of Column 2 in Panel A, but by separating the sample into by whether the elections involved high uncertainty or low uncertainty. The measures for the uncertainty of the election is whether there was a change in governor, whether the incumbent governor was running for election, and whether the election was close. High uncertainty elections are ones where the governor changes or the incumbent governor was not running, or the victory margin was less than the median. Panel C reports the results when the dependent variable is # of *Alliances in a state with election*, the total number in the state with an election. In parentheses are the t-statistics computed using standard errors based on double clustering by state and year. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table 6: Does increased policy uncertainty affect alliance formations because of relational risk?
Panel A: During politically uncertain times firms prefer an alliance with fewer partners

	(1)	(2)	(3)
		Dependent variable = *More than two partners in alliance*	
Policy Uncertainty	-0.0019	-0.0069	-0.0038
	(-1.9827)**	(-4.4705)***	(-2.6216)***
Firm-level controls	Yes	Yes	No
Macro-controls	Yes	No	No
Time trend	Yes	No	No
Industry Fixed Effects	Yes	Yes	Yes
Wald Chi2	379.9759	176.1935	6.8718
Pseudo R-squared	0.0515	0.0293	0.0105
N	8,387	8,387	8,387

Panel B: High policy uncertainty is associated with fewer strategic alliances undertaken when the partner is research intensive

	(1)	(2)	(3)
	Subsample= Partner with R&D expenditure	Subsample= Partner without R&D expenditure	All Firms
Policy Uncertainty	-0.0154	-0.0079	-0.0084
	(-12.4746)***	(-9.4103)***	(-9.1708)***
*Policy Uncertainty*High Partner R&D*			-0.0081
			(3.8322)***
High Partner R&D			0.0097
			(5.5537)***
Firm-level controls	Yes	Yes	Yes
Macro economic controls	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes
P-value of test for equality of the coefficients of *Policy Uncertainty*	0.0014		
Industry fixed effect	Yes	Yes	Yes
Wald Chi2	3,803.9519	3,426.7055	4,907.9793
Pseudo R-squared	0.1411	0.0907	0.2142
N	166,601	164,843	170,117

Panel C: High policy uncertainty is associated with fewer strategic alliances undertaken in services industries

	(1)	(2)	(3)
	DV= *Alliance Dummy*		
	Subsample = Services	Subsample = All Industries except Services	All Firms
Policy Uncertainty	-0.0150	-0.0085	-0.0101
	(-7.6967)***	(-3.2561)***	(-13.0022)***
*Policy Uncertainty*Services*			-0.0134
			(-3.1153)***
Services			0.0084
			(8.8136)***
Firm-level controls	Yes	Yes	Yes
Macro economic controls	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes
P-value of test for equality of the coeff. of *Policy Uncertainty*	0.0001		
Industry fixed effect	Yes	Yes	Yes
Wald Chi2	4,023.1186	3,714.0563	5,018.1032
Pseudo R-squared	0.1328	0.1026	0.1933
N	153,574	157,772	160,059

Panel D: High policy uncertainty is associated with fewer strategic alliances undertaken in contract intensive industries

	(1)	(2)	(3)
	Dependent Variable = *Alliance Dummy*		
	Subsample = Most Contract Intensive Industries	Subsample = Least Contract Intensive Industries	Subsample = Most + Least Contract Intensive Industries
Policy Uncertainty	-0.0122	-0.0038	-0.0115
	(-3.5892)***	(-0.8336)	(-4.3771)***
*Policy Uncertainty*Contract Intensive Industry*			-1.0005
			(-3.0776)***
Contract Intensive Industry			0.6179
			(1.5972)
Firm-level controls	Yes	Yes	Yes
Macro economic controls	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes
P-value of test for equality of the coeff. of *Policy Uncertainty*	0.0308		
Industry fixed effect	Yes	Yes	Yes
Wald Chi2	3,847.7612	3748.4846	4,034.8214
Pseudo R-squared	0.1126	0.1071	0.1108
N	162,005	158,108	170,117

