

Weathering the Storm: The Impact of Flooding on Corporate M&A Activity

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Abstract

Climate change has intensified the frequency and severity of natural disasters, generating operational disruptions, physical asset damage, and heightened uncertainty for firms. This study examines whether such climate-related shocks influence firms' participation in merger and acquisition (M&A) activity. Using county-level flooding events in the United States as an exogenous shock, I investigate how flood exposure affects firms' strategic investment decisions in the market for corporate control. The results show that firms headquartered in flood-affected counties become significantly less likely to engage in M&A activity, particularly as acquirers, during the years immediately following flood exposure. However, this negative effect is temporary and gradually reverses approximately three years after the disaster, suggesting that firms initially postpone strategic investments under heightened uncertainty before resuming acquisition activity as conditions stabilise. Additionally, the study shows that the impact of asset tangibility, nature of businesses, and first-time flooding experience are potential sources of flood-induced uncertainty. Overall, the findings provide new evidence that localised climate-related disruptions materially influence firms' strategic investment behaviour and participation in the market for corporate control.

Keywords: Climate Change, Flood Risk, Mergers and Acquisitions, Localised Shock, Real Strategic Decision-Making

1 Introduction

Climate change has emerged as one of the most significant global challenges, generating substantial environmental, social, and economic consequences. Rising temperatures, increasingly frequent extreme weather events, and shifting climate conditions are disrupting industries such as agriculture, energy, tourism, and infrastructure, with growing implications for firms' operational and financial decisions. Prior research shows that climate-related risks affect firms' financing conditions and investment behaviour (e.g., Huynh et al., 2020; Sautner et al., 2023), workers' productivity (e.g., Deryugina & Hsiang, 2014; Heal & Park, 2013), and investor sentiment and market reactions (e.g., Bassi et al., 2013; Jiang et al., 2021). Consequently, understanding how climate-related uncertainty influences firms' strategic decision-making has become an increasingly important issue in corporate finance research.

Merger and acquisition (M&A) transactions provide an important setting through which to examine firms' responses to climate-related uncertainty. Unlike routine operational decisions, M&As involve large, strategic, and often irreversible commitments of capital that require substantial managerial confidence regarding future economic conditions. Prior literature suggests that firms tend to delay investment under heightened uncertainty (Bloom, 2009; Bloom et al., 2007). In particular, heightened uncertainty may increase firms' tendency to postpone strategic investments until conditions become more predictable. At the same time, disruptions resulting from adverse shocks may also generate constraints for engaging in large investment opportunities, particularly for firms experiencing financial pressure (Erel et al., 2012; Malmendier & Tate, 2008; Williamson & Yang, 2021). As climate-related disruptions directly affect firm operations, among the impacts may extend to influence firms' incentives to undertake strategic actions. These possibilities suggest that climate-related shocks may influence not only whether firms engage in M&A activity, but also the timing and strategic motivations underlying such transactions.

While previous literature has extensively examined the relationship between climate change and corporate behaviour, less attention has been devoted to understanding how physical climate shocks, particularly natural disasters, affect strategic corporate investment decisions such as M&As. This consideration is important because natural disasters represent among the most disruptive manifestations of climate change. Changing climate conditions are known to intensify both the frequency and severity of natural disasters (Hirabayashi et al., 2013), while the timing, location, and magnitude of such events remain highly uncertain (e.g., Blanco et al.,

2024; Dessaint & Matray, 2017; Ouazad & Kahn, 2022). Unlike gradual climate trends, disasters such as floods can immediately disrupt production facilities, damage physical assets, interrupt supply chains, and impair firms' operational capacity. Previous studies document that exposure to natural disasters influences firms' financial and strategic policies, including cash holdings (Dessaint & Matray, 2017), leverage decisions and acquisition policies (Bernile et al., 2017), carbon emissions intensity (Garel & Petit-Romec, 2022), and ESG disclosure practices (Q. Huang et al., 2022). These findings suggest that firms actively adjust their corporate behaviour in response to disaster-related uncertainty and operational risk.

Motivated by these observations, this chapter investigates how flood exposure affects firms' participation in merger and acquisition activity. I focus specifically on flooding because floods are among the most frequent and economically disruptive natural disasters in the United States, while also being highly localised in nature. Their geographically concentrated impact allows for a more precise examination of how physical climate shocks influence corporate decisions. The aforementioned effects of natural disaster, which imply operational disruptions for disaster-stricken firms, give rise to two conflicting hypotheses regarding the impact of flooding on M&A activities. The first one is the *flood-induced retrenchment* hypothesis. As flooding increases operational uncertainty, the shocks also disrupt firms' strategic investment decisions; thereby reducing firms' incentives to participate in M&A activity. If firms located in flood-affected areas become more exposed to heightened uncertainty surrounding future operating conditions, financing needs, and asset recovery, they should experience a lower probability of engaging in M&A decisions. The alternative hypothesis is the *flood-induced survival* hypothesis. Under this hypothesis, flood exposure may also generate strategic restructuring incentives under certain conditions. This implies that firms may pursue acquisition activity or become acquisition targets in response to collateral deterioration, liquidity needs, or post-disaster consolidation opportunities. Consequently, the overall effect of flooding on M&A activity remains an empirical question.

To test these predictions, I use flood events identified from the Federal Emergency Management Agency (FEMA) Disaster Declaration database between 2002 and 2017. Following prior literature examining the effects of climate-related and disaster shocks on firms (e.g., Bernile et al., 2017; Dessaint & Matray, 2017; Blanco et al., 2024), I measure flood exposure using an indicator variable that equals one when a firm's headquarters county experiences a FEMA-declared flood event in a given year. Flood incidents are identified using

county-level Federal Information Processing Standards (FIPS) codes, allowing flood exposure to be matched to firms based on the five-digit county FIPS code of their headquarters location. Considering that local disaster shocks may directly influence firms' corporate policies and investment decisions, I follow prior studies (e.g., Gao et al., 2011; Kang & Kim, 2008) and use firms' headquarters which typically represent the centre of strategic decision-making and primary operational coordination.

The empirical analysis reveals several important findings. First, firms located in flood-affected counties become significantly less likely to engage in M&A activity in the years immediately following flood events. This negative effect is particularly concentrated among firms acting as acquirers, suggesting that flood-induced uncertainty discourages firms from initiating strategic expansion decisions. Second, the negative effect gradually weakens over time and begins to reverse approximately three years after flood exposure, indicating a potential "catch-up" effect whereby firms resume delayed investment activity once conditions become more stable. This dynamic pattern is broadly consistent with an interpretation in which firms temporarily postpone strategic investments following uncertainty shocks.

Additionally, I consider the possibility that observations are sensitive to a potential concern about whether events other than flooding incidents may be driving the baseline results. One important identification concern is whether firms located in flood-prone areas already exhibit different acquisition trends prior to flooding events. If firms anticipate future flood exposure or if flood-prone regions are characterised by gradually deteriorating economic conditions, then the estimated effects may simply capture pre-existing trends in M&A activity rather than firms' responses to flood shocks themselves. To address this concern, I implement a dynamic event-study analysis that traces firms' acquisition behaviour before and after flood exposure. The results reveal no evidence of significant pre-event effects, indicating that firms do not systematically reduce acquisition activity prior to flooding incidents.

Another concern is that the baseline findings may reflect omitted regional characteristics rather than the direct effect of flooding exposure itself. For instance, flood-prone regions may systematically differ in terms of local economic conditions, infrastructure quality, environmental vulnerability, or regional policy environments, all of which may independently influence firms' acquisition decisions. To alleviate this concern, I conduct placebo analyses designed to test whether the documented effects are driven by spurious regional patterns

unrelated to actual flood exposure. The placebo tests yield insignificant results, suggesting that the observed decline in M&A activity is unlikely to be driven by unrelated regional characteristics or coincidental local shocks.

Further, I acknowledge that, whereas the timing of flooding events is largely exogenous to firms, firms do not locate randomly across geographic areas. Firms headquartered in flood-prone counties may systematically differ from firms located in non-flood-affected areas in terms of operational characteristics, industry composition, financial conditions, and local economic environments. If firms' location choices are correlated with acquisition activity, then the observed decline in M&A likelihood cannot be fully attributed to flood exposure itself. Therefore, to further validate the findings, I perform a propensity score matching (PSM) analysis to control for observable firm characteristics that could potentially lead to selection bias. The matched-sample analysis indicates that the baseline results remain qualitatively unchanged, alleviating concerns that the documented decline in acquisition activity is primarily driven by observable differences between firms located in flood-prone and non-flood-prone areas.

In the last part of empirical analysis, I further examine the mechanisms through which flooding affects firms' acquisition decisions. First, investigate the role of asset tangibility. Prior literature highlights that asset tangibility is central to firms' financing and investment decisions because tangible assets shape borrowing capacity and collateral value (e.g., Almeida & Campello, 2007; Rajan & Zingales, 1995; Rampini & Viswanathan, 2013). In the context of natural disasters, however, tangible assets may also become a source of vulnerability because floods can directly damage production facilities, infrastructure, and other physical assets. Consistent with this mechanism, the empirical results show that the negative effect of flood exposure on M&A activity is stronger among firms with higher physical asset intensity. This suggests that flood-induced uncertainty is amplified when firms rely more heavily on tangible capital, supporting the interpretation that physical asset exposure increases operational disruption and raises firms' incentives to postpone acquisition decisions.

Second, I examine whether the effects of flooding are stronger among firms operating in industries that are naturally more sensitive to excess water exposure. Existing studies show that the real effects of climate shocks vary across sectors because firms differ in their exposure to weather-sensitive production processes, supply chains, and physical infrastructure (e.g.,

Addoum et al., 2020; Pankratz & Schiller, 2024). Related evidence also suggests that salient environmental shocks can shape firms' investment responses when managers perceive such shocks as informative about future operating risk (Rao et al., 2022). Consistent with this view, the results indicate that firms operating in industries more sensitive to excess water exposure experience a less pronounced decline in acquisition activity following flooding events. This pattern suggests that flood-sensitive firms may be more accustomed to water-related risks and therefore better prepared to respond strategically, potentially using M&A as a tool to adapt, diversify, or acquire more resilient assets.