Notes on Table 6: This table consists of four panels. This table reports the logit coefficients. *Alliance Dummy* is an indicator variable that takes the value of 1 if the firm undertakes a strategic alliance and 0 otherwise. *Policy Uncertainty* measures the extent of policy uncertainty. Firm-level controls, Macro-economic controls, and *Time trend* represent the control variables that we use in our main model (i.e., Table 3, Column 1). In parentheses are the p-values based on standard errors based on double clustering—by firm and year. Panel A shows that a firm is less likely to undertake a strategic alliance with multiple partners during politically uncertain times. *More than two partner in alliance* takes the value of 1 if the firm undertakes an alliance with multiple partners, rather than only one partner. The sample includes firms that formed an alliance. Panel B shows that the negative effect of *Policy Uncertainty* on the undertaking of strategic alliances is much stronger when the partner is research-intensive, compared to the rest. *High Partner R&D* is equal to 1 when the partner in the alliance reports *R&D* expenditure and 0 otherwise. Panel C shows that the negative effect of *Policy Uncertainty* on the undertaking of strategic alliances is much stronger for firms that belong to service industries, compared to the rest. In service industries, the likelihood of managerial opportunism is higher. *Services* is an indicator variable that is equal to 1 when the partner belongs to the household or business services (Fama French industry codes 33 and 34). Panel D shows that the negative effect of *Policy Uncertainty* on the undertaking of strategic alliances is much stronger when the partner belongs to an industry that requires more intense contracting. In parentheses are the t-statistics computed using standard errors based on double clustering by firm and year. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table 7: Does policy uncertainty affect alliance formation because it is optimal to delay irreversible investments?
Panel A: The effect of policy uncertainty on strategic alliances is not stronger when alliances are more irreversible

	(1)	(2)	(3)
	DV= *Alliance Dummy*		
	Subsample = License+Marketing	Subsample = Manufacturing+Supply+Funding	All Firms
Policy Uncertainty	-0.0103	-0.0209	-0.0077
	(-8.8702)***	(-9.2501)***	(-9.5586)***
*Policy Uncertainty*License+Marketing*			0.0096
			(1.0289)
License+Marketing			-3.7349
			(-1.9337)*
Firm-level controls	Yes	Yes	Yes
Macro economic controls	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes
P-value of test for equality of the coefficients of *Policy Uncertainty*	0.7106		
Industry fixed effect	Yes	Yes	Yes
Wald Chi2	2,369.6088	2,534.6412	3,438.3607
Pseudo R-squared	0.1531	0.1608	0.1672
N	162,499	160,354	170,117

Panel B: Irreversibility of investment does not moderate the effect of policy uncertainty on strategic alliances

	(1)	(2)	(3)
		DV= *Alliance Dummy*	
	Subsample = High Asset Redeployability	Subsample = Low Asset Redeployability	All firms
Policy Uncertainty	-0.0118	-0.0094	-0.0088
	(-9.4827)***	(-7.4574)***	(-7.2315)***
*Policy Uncertainty*Asset Redeployable*			-0.0018
			(-0.5769)
Asset Redeployable			0.6578
			(4.3857)***
Firm-level controls	Yes	Yes	Yes
Macro economic controls	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes
P-value of test for equality of the coefficients of *Policy Uncertainty*	0.3573		
Industry fixed effect	Yes	Yes	Yes
Wald Chi2	520.4931	283.6180	894.2273
Pseudo R-squared	0.0927	0.0703	0.0912
N	83,414	86,703	170,117

Notes on Table 7: This table reports the logit coefficients. *Alliance Dummy* is an indicator variable that takes the value of 1 if the firm undertakes a strategic alliance and 0 otherwise. *Policy Uncertainty* measures the extent of policy uncertainty. Firm-level controls, Macro-economic controls and Time trend represent the control variables that we use in our main model (i.e., Table 3, Column 1). In parentheses are the p-values based on standard errors based on double clustering—by firm and year. Panel A shows the effect of *Policy Uncertainty* on the formation of strategic alliances for two different subsamples. A subsample of alliance type that has less sunk costs (License & Marketing), and one with greater sunk cost (Manufacturing, Supply & Funding). In Panel B, column 1 reports the results of the subsample of firm-years where the partner belongs to industries whose assets redeployability score is above the median. Column 2 reports the results of the subsample of firm-years where the partner belongs to industries whose assets redeployability score is below the median. Column 3 reports the results of a pooled analysis. In parentheses are the t-statistics computed using standard errors based on double clustering, by firm and year.

Table 8: Policy uncertainty's effect on undertaking acquisitions
Panel A: Is the effect of increased policy uncertainty on acquisitions much stronger when the target belongs to an industry involving high contract intensity?

	(1)	(2)	(3)
	Dependent variable = *Acquisition Dummy*		
	Subsample = Most Contract Intensive Industries	Subsample = Least Contract Intensive Industries	Subsample = Most + Least Contract Intensive Industries
Policy Uncertainty	-0.012	-0.0105	-0.0078
	(-3.0584)***	(-2.8242)***	(-3.3681)***
*Policy Uncertainty**			-0.0032
Contract Intensive Industry			(-1.4582)
Contract Intensive Industry			0.4416
			(1.8583)*
Firm-level controls	Yes	Yes	Yes
Macro-economic controls	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes
P-value of test for equality of the coefficients of *Policy Uncertainty*	0.5294		
Industry fixed effects	Yes	Yes	Yes
Wald Chi2	1920.0537	1862.9732	2,200.8463
Pseudo R-squared	0.0817	0.0545	0.0508
N	162,005	158,108	170,117

Panel B: Is the effect of policy uncertainty on acquisitions much stronger when the target belongs to an industry involving high asset redeployability?

	(1)	(2)	(3)
	Dependent variable= *Acquisition Dummy*		
	Subsample = Asset Redeployable =1	Subsample = Asset Redeployable =0	Subsample = Asset Redeployable =1, 0
Policy Uncertainty	-0.0079	-0.0117	-0.0121
	(-5.6326)***	(-7.8423)***	(-7.6870)***
*Policy Uncertainty*Asset Redeployable*			0.0036
			(2.7467)***
Asset Redeployable			-0.2287
			(-1.0321)
Firm-level controls	Yes	Yes	Yes
Macro-economic controls	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes
P-value of test for equality of the coefficients of Policy Uncertainty	0.0148		
Industry fixed effect	Yes	Yes	Yes
Wald Chi2	157.7305	231.1136	360.864
Pseudo R-squared	0.0612	0.0742	0.0586
N	83,414	86,703	170,117

Panel C: The relative impact of relational risk and investment irreversibility on corporate alliances versus acquisitions

	(1)	(2)
	DV = *Acquisition Dummy*	DV = *Alliance Dummy*
Policy Uncertainty	-0.0119	-0.0131
	(-3.0835)***	(-3.3793)***
*Policy Uncertainty*Contract Intensive Industry*	-0.0006	-0.0037
	(-0.0616)	(3.2090)***
Contract Intensive Industry	0.2842	0.4679
	(0.2707)	(0.2541)
*Policy Uncertainty*Asset Redeployable*	0.0028	-0.0047
	(2.0721)**	(-1.1774)
Asset Redeployable	-0.1685	0.8027
	(-0.3641)	(2.0312)**
Firm-level controls	Yes	Yes
Macro-economic controls	Yes	Yes
Time trend	Yes	Yes
Industry fixed effect	Yes	Yes
Wald Chi2	2233.4917	4146.2445
Pseudo R-squared	0.0603	0.1149
N	170,117	170,117

Notes on Table 8: In column 1 of Panel A, the subsample includes only those acquisitions with partners in most contract intensive industries. In column 2 the subsample includes only those acquisitions with partners in the least contract intensive industries. The information on the intensity of the contract is obtained from Nunn (2007). Column 3 reports the results of a pooled analysis. *Contract Intensive Industry* is an indicator variable that is equal to 1 when the partner belongs to an industry ranked among top-twenty contract and 0 otherwise. The information on contract intensity is obtained from Nunn (2007). Panel B reports the logit coefficients. It shows that *Policy Uncertainty* has a weaker effect on the likelihood of acquisition when the target belongs to an industry with high asset redeployability. In column 1 the subsample includes only those acquisitions where the target's assets redeployability was more than the median, and in column 2 the subsample includes only those acquisitions where the target's asset redeployability is below the median. In Panel C, we also report the logit results when *Policy Uncertainty*Contract Intensive Industry* and *Policy Uncertainty*Asset Redeployable* are included in the same regression. Firm-level controls, Macro-economic controls and *Time trend* represent the control variables that we use in our main model (i.e., Table 3, Column 1). In parentheses are the t-statistics computed using standard errors based on double clustering, by firm and year.