Geographic dispersion provides a third mechanism. Because the main exposure measure is based on flooding in the county of a firm's headquarters, the effect of flood exposure may depend on whether firms' operations are concentrated around that location or spread across multiple regions. Prior literature suggests that geographically diversified firms are less exposed to local shocks because losses in one region may be offset by operations elsewhere (García & Norli, 2012). Similarly, climate-related studies show that the adverse effects of environmental shocks are weaker for firms or industries with more geographically dispersed operations (Benincasa et al., 2024; Huynh et al., 2020). In line with this argument, the results show that the negative effect of flooding on M&A activity is weaker among firms with more geographically dispersed operations. This evidence suggests that geographic diversification mitigates the disruptive effects of localised flood shocks and allows firms to maintain greater capacity to pursue acquisition opportunities.

Furthermore, learning and adaptation constitute an important moderating channel. Prior experience with environmental shocks may reduce uncertainty by allowing firms to update their beliefs, improve disaster preparedness, and develop operational resilience. This logic is consistent with studies showing that individuals and markets learn from flood experience and update their perceptions of future disaster risk (Bakkensen & Barrage, 2022; Gallagher, 2014; Kousky, 2010). Consistent with this mechanism, the empirical results show that first-time flood exposure is associated with a significant short-run decline in acquisition activity, whereas repeated exposure generates a weaker immediate response and a stronger later recovery. This pattern suggests that prior flood experience reduces the uncertainty associated with subsequent disasters, enabling firms to adapt more effectively and re-enter the M&A market more quickly after flood events.

To further validate the baseline findings, I also analyse whether the results remain robust when flood exposure is measured using flood duration rather than a binary indicator of flood occurrence. Prolonged flooding may generate greater damage to production facilities, transportation systems, and local infrastructure, thereby increasing uncertainty surrounding firms' future operations and investment decisions. Consistent with this argument, the empirical results indicate that longer flood duration is associated with a significantly lower likelihood of firms engaging in M&A activity. This finding suggests that the intensity and persistence of operational disruptions, rather than merely the occurrence of flooding itself, play an important role in shaping firms' strategic investment behaviour following disaster exposure.

I next investigate whether the documented effects are stronger for major flooding events that impose more severe disruptions. As these large-scale disasters yield higher uncertainty regarding required rehabilitation and recovery timelines, major flooding incidents may therefore exert a disproportionately stronger influence on firms' acquisition decisions relative to smaller or less disruptive events. Consistent with this expectation, the results reveal that the negative effect of flood exposure on M&A activity is more pronounced when the analysis focuses on flooding events associated with extensive rehabilitation needs. This evidence supports the interpretation that the severity of disaster-related disruptions amplifies firms' incentives to postpone acquisition activity under heightened uncertainty.

Finally, I examine whether the baseline findings are driven primarily by firms located in coastal areas, which are naturally more exposed to flooding risk and may systematically differ from inland regions in terms of economic activity, infrastructure, industrial composition, and environmental vulnerability. To address this concern, I repeat the analysis after excluding firms headquartered in coastal counties. The results remain qualitatively consistent with the baseline findings, indicating that the negative relationship between flood exposure and M&A activity is not solely driven by the unique characteristics of coastal regions. This finding strengthens confidence that the documented effects capture a broader relationship between flooding shocks and firms' strategic investment decisions rather than merely reflecting the economic structure of coastal areas.

This study offers novel contributions to the literature on climate change, M&As, and corporate decision-making under localised environmental shocks. First, it provides comprehensive evidence that natural disasters have important consequences for firms' strategic investment decisions. While existing studies primarily focus on weather-related phenomena, comparatively less attention has been devoted to understanding how natural disasters affect firms' participation in the market for corporate control. Prior disaster-related research documents that natural disasters influence firms' cash holdings (Dessaint & Matray, 2017), leverage and acquisition policies (Bernile et al., 2017), carbon emissions intensity (Garel & Petit-Romec, 2022), and ESG disclosure behaviour (Huang et al., 2022). Building upon this literature, this chapter provides new evidence that flood exposure significantly reduces firms' likelihood of undertaking large and uncertain strategic investments such as M&A transactions. At the same time, the results also highlight that environmental shocks affect different sides of M&A transactions asymmetrically, as firms exposed to flooding become substantially less likely to initiate acquisitions while target-related effects appear comparatively weaker and less consistent. Overall, these findings demonstrate that localised climate-related disruptions materially influence firms' participation in strategic corporate investment activity and reshape behaviour within the market for corporate control.

Second, this chapter further contributes to the literature examining how uncertainty shapes firms' M&A decisions. Prior research shows that firms' acquisition behaviour is sensitive to uncertainty shocks, financing constraints, and changes in investment opportunities (e.g., Almeida & Campello, 2007; Bloom, 2009; Harford, 1999; Nguyen et al., 2023). Building upon this literature, the present study demonstrates that managers respond to flood-induced uncertainty by significantly reducing firms' likelihood of undertaking M&A activity, particularly during the years immediately following disaster. Importantly, however, this negative effect is not persistent. The gradual recovery in acquisition activity beginning approximately three years after flooding events suggests that firms initially postpone large and uncertain strategic investments under heightened uncertainty before gradually resuming M&A activity as operational conditions stabilise and disaster-related uncertainty subsides. In addition, the heterogeneous analyses reveal that firms' responses to flooding shocks vary according to the degree of operational vulnerability embedded within the firm. Specifically, the decline in acquisition activity is more pronounced among firms with greater concentrations of tangible assets and among firms operating in industries that are highly sensitive to excess water exposure, suggesting that operational rigidity and physical asset dependence amplify firms'

incentives to delay strategic investments following environmental shocks. Overall, these findings contribute to a deeper understanding of how environmental uncertainty shapes the timing, persistence, and intensity of firms' participation in the market for corporate control.

Finally, this chapter contributes to the growing literature highlighting the importance of geographic location in shaping firms' financial and strategic decisions. Although firms possess discretion in determining where to locate their headquarters and operations, these location choices also expose firms to heterogeneous local economic, environmental, and climate-related risks. Prior literature shows that firms located in areas with greater climate risk exposure face higher borrowing costs (Javadi & Masum, 2021), lower organisational capital accumulation (Dougal et al., 2022), declines in firm value (Choi et al., 2020), and greater operational vulnerability to environmental shocks (Blanco et al., 2024; Pankratz & Schiller, 2024). Building upon this literature, the present study demonstrates that localised exposure to flooding materially influences firms' participation in the market for corporate control. In particular, the findings suggest that geographic vulnerability to natural disasters shapes firms' willingness to undertake strategic investments such as M&A transactions. Moreover, the heterogeneous effects associated with geographic dispersion and prior disaster experience further highlight the importance of local environmental exposure in determining firms' strategic responses to climate-related uncertainty.

2 Prior Literature & Hypothesis Development

2.1 *Climate Risk and Corporate Responses*

Climate change becomes a central topic which has been examined due to its impact on firms' economic and financial outcomes. For example, one study by Addoum et al. (2020) investigated how temperature shocks, a form of physical climate risk, affect firm performance by linking high-resolution climate data on days above temperature thresholds with establishment-level economic outcomes across a broad sample of U.S. firms. By constructing firm-level exposure measures by aggregating weather data for each establishment's geographical footprint, and then analysed whether these temperature exposures influence sales, productivity, and profitability at both the establishment and firm levels. They found that temperature shocks have economically small and statistically insignificant effects on establishment-level sales and productivity, even when focusing on heat-sensitive sectors. However, one exception showed up when authors regress firm sales on exposure to extreme cold temperatures; where a small but statistically significant effect was found. Their framework

demonstrates that linking climate exposures with firm-level economic performance is feasible and important, providing a foundation for later work showing the need for attention around climate-specific contexts.

Another study by Huynh et al. (2020) examined the role of drought in raising the cost of equity capital. Using the Palmer Drought Severity Index (PDSI) and forward-looking implied cost of equity measures, they found that firms headquartered in areas experiencing severe drought face a significantly higher cost of equity capital, with extreme drought conditions associated with increases of roughly 92–162 basis points. This relation was economically meaningful and persisted after controlling for standard firm risk characteristics. The study also showed that the drought risk premium was stronger for firms with greater local institutional holdings and weaker for firms with diversified operations or high cash holdings, indicating that climate exposure materially influences perceived firm risk and financing costs. These findings imply that physical climate risks like drought (and by extension other extreme events such as floods) are priced into firms' expected returns and thus can materially affect corporate financial outcomes and risk-taking behaviour.

Other studies discussed how the negative consequences induced by the climate change has also extended to firm performance in the financial market. For example, Hong et al. (2019) investigated whether stock prices of food companies around the world efficiently reflect physical climate risks. Using the PDSI to rank countries by drought trends and linking this ranking to profit growth and stock return performance for food firms, the study found that worsening drought trends predict weaker future profit growth and lower subsequent stock returns for these firms. This return predictability suggested that financial markets underreacted to persistent physical climate risks embedded in drought trends and later made delayed adjustments. These findings highlight that climate risk is economically material and can affect firms' financial performance and valuation, underscoring that climate risks have real consequences for corporate outcomes beyond environmental contexts.

Researchers also show that firm decision makers are increasingly factoring climate into strategic planning. For example, Coffee (2014) found evidence of climate change-induced decisions when choosing where to locate or expand operations. Author noted that traditional site selection criteria; like labour and incentives, had now been supplemented with climate-related considerations such as water scarcity and flood risk, as both drought and inundation can

disrupt supply chains and infrastructure. For example, severe flooding in Thailand in 2011 caused substantial losses for parts suppliers and highlighted the bottom-line impact of extreme weather on multinational operations. The article also referenced evidence that a large share of firms viewed physical climate risks as a significant supply-chain threat, prompting companies to rethink location, resilience, and risk management strategies. This article demonstrates that both experienced or anticipated climate events can influence corporate site selection and investment choices, reflecting broader behavioural and strategic responses to climate risk exposure.