Table 9: When policy uncertainty is high, firms are more likely to withdraw from an alliance

Panel A: Univariate tests

	High Policy Uncertainty	Low Policy Uncertainty	(1)-(2)	t-stat	p-value
	(1)	(2)	(3)	(4)	(5)
Withdrawn	0.032	0.027	0.005	5.764	(0.000)

Panel B: Multivariate tests

	(1)	(2)	(3)
	Dependent Variable = *Withdrawn*		
Policy Uncertainty	0.0008	0.0020	0.0048
	(0.2168)	(2.1825)**	(5.2959)***
Firm-level controls	Yes	Yes	No
Macro-controls	Yes	No	No
Time trend	Yes	No	No
Industry Fixed effect	Yes	Yes	Yes
Wald Chi2	1,188.67	330.95	28.05
Pseudo R-squared	0.2134	0.1239	0.0704
N	12,531	12,531	12,531

Notes on Table 9: The variable *Withdrawn* takes the value of 1 if an alliance that was announced is broken off. Panel A presents the univariate analysis. *High Policy Uncertainty* represents the period when policy uncertainty was greater than the median. Low Policy Uncertainty represents the period when policy uncertainty is lower than the median. Panel B presents the multivariate results. Firm-level controls, Macro-economic controls and Time trend represent the control variable that we use in our main model (i.e., Table 3, Column 1). In parentheses are the t-statistics computed using standard errors based on double clustering, by firm and year.

Table 10: Stock market reaction to announcement of strategic alliances is higher when policy uncertainty is high

Panel A: Univariate Analysis

	High Policy Uncertainty	Low Policy Uncertainty	(1)-(2)	t-stat	p-value
	(1)	(2)	(3)	(4)	(5)
CAR[-1,1]	0.0113	0.0082	0.0031	2.0717	0.0192**
CAR[-2,2]	0.0118	0.0089	0.0029	1.9741	0.0463 **

Panel B: Multivariate Analysis

	(1)	(2)	(3)	(4)
	DV= *CAR(-1,+1)*	DV= *CAR(-2,+2)*	DV= *CAR(-1,+1)*	DV= *CAR(-2,+2)*
Policy Uncertainty	0.0001	0.0003	0.0002	0.0005
	(2.3721)**	(2.6265)***	(2.5276)**	(2.9794)***
CAR[-30,-3]			0.0454	0.0424
			(3.5259)***	(3.1138)***
Firm-level controls	Yes	Yes	Yes	Yes
Macro economic controls	Yes	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes	Yes
Adjusted R-squared	0.0171	0.0314	0.0425	0.0495
N	12,987	12,987	12,987	12,987

Notes on Table 10: This table shows that the cumulative abnormal returns of the strategic alliances that were undertaken during politically uncertain times are higher. CAR [-1, 1] and CAR [-2, 2] represents the cumulative abnormal returns for 3 day and 5 day windows. Panel A presents the univariate analysis. High Policy Uncertainty represents the period when policy uncertainty was greater than the median. Low Policy Uncertainty represents the period when policy uncertainty is lower than the median. Panel B presents the multivariate results. Firm-level controls, Macro-economic controls and Time trend represent the control variables that we use in our main model (i.e., Table 3, Column 1). In parentheses are the t-statistics based on standard errors based on double clustering—by firm and year.

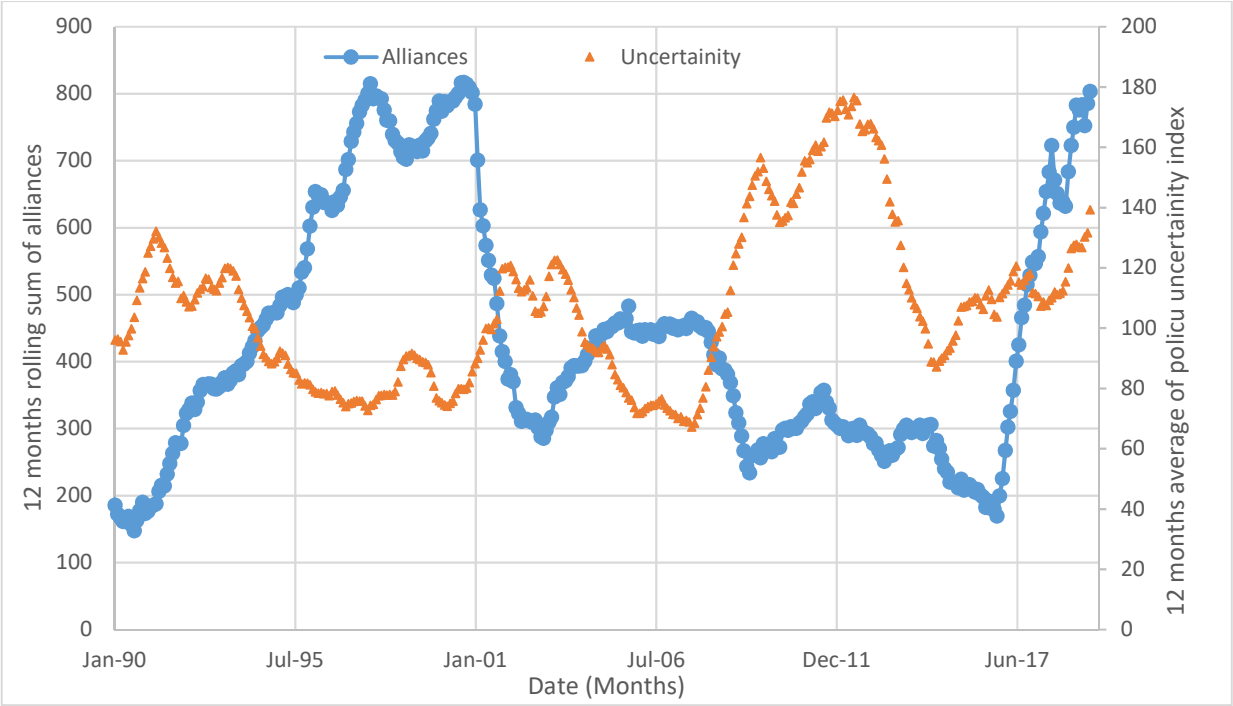
Table 11: Acquisition and policy uncertainty