In another study, Chhaochharia et al (2019) examined how climate change experience by managers influences firms' economic expectations and subsequent decisions, including investment and hiring. By linking sunshine (cloud cover) to mood-induced optimism (pessimism), authors showed that weather conditions influenced managers to alter their forecasts about future economic conditions, and these biased expectations then shape real corporate decisions such as capital expenditures and employment. Because environmental-induced mood is unrelated to fundamentals, these results demonstrate that managerial perceptions driven by experience or affect can have material implications for firm behaviour. The study also showed that when many managers in a region share a common experiential state (e.g., extended sunny or cloudy conditions), their correlated expectations can influence broader economic outcomes. This mechanism implies the important role of salient environmental shocks in updating managerial beliefs and decisions in ways that deviate from purely objective risk assessments, thus supporting the idea that climate exposure can shape corporate strategy and risk-taking beyond purely statistical uncertainty.

Finally, some researchers focused on how firms react on the ratification of new regulations in response to growing concerns for climate change. For example, Nguyen & Phan (2020) use Australia's ratification of the Kyoto Protocol in December 2007 as an exogenous policy shock that increased carbon transition risk for carbon-intensive firms. They found that following this shock, managers of heavy carbon emitters reduce financial leverage relative to other firms, consistent with increased risk perception induced by climate-related regulation. The leverage decline is stronger among financially constrained firms, indicating that limited access to external finance amplifies firms' responses to heightened climate-related risk. Further mechanism tests suggested that the policy-induced rise in carbon risk increases financial distress risk, which led firms rethinking their strategies in order to stay delivered.

Overall, the study showed that climate-related exposures can materially influence corporate decision-making.

2.2 Weather Events as Proxies for Climate Risk

In the discussions of climate change, managing the risks becomes challenging. Researchers have argued that this is due to the difficulties to understand the likelihood and impacts of the risks (e.g., Engle et al., 2020; Huang et al., 2022; Krueger et al., 2020). Especially when it comes to natural disasters, challenges are multiplied by their exogenous nature and even with forecast, their specific location and severity are still hard to predict (e.g., Dessaint & Matray, 2017; Ouazad & Kahn, 2022). These distinctive characteristics of climate change compel individuals and firms to assess climate risk using more readily available proxies; such as extreme weather events and natural disasters, to navigate the complexities of climate change when making economic and financial decisions. Consequently, observable weather shocks provide a meaningful empirical proxy because they capture the climate risk that decision-makers perceive and respond to. Within this context, various weather-specific events are commonly employed as representative proxies for physical climate risks exposure. This has been explained through the idea of attribute substitution. According to an article by Y. Li et al. (2011), attribute substitution is a cognitive process which explains how individuals rely on salient short-term weather experiences when judging long-term climate risks. Across several surveys and experiments, these authors show that people who perceived the survey day as warmer than usual expressed stronger belief and concern about global warming than those experiencing cooler conditions. These people also became more willing to take climate-related action (e.g., donating to environmental causes), demonstrating that immediate weather exposure shapes behavioural responses to perceived climate risk. The article explained further that the above findings became possible because long-term climate trends are psychologically distant and harder to evaluate directly. Consequently, authors also provided behavioural justification for the use of extreme weather events as proxies by referencing the real-world decision-makers who had interpreted such events as indicators of underlying climate change risk rather than random variability.

Another supporter for the attribute substitution, Zaval et al. (2014), found evidence that individuals also infer climate change risk from current temperature anomalies, a phenomenon in which they referred as the *local warming effect*. Across five studies they performed, people substitute easily observed short-term weather information (e.g., today's warmth) for complex

long-term climate trends when forming beliefs about global warming. Warm conditions also lead individuals to overestimate the frequency of similar past extreme events, increasing perceived climate risk and concern. Here, authors showed how temperatures were treated as salient experiential cues which then led to climate judgments, mainly because long-term climate processes are difficult to evaluate. Therefore, observable weather shocks and extreme events function as behavioural signals of underlying climate change, supporting empirical research that uses weather or natural disaster occurrences as proxies for physical climate risk exposure. While the above studies explain how individuals cognitively infer climate risk from short-term environmental cues, another strand of literature shows that such experiences also receive disproportionate weight in decision-making, shaping economic behaviour through salience and experiential learning mechanisms.

At the same time, events such as extreme temperatures and natural disasters are not only more visible but also often resonate on a personal level for many individuals. According to an article by Dessaint & Matray (2017), decision-makers overweight salient rare events; such as local hurricane strikes, when assessing risk, which they found to be consistent with salience theories of choice. Authors found that salient events capture attention through their vividness and contrast with normal conditions, which further distort perceived probabilities relative to objective statistical risk. They used actions by managers in adjusting corporate cash holdings and express more concerns about hurricane risk in 10-Ks/10-Qs after hurricane events in nearby locations as an example of this distortion. It was found that the behaviours were driven by sudden shock to the perceived liquidity risk as if long-run risk permanently increased even though the underlying distribution of risk remains unchanged. Although those managerial responses were found to be temporary, this implies that economic agents infer persistent risk from memorable shocks, using realised disasters as mental shortcuts for abstract underlying uncertainty.

Another proponent of salience theories of choice connects extreme climate events to the intensified perceptions of climate risks post-events. For example, a study by Akerlof et al. (2013) found that perceived individual personal experience on local environmental and weather changes (e.g., unusual seasons, temperature shifts, flooding, ecological changes) strongly shapes climate risk perceptions and concern, even when those experiences do not perfectly match objective meteorological records. Since long-term climate processes are abstract and difficult to observe directly, people construct beliefs about climate risk through tangible local

events they could recall and narrate. Together, studies on salience theories of choice provide another theoretical lens on the validity of observable weather shocks and natural disasters as empirical proxies for physical climate risk exposure because, under salience-based choice, firms and investors react to the experienced event itself rather than to long-run climate statistics.

The relevance of individual experience of extreme climate events to be used as proxies for climate risk exposure can also be justified through the lens of experiential learning. For example, literature on house price fluctuations have known to be consistent with flood risk learning. Kousky, (2010) found evidence that the price of high-risk but non-damaged properties drops in the aftermath of flooding, while Gallagher (2014) showed that pattern in national flood insurance markets rises sharply after floods before returning to baseline within a decade. Finally, a recent study by Bakkensen & Barrage (2022) specifically examined implications of flood risk misperceptions in coastal US housing market. Authors showed that the relationships between flood events and sharp declines in the prices of vulnerable homes could be modelled where some agents initially underestimated flood and climate risks but later updated their beliefs based on flood realisations. In other words, those who experienced a flood in the past are more concerned about future flooding than those who did not, and these risk perceptions drove selection into homes within at-risk areas.

Further evidence on experiential learning were studied by Myers et al. (2013). Through examination on whether perceived personal experience with climate impacts affects belief in global warming, they found evidence that firsthand environmental experience, especially when there were memorable local impacts, shapes perceptions for most people that climate change is real. Authors argued that through experiential learning, people do not learn about climate change like scientists (through statistical trends). Instead, they update beliefs the way humans usually learn about rare risks; through lived experience. This explains why authors found experiential learning to be the dominant mechanism even among individuals that were less engaged on climate issues. Taken together, literature implies that using extreme weather events as empirical proxies captures the climate risk that economic agents perceive and act upon, consistent with experiential learning-based belief formation.

2.3 Flooding as a Physical Climate Risk

This chapter focuses on floods, among other types of weather events, for two primary reasons. First, the interrelationship between climate change and flooding is closer than expected. Existing literature underscores that global exposure to flooding is heavily contingent upon natural factors. For example, one study by Hirabayashi et al. (2013) highlighted the significance of the degree of warming. Using various climate model simulations given different future warming scenarios, they projected that a warmer climate broadly increases the frequency and spatial extent of river flood hazard, especially in regions such as Southeast Asia, peninsular India, eastern Africa, and the northern Andes. Overall risk exposure of populations and landscapes to flood hazard is also amplified with greater degrees of warming, thus providing further linkage between rising temperatures and flood risk. Through multiple global climate and hydrological models, their analyses illustrated climate change as an important driver of changing flood dynamics and exposure at continental to global scales, and therefore, making floods a relevant indicator of climate risk in empirical research.

In another study by (Lenderink & Van Meijgaard, 2008), a clear physical basis of damaging flood episodes in a warmer climate is provided. Using modelling evidence, authors observed hourly rainfall extremes intensify in a nonlinear rate, because warmer air holds more moisture and can release it rapidly during convective events, thus amplifying rainfall over short time periods. Such intense short-duration rainfall is especially important for generating surface runoff and flash flooding, as drainage systems and river basins are often designed around historical rainfall intensities rather than amplified extremes. Also, since heavy rainfall is a dominant driver of many land-based flood events, the observed amplification implies that climate change can increase flood hazard even if mean precipitation changes only slightly. The paper provides links that climate change is not only relevant merely to gradual hydrological shifts but also to the intensification of extreme rainfall events that trigger flood disasters. This reinforces the relevance of floods as a manifestation of physical climate risk.

Further evidence on the significance of global warming on flood dynamics also became a subject in a study by Merz et al., (2021). Focusing on impact quantification, they projected that with a temperature increase of 1.5°C, human losses from flooding could rise by 70-83%, and direct flood damage could escalate by 160-240% relative to the period from 1976 to 2005, when concerns about global warming were still emerging. While improved risk awareness and defensive measures have reduced fatalities, economic flood impacts have generally increased

due to greater exposure and vulnerability. Given unusual atmospheric circulation patterns and unexpected failures of defences; which could be exacerbated by climate-driven changes in precipitation and hydrology, flooding had become more severe and costly under ongoing climate change, making flood events a salient and relevant indicator of physical climate risk exposure in empirical research.

Finally, Milly et al., (2002) highlighted the interrelation between climate change and flooding by investigating changes in the frequency of “great floods”, which is defined as river discharges exceeding the historical 100-year level for large basins. Using both long-term streamflow measurements and climate model simulations that incorporate anthropogenic greenhouse gas and aerosol forcings, they found that the frequency of such extreme floods has increased significantly over the twentieth century, with observed trends showing more frequent exceedances of high discharge thresholds than would be expected from natural variability alone. Their analyses also linked both intensification of the hydrological cycle; driven by warming and enhanced atmospheric moisture content and continued anthropogenic climate change (such as emissions from greenhouse gases and sulphate aerosols) as contributors to greater flood risk and amplified flood hazard in the future.

The second motivation for this analysis pertains to the detrimental effects of flooding. With its lower probability of occurrence, flooding can result in severe consequences. Historically, floods have been responsible for millions of fatalities in the 20th century, leading to billions of dollars in economic losses annually and causing significant disruptions to global trade (Merz et al., 2021). More importantly, authors also highlighted human exposure as a salient and consequential manifestation of physical climate risk, which is as important as climate-driven precipitation extremes. Furthermore, while some risk reduction measures have lowered human impacts in recent decades, authors also acknowledged that socioeconomic changes; stemming from exposure of populations and asset destructions, are projected to increase flood hazard and vulnerability in many regions going forward.

Within finance and economics literature, the adverse effects of extreme weather events have been observed in the area of financial markets. In this context, a number of studies suggests that climate events generate a perception of cash flow risk, which further influences the pricing of financial assets. For example, Blanco et al., (2024) examined stock market responses to natural disasters and found negative impact on pricing as investors reduced a relatively high

exposure to natural disasters in their portfolio by divesting from disaster-hit stocks. At the same time, authors noted the decrease trading intensity in non-hit stocks; supporting the idea of propagation effects of disasters to non-hit stocks due to investors' ability to collect and interpret firm-specific information as a consequence of the reallocation of their limited information-processing capacity towards disaster-hit stocks. Authors later concluded that this phenomenon by highly exposed investors also became worse predictors of future stock returns.

Other studies examined how extreme weather affects credit market. For example, in their study, Goldsmith-Pinkham et al. (2023) used sea-level rise (SLR) as a proxy for climate exposure and observed how municipal bond market responded to it. This coincides with upward revisions in bond pricing following property market price adjustments to worst-case SLR projections along with accompanying uncertainty around these projections. One example was when the increase in the fraction of properties exposed to six feet of sea-level rise (SLR) drove increase in municipal bond credit spreads in 2015. Authors further highlighted two distinct channels through which SLR could affect municipal debt pricing; either the present value of municipal cash flows or the riskiness of the cash flows. They also found that SLR exposure premium is larger for bonds whose districts rely more on local property taxes for budgetary needs, and in states where residents report higher levels of concern about climate change. Some other studies around the credit market topics also found evidence of perceived risk associated with floods within the mortgage market. Ouazad & Kahn (2022) demonstrated how this heightened risk perception drove lenders to implement more rigorous screening processes for mortgages as well as its negative impact to the availability of mortgage financing in flood-prone areas. In addition, Collier et al. (2024) linked this risk perception to credit delinquencies. While short- and medium-term delinquencies (<90 days) doubled in areas with the worst flooding, increase in delinquencies were also detected among non-flooded local firms, suggesting spillover effects. Authors also observed negative impact of flooding on the availability of corporate credit, especially among uninsured firms who found their credit applications denied post-disaster.

Though with much more limited references, researchers have also started to discuss the adverse effects of extreme weather events on firm. For example, a study by Pankratz & Schiller (2024) demonstrated this associations through customer-supplier relationships. Using heat as a proxy for physical climate exposure, authors found evidence that suppliers' exposure to extreme heat adversely affects the operating income of for both suppliers and their downstream customers.

This downside effect was further intensified with customers more likely to terminate their supplier relationships, particularly when the supplier's realised flood exposure exceeds customers' ex-ante expectations. Authors finally concluded that the similar results applied when flooding was included in the empirical model. This suggests that floods are not just environmental phenomena but can materially disrupt firm operations, performance, and network relationships among corporations.

2.4 Flood Exposure & M&A Activity

Firms are increasingly exposed to physical climate risks such as flooding, which can disrupt operations, damage productive assets, interrupt supply chains, and impair cash flows (e.g., Addoum et al., 2020; Benincasa et al., 2024; Hong et al., 2019; N. M. C. Pankratz & Schiller, 2024). Because flooding can generate both immediate financial losses and heightened uncertainty regarding future operating conditions, managers must reassess capital allocation, financing, and strategic investment decisions in its aftermath (e.g., Bernile et al., 2017; Dessaint & Matray, 2017; Nguyen & Phan, 2020). In particular, M&As represent large, irreversible, and information-intensive investments that are especially sensitive to shifts in perceived risk and uncertainty (Bernanke, 1983; Bloom, 2009)). When firms are at their most vulnerable following a flood event, unsuccessful acquisitions may exacerbate financial distress, suggesting incentives for managerial caution. At the same time, post-disaster environments may generate acquisition opportunities through asset mispricing, weakened competitors, or strategic consolidation, creating scope for opportunistic expansion. Consequently, flooding may induce either retrenchment or opportunism in corporate M&A activity, with each mechanism implying distinct effects on firms' participation in M&A activity.

2.4.1 Flood-Induced Retrenchment

The central rationale of this hypothesis stems from reduction; or even loss, of attractiveness from the M&A post-flooding as the disaster disrupts firm operations. Both limited attention and salience bias by decision makers provide further support for this rationale. Existing literature on limited attention have discussed how investors make biased decisions due to the inherent limitations in their capacity to gather and interpret information. Peng (2005) discovered this phenomenon while finding that investors face information capacity constraints which limit how much they could learn from multiple sources of uncertainty at the same time. By developing a continuous-time equilibrium model, authors demonstrated that when agents optimally allocate their limited attention across different uncertain signals, endogenous

variation were found in the speed of learning and market reactions, and they varied with attention allocation. As limited capacity forces agents to focus on the most salient information and ignore less-attended signals, the study implied that decision makers can underestimate or delay processing relevant information when overwhelmed by competing sources.

Another study by Kacperczyk et al. (2016) discovered this phenomenon by developing a general equilibrium model in which investors optimally allocate limited attention across many assets, and showed that attention is a scarce information processing resource that affects portfolio decisions and asset pricing outcomes. Their theory implied that when information environments were complex and competed for attention, agents might focus on the most salient signals and neglect others, thus, implicitly creating attention bottlenecks in decision making. In addition, when concentrating on the materialisation of physical climate shocks such as natural disasters, Blanco et al. (2024) found evidence that institutional investors with relatively high exposure to disaster-hit stocks tend to divest from those stocks and reduce trading intensity in other holdings. While the actions were predicted, the study also showed that institutional investors propagate the reallocation decision post-disaster to unaffected firms by decreasing the incorporation of firm-specific information into stock prices, particularly for lower-weight holdings. Their results implied that natural disasters trigger a rational reallocation of investors' information-processing resources, reflecting attention constraints when physical climate risks materialise. Together, literature on limited attention provides theoretical support for the idea that bounded attention and information processing limits can shape real economic decisions, consistent with the proposition that managers may deprioritise complex strategic decisions like M&As when attention is consumed by immediate operational risks.

The reluctance to engage in M&As following flood events may also be attributable to salience bias. Tversky & Kahneman (1973) provided further explanation when introducing the coined term “availability heuristic”, that is a cognitive bias whereby individuals estimate the frequency or probability of events by how easily instances come to mind. They showed that people rely on readily recalled examples rather than objective statistical evidence when making judgments under uncertainty, leading to systematic biases in probability estimation. Authors also highlighted uncommon but memorable events and repeated events among the examples of occurrences which were easier to recall and prone to be overestimated by individuals despite the events' actual frequency and importance. Moreover, Dessaint & Matray (2017) further demonstrated salience bias could influence decision-making even when the probabilities of

future occurrences remain unchanged. When examining how managers of firms located near hurricane disasters respond to the sudden salience of risk by adjusting their corporate cash holding policies, they found that managers of unaffected firms in close proximity to a hurricane significantly increase cash holdings despite no measurable change in actual risk. Authors argued that this is consistent with heightened perceived risk driven by the salience of recent disasters rather than changes in fundamentals, which was further validated with the increase in cash lasted only temporarily. The suggested overreaction to salient risk rather than a rational response to changed probabilities supports the notion that managers can overemphasise rare but vivid events when making assessments, providing behavioural evidence that salience bias may contribute to reluctance to engage in complex strategic decisions such as M&A in the immediate aftermath of a flood event.

Taken together, limited attention and salience bias not only distort risk perception in the immediate aftermath of flooding but also contribute to a broader rise in perceived uncertainty. As managerial attention is diverted toward operational recovery and as recent flood impacts remain cognitively salient, firms face heightened ambiguity regarding future cash flows, asset vulnerability, and financing conditions. In such environments, decision makers may find it difficult to disentangle temporary disruptions from persistent structural risk, thereby widening the range of inaction. This leads to the delay of any capital commitments because the option value of waiting rises, especially when these future commitments are partially irreversible (Bloom, 2009; Bloom et al., 2007). However, as operational pressures ease and the salience of the event gradually dissipates, attention reallocates and perceived uncertainty declines, allowing firms to reassess strategic opportunities with clearer information. Floods therefore create an exogenous setting in which firms may temporarily defer engagement in complex and irreversible transactions such as M&As. This means that instead abandoning the strategic moves, decision makers choose to postpone commitment until uncertainty resolves. This short-run caution is consistent with the real option hypothesis driven by transient cognitive and uncertainty shocks rather than a permanent withdrawal from corporate control activity.

H1: *Firms exposed to flood events exhibit a lower likelihood of engaging in M&A transactions in the short run following flooding events.*

For firms that are potential acquirers, retrenchment may arise because flood exposure alters both managerial attention allocation and perceived risk at the initiation stage of M&A activity.

As initiators of transactions, acquirers must actively search for targets, conduct due diligence, secure financing, and coordinate complex negotiations; a range of processes that require substantial managerial bandwidth. In the aftermath of flooding, attention is often redirected toward operational recovery, liquidity preservation, and reassessment of internal risk exposure, limiting the cognitive and organisational capacity available for proactive deal origination. At the same time, the salience of recent disaster impacts may amplify perceived downside risks, leading managers to overweight adverse scenarios when evaluating acquisition prospects. Heightened ambiguity regarding target valuation, integration risk, and post-merger performance further increases uncertainty around expected returns. When such uncertainty coincides with the irreversibility of acquisition commitments, the option value of waiting rises, widening the range of inaction (Bloom, 2009; Bloom et al., 2007). Consequently, flood-exposed firms may temporarily defer initiating acquisitions. While this does not imply disappearance of expansion opportunities, constrained attention and elevated perceived risk make a wait-and-see approach more optimal in the short run.