	(1)	(2)
	DV= *Acquisition Dummy*	DV= *Acquisition Dummy*
	Logit	OLS
Policy Uncertainty	-0.0078	-0.0003
	(-5.9893)***	(-3.4114)***
Firm-level controls	Yes	Yes
Macro-economic controls	Yes	Yes
Time Trend	Yes	Yes
Industry fixed effect	Yes	Yes
Wald Chi2	1964.1404	
(Pseudo) R-squared	0.0461	0.0123
N	170,117	170,117

Notes on Table 11: This reports the results of regression analysis when the dependent variable is *Acquisition Dummy*, and indicator variable that is equal to 1 when the firm acquires a target. *Policy Uncertainty* measures the extent of policy uncertainty. Column 1 reports logit coefficients, column 2 reports the OLS results. Firm-level controls, Macro-economic controls and Time trend represent the control variables that we use in our main model (i.e., Table 3, Column 1). In parentheses are the t-statistics based on standard errors based on double clustering—by firm and year.

Figure 1

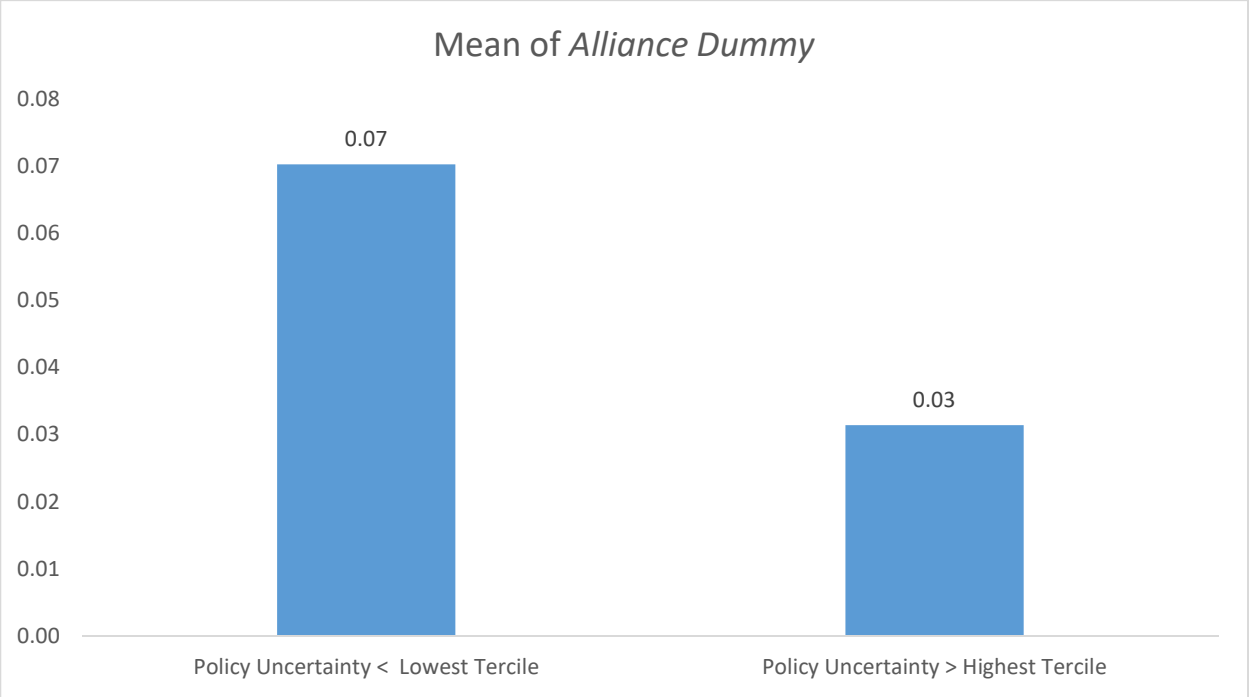
A graphical representation of policy uncertainty and the number of alliances during the sample period