H2a: *Firms exposed to flood events are less likely to M&A acquirers in the short run following flooding events.*

For firms exposed to flooding that might otherwise become targets, retrenchment may similarly arise from heightened uncertainty combined with constrained managerial attention. In the immediate aftermath of a flood event, management must prioritise operational recovery, liquidity management, insurance coordination, and stakeholder reassurance, leaving limited cognitive and organisational capacity to engage in complex merger negotiations. Post-disaster ambiguity further complicates valuation, as uncertainty increases regarding the persistence of operational damage, recovery prospects, and future climate exposure. When multiple urgent and uncertain contingencies compete for attention, bounded rationality may delay the processing of strategic alternatives, consistent with models of limited information capacity (Kacperczyk et al., 2016; Peng, 2005). Moreover, because agreeing to an acquisition is an irreversible decision, heightened uncertainty raises the option value of waiting (Bloom, 2009; Bloom et al., 2007), making boards more inclined to defer sale discussions until recoveries are completed so that clearer signals about firm value emerge. Thus, flood exposure may reduce the short-run likelihood of becoming a target not due to permanent withdrawal from the market for corporate control, but because attention constraints and uncertainty jointly expand the range of inaction during the recovery period.

H2b: *Firms exposed to flood events are less likely to become M&A targets in the short run following flooding events.*

2.4.2 Flood-Induced Survival

Alternatively, firms may overlook short-term risks posed by natural disasters and still engage in M&As due to survival-driven motivations. A central mechanism underlying the survival-driven logic is asset tangibility and its role in the collateral channel of external finance. Tangible assets, such as property, plant, and equipment, can be pledged to creditors and therefore determine a firm's borrowing capacity. Rajan & Zingales (1995) showed that asset structure is a fundamental determinant of leverage across major economies, documenting that firms with higher tangible asset ratios consistently exhibit greater debt capacity. Their findings underscore that collateralisable assets are not merely accounting features but key drivers of financing access. Building on this logic, Rampini & Viswanathan (2013) developed a dynamic model in which only tangible capital can serve as collateral, implying that firms with impaired collateral or reduced net worth face binding financing constraints. In their framework, adverse shocks that reduce collateralisable assets tighten borrowing limits, restrict investment, and alter corporate financial policies. Together, this literature establishes that asset tangibility lies at the core of firms' ability to access external capital, particularly when internal liquidity is insufficient.

The survival motive becomes particularly salient when physical destruction erodes the collateral base that currently supports outstanding external financing. Recent empirical work further highlights how climate change exposure influences corporate financial conditions; for instance, Javadi & Masum (2021) found that firms operating in hazard-prone areas face significantly higher spreads on bank loans, suggesting that lenders price climate risk and impose tighter credit terms on exposed firms, exacerbating financing difficulties. Authors further explained that the higher spreads were driven by increased default risk and credit tightening, as firms with greater disaster intensity encounter heightened operational risk and reduced access to debt markets. When debt capacity contracts while operational risks intensify, firms may face increased bankruptcy risk. In such circumstances, M&As can emerge as an alternative to liquidation, allowing distressed firms to preserve going-concern value through consolidation rather than exit, consistent with the restructuring logic proposed by Pastena and Ruland (1986). Accordingly, flood-induced collateral erosion and heightened financing

constraints can increase the likelihood of M&A activity as firms seek to restructure, secure complementary resources, and avoid deeper financial distress.

Beyond immediate survival concerns, shock exposure may also create incentives for strategic restructuring. Negative productivity shocks can reveal inefficiencies in asset utilisation and prompt firms to reconsider the optimal allocation of resources across divisions and projects. Andrade & Kaplan (1998) demonstrate that financial distress does not necessarily destroy economic value but often triggers restructuring that improves operational performance. Applied to flood exposure, the destruction of physical capital and disruption of operations may encourage firms to reassess asset portfolios, divest underperforming segments, or combine with complementary firms to restore efficiency. Similarly, Maksimovic & Phillips (2001) show that mergers and asset sales facilitate the reallocation of assets toward more productive users, particularly following industry or firm-level shocks that alter relative productivity. In this framework, adverse events can accelerate asset redeployment and efficiency-enhancing consolidation rather than merely suppressing activity. Under this restructuring purpose, M&A represents not only a mechanism to avoid bankruptcy but also an opportunity to reconfigure operations and enhance long-term productivity following a disruptive shock.

In addition to collateral constraints in debt markets, firms exposed to sudden shocks may also face heightened difficulties in raising capital from equity markets. Even in the absence of severe tangible asset destruction, external disruptions can alter the supply of capital by influencing investors' willingness to provide funds. Opler (1999) showed that firms accumulate precautionary cash balances in anticipation of costly external finance, highlighting the difficulty of raising capital during adverse conditions. Similarly, Campello (2002) further demonstrated that financing constraints materially affect corporate investment decisions, particularly when firms rely on external markets for capital. This logic extends naturally to climate-related shocks: empirical evidence suggests that markets penalise firms with greater exposure to physical climate risks. For example, Choi et al., (2020) documented that climate risk exposure is associated with higher required returns and lower firm valuations. Consistent with these findings, Pankratz et al., (2023) documented that increases in climate risk perception, as proxied by extreme heat exposure, translates into negative impacts on firm financial performance relative to analyst predictions and on earnings announcement returns. Finally, Blanco et al., (2024) show that physical disaster exposure affects institutional investor behaviour and information incorporation in stock prices. Together, this literature suggests that

while climate risk can tighten both debt and equity financing channels by increasing perceived risk and reducing investor willingness to supply capital, M&As may serve as an alternative mechanism for accessing resources and restoring financial stability when standalone financing becomes prohibitively costly. This supports the alternative hypothesis that *firms exposed to flood events exhibit a higher likelihood of engaging in M&A transactions in the short run following flooding events.*

For potential acquirers, flood exposure may increase the likelihood of initiating M&As as a strategic response to disrupted operations and constrained recovery. Natural disasters can impair production capacity, damage supply networks, and reduce internal liquidity, forcing managers to reconsider how best to restore operational stability. Rather than relying solely on organic rebuilding; which may be slow or financially infeasible, firms may seek M&A as a mechanism to rapidly obtain operational infrastructure, geographic diversification, or complementary capabilities that substitute for damaged assets. Maksimovic & Phillips (2001) showed that mergers are often associated with productivity-driven reallocation, whereby firms adjust asset ownership following shocks that alter relative efficiency across firms and industries. Their evidence suggests that transactions are not merely expansionary but can serve as mechanisms for reorganising production and reallocating assets when economic conditions shift. In addition, Andrade & Kaplan (1998) demonstrated that financial distress does not automatically destroy firm value; instead, it often triggers restructuring processes that improve efficiency and performance once firms reorganise their capital structures and operations. In the aftermath of flooding, M&A activity may therefore represent an active restructuring strategy. The action allows firms to consolidate fragmented operations, access more resilient assets, and restore competitive positioning, rather than passive retrenchment. Accordingly, flood-exposed firms may become more likely to act as acquirers in the short run when M&As provide a faster and more viable path to operational recovery than internal investment. This motivates the alternate hypothesis that *firms exposed to flood events are more likely to M&A acquirers in the short run following flooding events.*

Finally, flood exposure may also increase the likelihood that affected firms become M&A targets, particularly when financial vulnerability intensifies alongside operational disruption. Masulis & Simsir (2018) documented that target-initiated mergers were more common among firms experiencing financial weakness and adverse economic shocks, suggesting that distressed firms may proactively seek buyers rather than wait for unsolicited bids. Their findings indicated

that target firms in weaker financial positions are more likely to initiate transactions, consistent with a strategic effort to secure stability under constraint. Similarly, Pastena & Ruland (1986) showed that mergers can serve as an alternative to bankruptcy for financially distressed firms, allowing companies to preserve going-concern value rather than incur the costs associated with liquidation. This survival-oriented perspective implies that firms facing post-disaster cash flow pressures and tightened financing conditions may view M&A transaction with a stronger partner as a mechanism to stabilise operations and avoid deeper financial deterioration. Moreover, Hartzell et al., (2004) demonstrated that target executives often negotiate compensation protections and continued roles in takeover transactions, indicating that M&As may mitigate managerial employment risk during periods of distress. Taken together, these findings suggest the alternate hypothesis that flood-exposed firms may exhibit a higher likelihood of becoming targets in the short run, as consolidation provides both organisational and managerial protection when standalone recovery becomes increasingly uncertain.

3 Data & Methodology

3.1 Data Source & Sample Construction

This study combines multiple data sources to construct a comprehensive firm-level panel dataset that links climate-related shocks to corporate M&A activity. Specifically, the analysis integrates data on flood events, M&A transactions, and firm-level financial characteristics. These datasets are merged using geographic identifiers to capture firms' exposure to localised natural disasters. The final sample is structured at the firm-year level and spans the period from 2007 to 2022.

3.1.1 Flood Event Data

Flood event data are obtained from the U.S. Federal Emergency Management Agency (FEMA) Official Disaster Declarations database, which serves as the primary source for identifying exogenous climate-related shocks in this study. The FEMA database is widely used in empirical research on natural disasters due to its comprehensive coverage, institutional credibility, and standardised reporting framework. It provides detailed information on disaster occurrences across the United States, including the type of disaster, the timing of the event, the geographic areas affected, and the extent of federal assistance provided. Importantly, the dataset captures disasters that are sufficiently severe to warrant official federal recognition, thereby ensuring that the events included in the analysis reflect economically meaningful shocks rather than minor or routine weather fluctuations. As such, the FEMA database offers a reliable and policy-

relevant measure of flood exposure that is well suited for examining the impact of natural disasters on firm-level decision-making.

A key advantage of the FEMA dataset is that each disaster declaration follows a formal verification process. Upon request from state or local authorities, FEMA conducts damage assessments to evaluate the severity of the event and its impact on public infrastructure and affected populations. These assessments form the basis for presidential disaster declarations and the allocation of federal aid. As a result, the dataset captures economically meaningful disaster events rather than minor or unverified incidents, making it particularly suitable for empirical analysis.

For the purposes of this study, I restrict the sample to flood-related disasters occurring from 2002 onwards. This restriction ensures sufficient pre-event observations and allows for the construction of lagged exposure measures capturing the impact of flooding up to several years prior to firms' M&A decisions. Flood events are identified at the county level using the Federal Information Processing Standards (FIPS) code, which uniquely identifies each U.S. county. This geographic granularity enables precise matching between disaster exposure and firm headquarters locations.

3.1.2 M&A Deals Data

Data on M&A transactions are obtained from the Refinitiv Securities Data Company (SDC) Platinum database, which is one of the most widely used sources in the corporate finance literature for studying M&A activity. The SDC database provides detailed deal-level information, including announcement dates, deal values, payment methods, ownership stakes, and the identities of both acquirers and targets. Its comprehensive coverage of both domestic and cross-border transactions makes it particularly suitable for analysing corporate control activity across time. In the context of this study, the SDC database enables the identification of firms' participation in M&A transactions and allows for the construction of firm-year indicators capturing acquisition behaviour. By focusing on completed and announced deals involving publicly listed firms, the dataset ensures consistency in reporting standards and facilitates integration with firm-level financial information from other sources.

To ensure consistency with prior literature (e.g., Arouri et al., 2019; Deng et al., 2013; Nguyen et al., 2023) and to focus on economically meaningful transactions, several filters are applied.

First, only deals with a transaction value exceeding \$1 million are included, thereby excluding very small transactions that are unlikely to reflect strategic corporate decisions. Second, the acquirer must hold less than 50% of the target's shares prior to the transaction, ensuring that the deal represents a genuine transfer of corporate control rather than an incremental ownership adjustment. Third, the target firm must represent at least 1% of the acquirer's market value, which eliminates transactions that are unlikely to have a material impact on the acquirer's operations or financial position. Finally, both acquirers and targets are required to be U.S.-based publicly listed firms with available financial data, ensuring compatibility with other datasets used in the analysis. These filtering criteria serve to enhance the comparability and economic relevance of the sample by focusing on transactions that are likely to involve substantive strategic considerations. In particular, restricting the sample to publicly listed firms ensure consistency in disclosure standards and data availability, which is critical for constructing reliable firm-level controls.

In addition, the analysis excludes firms headquartered outside the United States, as well as U.S. firms headquartered in non-contiguous regions such as Puerto Rico and other territories, to maintain geographic consistency with the FEMA disaster data. Because flood exposure is measured using county-level disaster declarations within the United States, including firms located outside this geographic scope would introduce measurement inconsistencies and potentially misclassify firms' exposure to flooding events. Restricting the sample to firms headquartered in the contiguous United States ensures that all observations are subject to a common institutional environment and are directly comparable in terms of disaster exposure. Finally, by maintaining geographic consistency across datasets, the analysis minimises potential biases arising from heterogeneous reporting standards, regulatory environments, and exposure definitions. As a result, the final M&A sample provides a coherent and internally consistent basis for examining how firms adjust their acquisition behaviour in response to localised flood shocks.

3.1.3 Firm Characteristics Data

Firm-level financial and accounting data are obtained from the Compustat database, which provides standardised and detailed information on publicly listed firms' financial statements. Compustat is a widely used data source in empirical corporate finance research due to its broad coverage, consistency in reporting, and availability of key financial variables necessary for controlling firm heterogeneity. The dataset includes information on firms' balance sheets,

income statements, and cash flow statements, enabling the construction of variables that capture firm size, capital structure, liquidity, operating performance, and growth potential. These characteristics are essential for isolating the effect of flood exposure on corporate decision-making, as they account for underlying differences in firms' financial conditions and investment capacities. By incorporating these controls, the analysis aims to mitigate concerns that observed differences in M&A behaviour are driven by firm fundamentals rather than exposure to climate-related shocks.

To mitigate the influence of extreme values, all continuous variables are Winsorised at the 1st and 99th percentiles, a standard practice in empirical corporate finance research. Observations with missing values for key variables, particularly total assets, are excluded to ensure data consistency and avoid distortions in the estimation results. The Compustat dataset is first merged with the SDC M&A data to retain only those firm-year observations for which complete financial information is available, thereby ensuring that all variables used in the empirical analysis are consistently defined across the sample.

3.1.4 Final Sample Construction

The final sample is constructed by integrating the flood event data, M&A transaction data, and firm-level financial information into a unified panel dataset that captures firms' exposure to localised climate shocks and their subsequent corporate behaviour. This integration requires careful alignment of datasets with different structures and levels of aggregation, particularly given that flood events are recorded at the county level while firm-level data are reported at the company level. To bridge this gap, geographic identifiers are used to link firms to the counties in which their headquarters are located, thereby assigning each firm-year observation a corresponding measure of flood exposure. This approach allows the analysis to exploit spatial variation in disaster occurrence while maintaining a consistent firm-level unit of observation. The resulting dataset provides a comprehensive framework for examining how exogenous environmental shocks translate into corporate decision-making outcomes.

The use of headquarters location as a proxy for firm exposure to local shocks is well established in the literature (e.g., Blanco et al., 2024; Dougal et al., 2022; Grieser et al., 2022; Pirinsky & Wang, 2006). This approach assumes that a firm's headquarters represents the centre of its primary economic and strategic activities, making it a relevant unit for measuring exposure to geographically localised disasters. One alternative approach includes measuring the coordinate

distance between the disaster site and the firm's headquarters. Studies such as Smith (2022) and Nguyen et al. (2023) employ this distance-based measures when investigating various types of disasters, including extreme temperatures and terrorist attacks. However, these measures are not feasible in this context due to the absence of precise geographic coordinates in the FEMA dataset.

The merged dataset is structured as a firm-year panel covering the period from 2007 to 2022 and comprises 91,305 firm-year observations. Within this sample, 1,260 observations correspond to firm-years in which completed M&A transactions occur. A small number of firms engage in multiple transactions within the same year, leading to non-unique firm-year observations. To address this issue, I retain only the first recorded transaction for each firm-year. This approach ensures that the analysis captures the initial response of firms to flood exposure, which is most relevant for examining post-disaster behavioural adjustments.

3.2 Variables Construction

This section outlines the construction of the key variables used in the empirical analysis, including the measure of flood exposure, the dependent variables capturing firms' participation in merger and acquisition (M&A) activity, and the set of control variables. Particular attention is given to the measurement choices underlying each variable, as these choices are closely tied to the theoretical mechanisms examined in this study. All variables are constructed at the firm-year level unless otherwise specified.

3.2.1 Flood Exposure

The central explanatory variable in this study is firms' exposure to flood events, which is intended to capture exogenous shocks to firms' operating environments. Flood exposure is measured using county-level disaster declarations obtained from the FEMA database and is mapped to firms based on the location of their headquarters. Specifically, I construct an indicator variable, *FLOOD_DUMMY*, which equals one if a flood event occurs in the county where the firm is headquartered in a given year, and zero otherwise.

The use of a binary indicator is motivated by the objective of capturing the occurrence of economically meaningful disruptions rather than the intensity of flooding, which may be measured with noise and inconsistencies across regions. FEMA disaster declarations reflect events that have undergone formal assessment and meet a threshold of economic significance,

making them suitable proxies for exogenous shocks. This approach is consistent with prior literature that relies on disaster declarations to identify plausibly exogenous variation in local economic conditions (e.g., Huynh et al., 2020; Shafi & Mohammadi, 2020).

To account for the possibility that firms adjust their behaviour gradually following a disaster, I construct lagged measures of flood exposure, denoted as $FLOOD_DUMMY_{t-1}$, $FLOOD_DUMMY_{t-2}$, and $FLOOD_DUMMY_{t-3}$, which indicate whether a flood occurred one, two, and three years prior, respectively. The inclusion of these lagged variables is grounded in the notion that the economic consequences of flooding; such as disruptions to supply chains, financing constraints, or changes in investment opportunities, may unfold over time rather than instantaneously. By incorporating multiple lags, the analysis captures both immediate and delayed responses, allowing for a more comprehensive assessment of how flood exposure affects corporate decision-making.

This measurement strategy follows the standard approach in the literature of using firms' headquarters location as a proxy for exposure to localised shocks. While firms may operate in multiple geographic areas, the headquarters typically represents the centre of strategic decision-making and is therefore a relevant unit for capturing exposure to regional economic conditions. Moreover, because flood events are driven by exogenous environmental factors, the resulting measure of exposure is plausibly independent of firms' short-term strategic decisions, supporting its use in identifying causal effects.

3.2.2 M&A Activity

The dependent variables in this study capture firms' participation in M&A activity and are designed to reflect different dimensions of corporate control decisions. These variables are constructed using the SDC M&A dataset and are defined at the firm-year level. The primary dependent variable, MA , is an indicator equal to one if a firm is involved in at least one M&A transaction in a given year, and zero otherwise. This measure captures the extensive margin of M&A activity, focusing on whether firms engage in acquisitions rather than the number or size of transactions. This approach is consistent with the theoretical focus of the study, which examines how exogenous shocks affect firms' propensity to undertake strategic investments, rather than the scale of those investments.

In addition, I construct two role-specific dependent variables. The first, *ACQ*, equals one if the firm acts as an acquiring entity in a given year. This variable captures the firm's willingness to actively pursue growth and expansion opportunities through acquisitions. The second, *TGT*, equals one if the firm becomes the target of an acquisition. The inclusion of this variable is motivated by the hypothesis that flood exposure may not only affect firms' acquisition behaviour but also alter their vulnerability to being acquired. For instance, flood-induced financial distress or operational disruptions may make firms more attractive takeover targets or reduce their ability to resist acquisition attempts.

Because firms may engage in multiple transactions within a given year, an aggregation rule is required to construct firm-year level indicators. In this study, multiple transactions are consolidated into a single observation by assigning a value of one if at least one qualifying event occurs within the year. This binary aggregation approach ensures that the dependent variables capture the occurrence of M&A activity rather than its frequency, thereby avoiding issues related to skewed distributions and extreme values. It also aligns with the econometric framework, which models the likelihood of engaging in M&A activity as a function of flood exposure and firm characteristics.

Overall, the use of these three dependent variables; *MA*, *ACQ*, and *TGT*, provides a comprehensive framework for analysing how firms respond to flood exposure along multiple dimensions of corporate control activity. While *MA* captures the overall likelihood of participation in M&A activity, distinguishing between *ACQ* and *TGT* roles allows for a more nuanced understanding of firms' strategic responses. In particular, these measures make it possible to disentangle whether flood exposure primarily affects firms' willingness to actively pursue acquisitions or instead alters their susceptibility to being acquired.