Notes on Figure 1: This figure plots the 12 months rolling sum of the total number of alliances and the 12 months rolling average of policy uncertainty for every month from January 1990 onwards up to December 2019.

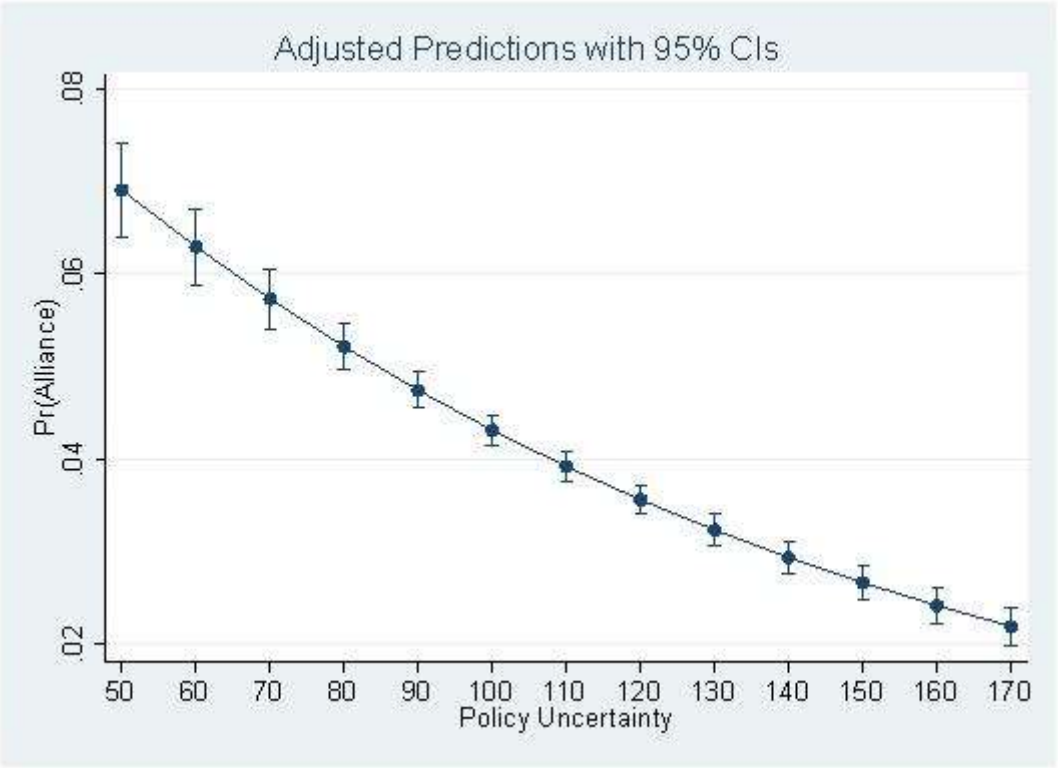
Figure 2

Policy uncertainty and strategic alliances undertaken



Notes on Figure 2: This figure presents the mean of *Alliance Dummy* for a subsample that has policy uncertainty below the median and another subsample that has uncertainty above the median. *Alliance Dummy* is an indicator variable that is one if the firm undertakes an alliance in that year, and 0 otherwise. A two-tailed t-test shows that the difference is statistically significant with p-value < 0.001 percent. The t-statistics for t-test is 21.556.

Figure 3: The probability of undertaking an alliance with increasing policy uncertainty



Notes on Figure 3: The figure plots the probability of undertaking an alliance based on the base line logit analysis specified in column 1 of Table 3.