This distinction is theoretically important, as the mechanisms underlying these two outcomes may differ. For example, flood exposure may reduce firms' acquisition activity by constraining internal resources or increasing uncertainty, thereby discouraging expansionary investments. At the same time, the same shocks may increase the likelihood of becoming a target by weakening firms' financial positions or making them more attractive to potential acquirers seeking undervalued assets. By jointly analysing these dependent variables, the empirical framework can capture both active and passive dimensions of M&A behaviour, providing a

more complete assessment of how exogenous environmental shocks influence corporate restructuring decisions.

3.2.3 *Control Variables*

To isolate the effect of flood exposure on M&A activity, the analysis includes a set of firm-level control variables that capture key dimensions of firms' financial condition and operational capacity. These variables are derived from the Compustat database and are lagged by one period to ensure that they are predetermined with respect to the dependent variables, thereby mitigating concerns related to reverse causality. The inclusion of these control variables is grounded in the extensive literature on corporate investment and M&A decisions, which highlights the importance of financial constraints, firm size, and profitability in shaping firms' strategic behaviour (e.g., Benincasa et al., 2024; Huang et al., 2018; Huynh et al., 2020; Sautner et al., 2023; Wang, 2023). By controlling for these factors, the analysis aims to ensure that the estimated effects of flood exposure are not confounded by underlying differences in firm fundamentals.

Firm size is measured as the natural logarithm of total assets (*ASSETS_TOTAL*). It is expressed in its natural logarithm to reflect the scale of the firm's operations and its access to resources. Larger firms are generally more likely to engage in M&A activity due to greater financial flexibility and economies of scale in transaction costs. Leverage (*LEVERAGE*) is defined as the ratio of total debt to total assets and captures the firm's capital structure. Highly leveraged firms may face financial constraints that limit their ability to pursue M&As or alternatively may engage in acquisitions as part of restructuring strategies.

Liquidity (*CASH*) is measured as cash holdings relative to total assets and reflects the firm's internal financing capacity. Firms with greater liquidity are better positioned to undertake acquisitions without relying on external financing. Sales (*SALES*) are measured in its natural logarithm. The variable is included as a proxy for firm size and growth opportunities, capturing the scale of operations and market demand conditions. Profitability (*ROA*) measures operating performance and indicates the firm's ability to generate internal funds, which may influence its capacity to finance acquisitions.

In addition to firm-level controls, the regression models include state and year fixed effects. State fixed effects control for time-invariant regional characteristics, such as economic

structure, institutional environment, and exposure to long-term climate risks. Year fixed effects capture aggregate shocks that affect all firms simultaneously, including macroeconomic conditions and changes in financial markets. Together, these controls help isolate the impact of flood exposure from other sources of variation.

Table 1 presents the summary statistics for both the overall firm-year sample and the subsample of firms involved in M&A transactions. Panel A reports descriptive statistics for the full sample consisting of 91,612 firm-year observations. The mean value of M&A likelihood is 0.014, indicating that approximately 1.4% of observations engage in at least one M&A transaction during a given year. The flood exposure indicator has a mean value of 0.098, suggesting that nearly 10% of observations in the sample are exposed to at least one flooding event annually. These figures highlight that, although flooding events are relatively infrequent, a substantial proportion of firms remain exposed to localised climate-related disruptions over the sample period.

Panel B focuses on the M&A subsample and separately reports characteristics for acquiring and target firms. Acquiring firms are substantially larger than target firms on average, as reflected by higher total assets and sales values. Acquirers also exhibit slightly lower cash holdings but marginally stronger profitability relative to target firms. In terms of flood exposure, approximately 10.9% of acquiring firm-observations and 11.1% of target firm-observations are exposed to one flood per year. Overall, the summary statistics suggest meaningful variation in exposure to flooding events and financial characteristics, providing suitable cross-sectional variation for the subsequent empirical analyses. Finally, the distribution of the variables and the characteristics of the sample are also broadly consistent with those reported in prior studies (e.g., Boone & Uysal, 2020; Hossain et al., 2023; Macias & Pirinsky, 2015; Nguyen et al., 2023), providing reassurance regarding the representativeness and reliability of the dataset used in this analysis.

Table 1. Sample Descriptive Statistics

	Mean	Median	Standard deviation	Observations
Panel A: Overall Sample				
Dependent variable				
<i>MA</i>	0.014	0.014	0.116	91,612
Flood variable				
<i>FLOOD_DUMMY</i>	0.098	0.098	0.297	91,612
Firm variables				
<i>ASSETS_TOTAL</i>	5.855	5.855	2.949	91,612
<i>LEVERAGE</i>	1.199	1.199	3.656	91,432
<i>CASH</i>	0.169	0.169	0.231	90,270
<i>SALES</i>	5.264	5.264	2.805	84,537
<i>ROA</i>	-0.551	-0.551	2.644	89,997
Panel B: M&A Sample				
Dependent variable				
<i>ACQ</i>	0.862	0.862	0.345	1,245
<i>TGT</i>	0.006	0.006	0.075	1,245
Acquirer flood exposure				
<i>FLOOD_DUMMY</i>	0.109	0.109	0.312	1,073
Target flood exposure				
<i>FLOOD_DUMMY</i>	0.111	0.111	0.314	370
Acquirer characteristics				
<i>ASSETS_TOTAL</i>	8.532	8.532	1.732	1,073
<i>LEVERAGE</i>	0.677	0.677	0.255	1,069
<i>CASH</i>	0.078	0.078	0.103	1,058
<i>SALES</i>	7.056	7.056	2.002	1,070
<i>ROA</i>	0.003	0.003	0.167	1,035
Target-firm characteristics				
<i>ASSETS_TOTAL</i>	7.224	7.224	1.792	370
<i>LEVERAGE</i>	0.656	0.656	0.286	369
<i>CASH</i>	0.108	0.108	0.132	367
<i>SALES</i>	6.069	6.069	2.068	368
<i>ROA</i>	-0.004	-0.004	0.174	359

Notes: This table presents summary statistics for a sample of U.S. publicly listed firms with data available on Compustat over the period 2007–2022 and for a sample of U.S. domestic public acquisitions announced over the same period. Specifically, it reports the mean, median, standard deviation, and number of observations for the overall sample (panel A) and for the acquisition sample (panel B). The definitions of all variables are provided in the appendix.

3.3 Model Specification

To examine the relationship between flood exposure and firms' M&A activity, I estimate a set of firm-level panel regression models in which the dependent variables capture firms' participation in merger and acquisition activity, and the key independent variables measure lagged flood exposure. The empirical framework is designed to assess how exogenous environmental shocks affect firms' strategic investment decisions while controlling for observable and unobservable sources of heterogeneity.

The baseline specification is given by:

$$Y_{i,t} = \beta FLOOD_DUMMY_{i,t-k} + \gamma X_{i,t-1} + \delta_s + \tau_t + \varepsilon_{i,t} \quad (1)$$

where $Y_{i,t}$ denotes the dependent variable for firm i in year t , capturing either the likelihood of engaging in M&A activity (MA), the probability of acting as an acquirer (ACQ), or the probability of becoming a target (TGT). The main independent variable, $FLOOD_DUMMY_{i,t-k}$, represents lagged flood exposure, measured using indicator variables that equal one if a flood event occurred in the firm's headquarters county k years prior. The vector $X_{i,t-1}$ includes lagged firm-level control variables, such as firm size, leverage, liquidity, sales, and profitability, which capture key dimensions of firms' financial condition and investment capacity. All control variables are lagged by one period to mitigate concerns related to simultaneity and reverse causality.

The model includes state fixed effects (δ_s) to account for time-invariant regional characteristics, such as economic structure, institutional environment, and long-term exposure to climate risk. Year fixed effects (τ_t) are included to control for macroeconomic conditions and aggregate shocks that affect all firms in a given year. Standard errors are clustered at the state level to account for potential spatial correlation in shocks and unobserved heterogeneity within geographic regions.

Given the binary nature of the dependent variables, the baseline models are estimated using logistic regression, and marginal effects are reported to facilitate economic interpretation. This specification allows for a direct assessment of how flood exposure influences the probability of firms engaging in M&A activity while accounting for both firm-level characteristics and broader economic conditions.

3.4 Identification Strategy

A key empirical challenge in this study is ensuring that the estimated relationship between flood exposure and M&A activity reflects a causal effect rather than spurious correlation. In particular, firms located in flood-prone areas may systematically differ from those in unaffected regions in ways that also influence their acquisition behaviour. Such differences may give rise to endogeneity concerns, including selection on observables, omitted variable bias, and potential reverse causality.

This study addresses these concerns by exploiting the plausibly exogenous nature of flood events. Flooding is driven by environmental and climatic conditions that are largely outside the control of individual firms, making it unlikely that firms' short-term strategic decisions influence the timing or occurrence of such events. As a result, variation in flood exposure across counties and over time provides a source of exogenous variation that can be used to identify the impact of environmental shocks on corporate behaviour.

Nevertheless, several potential sources of bias remain. First, firms may sort into geographic locations based on long-term economic considerations, leading to systematic differences between firms in flood-prone and non-flood-prone areas. Second, unobserved regional characteristics, such as local economic conditions or infrastructure quality, may be correlated with both flood exposure and M&A activity. Third, although reverse causality is unlikely in a strict sense, firms' expectations about future risks may influence both their location decisions and acquisition strategies.

To mitigate these concerns, the empirical strategy incorporates multiple complementary approaches. The inclusion of firm-level control variables and fixed effects addresses observable heterogeneity and time-invariant regional characteristics. In addition, the analysis employs dynamic specifications using lagged flood exposure to capture the temporal evolution of firms' responses and to reduce concerns related to simultaneity.

Beyond these baseline controls, the study implements a series of additional tests to strengthen causal interpretation. A dynamic event study framework is used to examine the timing of effects and to test for the presence of pre-existing trends in M&A activity. Placebo tests are conducted by assigning pseudo flood events to untreated observations to assess whether the observed

relationships arise from spurious correlations. Finally, propensity score matching is employed to evaluate the extent to which differences in observable firm characteristics drive the results.

Together, these approaches provide a comprehensive framework to address potential endogeneity concerns. The dynamic event study is designed to examine the timing of effects and to test for the presence of pre-existing trends, the placebo tests assess whether observed relationships could arise from spurious correlations, and the matching procedure evaluates the role of observable firm characteristics in driving the results. The outcomes of these empirical tests are presented and discussed in Section 4.

4 Empirical Analysis

4.1 Baseline Results: Flooding & M&A Likelihood

This section presents the baseline results on the relationship between flood exposure and firms' M&A activity. Building on the empirical framework outlined in Section 3, I estimate the effect of lagged flood exposure on firms' likelihood of participating in merger and acquisition transactions using logit models and report marginal effects for ease of interpretation. Table 2 reports the results for three dependent variables capturing different dimensions of M&A activity: overall participation (*MA*), the probability of acting as an acquirer (*ACQ*), and the probability of becoming a target (*TGT*). The key independent variables are lagged flood indicators, which capture exposure to flooding events one, two, and three years prior.

Table 2. The Effects of Flood Exposure on M&A Likelihood

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<i>MA</i>	<i>MA</i>	<i>MA</i>	<i>ACQ</i>	<i>ACQ</i>	<i>ACQ</i>	<i>TGT</i>	<i>TGT</i>	<i>TGT</i>
<i>FLOOD_DUMMY</i> _{t-1}	-0.003* (0.052)			-0.004** (0.012)			0.000 (0.990)		
<i>FLOOD_DUMMY</i> _{t-2}		-0.001 (0.540)			-0.001 (0.401)			-0.001 (0.394)	
<i>FLOOD_DUMMY</i> _{t-3}			0.005*** (0.000)			0.005*** (0.000)			-0.000 (0.780)
<i>ASSETS_TOTAL</i>	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.007*** (0.000)	0.007*** (0.000)	0.007*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
<i>LEVERAGE</i>	-0.003* (0.061)	-0.003* (0.061)	-0.003* (0.059)	-0.001 (0.473)	-0.001 (0.471)	-0.001 (0.465)	0.000** (0.017)	0.000** (0.018)	0.000** (0.017)
<i>CASH</i>	0.010*** (0.002)	0.010*** (0.002)	0.010*** (0.002)	0.008*** (0.003)	0.008*** (0.003)	0.008*** (0.003)	-0.003** (0.035)	-0.003** (0.035)	-0.003** (0.035)
<i>SALES</i>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.001* (0.097)	-0.001* (0.097)	-0.001* (0.098)
<i>ROA</i>	0.012*** (0.002)	0.012*** (0.002)	0.012*** (0.002)	0.013*** (0.001)	0.013*** (0.001)	0.013*** (0.001)	0.005*** (0.000)	0.005*** (0.000)	0.005*** (0.000)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	71,326	71,326	71,326	71,326	71,326	71,326	70,209	70,209	70,209
Pseudo R ²	0.089	0.089	0.089	0.096	0.096	0.096	0.042	0.042	0.042

Notes: This table reports the marginal effects from logit regressions examining the relationship between flood exposure and firms' likelihood of engaging in M&A activity. Columns (1)–(3) use an indicator for overall M&A participation (MA) as the dependent variable, Columns (4)–(6) examine the likelihood of becoming an acquirer (ACQ), and Columns (7)–(9) examine the likelihood of becoming a target firm (TGT). The main explanatory variables are lagged flood exposure indicators measured at one-, two-, and three-year horizons relative to the flooding event. Flood exposure is defined as an indicator equal to one if the firm's headquarters county experiences at least one declared flooding event during the year. All control variables are lagged by one year. Coefficients of State and Year fixed effects are suppressed. Standard errors are adjusted for heteroscedasticity and clustered at the state level, and p-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Focusing first on overall M&A activity (Columns 1–3), the results show that flood exposure in the previous year ($t-1$) is associated with a 0.3 percentage point decrease in the probability of engaging in M&A activity (-0.003 , $p \approx 0.05$). A similar pattern is observed for acquisition behaviour (Columns 4–6), where flood exposure reduces the probability of being an acquirer by 0.4 percentage points (-0.004 , $p \approx 0.01$). Although these magnitudes may appear small in absolute terms, they are economically meaningful given the relatively low baseline probability of M&A activity at the firm-year level. The marginal effect of -0.003 implies a reduction of approximately 0.3 percentage points in the probability of engaging in M&A activity one-year post-flooding. Relative to the baseline participation rate of 1.4%, this corresponds to a decline of approximately 21.4%, indicating a meaningful economic effect. The results indicate that flood exposure has a measurable and statistically significant dampening effect on firms' propensity to engage in M&As in the short run.

A key feature of the results is the dynamic pattern across lags. While the immediate effect of flooding ($t-1$) is negative, the coefficient on flood exposure at $t-3$ becomes positive and highly

significant. Specifically, firms exposed to flooding three years earlier exhibit an increase in M&A participation of approximately 0.5 percentage points (0.005, $p < 0.01$), with a similar magnitude observed for acquisition behaviour. This reversal in sign suggests that the impact of flooding is not purely negative but evolves over time. In the short run, firms appear to delay acquisition activity following a shock. However, in later periods, they become more likely to engage in M&A.

This dynamic pattern is strongly consistent with the real options theory of investment under uncertainty. Flooding introduces a sudden increase in uncertainty regarding firms' operating conditions, financial constraints, and future cash flows. Under such conditions, firms have an incentive to delay irreversible investment decisions, such as acquisitions, in order to preserve flexibility and wait for uncertainty to resolve. This explains the negative effect observed in the immediate aftermath of flooding.

As uncertainty gradually resolves over time, firms may then exercise previously postponed investment opportunities, leading to the positive effect observed in later periods. In this sense, the delayed increase in M&A activity can be interpreted as a "catch-up" effect, where firms resume or accelerate acquisition activity once conditions stabilise. This intertemporal adjustment provides direct empirical support for the real options framework, highlighting that environmental shocks affect not only the level of investment but also its timing.

In contrast, the results for the target variable (Columns 7–9) do not provide strong evidence that flood exposure systematically affects firms' likelihood of becoming acquisition targets. The estimated coefficients are small and statistically insignificant across all lag specifications. This suggests that, within this setting, flood exposure primarily affects firms' active investment decisions (acquisition behaviour) rather than their passive vulnerability to being acquired. In other words, flooding appears to influence firms' willingness or ability to pursue M&As but does not significantly alter their attractiveness as takeover targets.

The estimated coefficients on control variables are broadly consistent with prior literature. Larger firms (*ASSETS_TOTAL*) and more profitable firms (*ROA*) are more likely to engage in M&A activity, while higher liquidity (*CASH*) is positively associated with acquisition likelihood. In contrast, leverage tends to reduce acquisition activity, reflecting financial

constraints. These patterns provide reassurance that the model captures standard determinants of M&A behaviour.

Overall, the baseline results reveal a temporally nuanced effect of flood exposure on M&A activity. Flooding reduces firms' acquisition activity in the short run but increases it in later periods, consistent with a real options interpretation in which firms delay investment under uncertainty and resume activity once conditions stabilise. The next section builds on these findings by formally examining the timing of effects and testing for pre-existing trends using a dynamic event study framework, as outlined in Section 3.4.

4.2 *Endogeneity Tests*

This section presents a series of empirical tests to address the endogeneity concerns discussed in Section 3.4. In particular, I examine whether the baseline results are driven by pre-existing trends, spurious correlations, or systematic differences in observable firm characteristics. The analysis proceeds by implementing a dynamic event study, placebo tests, and propensity score matching. Together, these approaches provide a comprehensive assessment of the robustness of the baseline findings.

4.2.1 *Dynamic Event-Study Analysis*

One important concern is whether firms located in flood-prone areas already anticipate future flood exposure. Other factors; such as gradually deteriorating regional economic conditions may result in firms experiencing different acquisition trends prior to flooding events. If such factors are correlated with firms' propensity to engage in M&A activity, the estimated relationship may partly reflect these underlying differences rather than firms' responses to flood shocks themselves. Therefore, it is important to examine whether firms exposed to flooding exhibit differential acquisition behaviour prior to the occurrence of flood events.

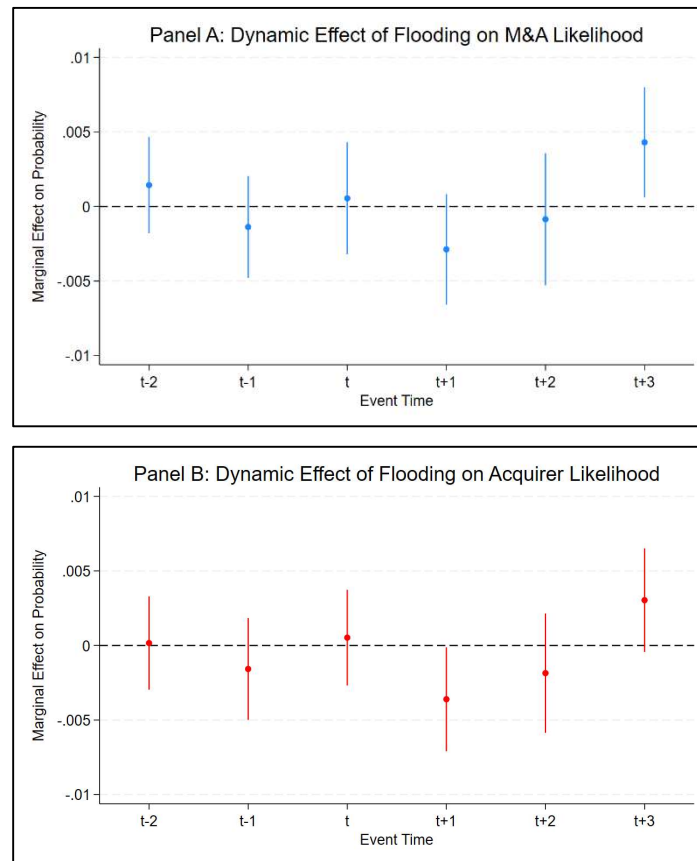
To address this concern, I adopt a dynamic event-study specification that exploits the timing of flood events to assess the evolution of firms' acquisition behaviour before and after exposure. The specification is implemented by constructing a series of lead and lag indicators relative to the timing of flood exposure, capturing up to two years prior to the event and three years following it. These event-time indicators are included alongside firm-level controls and fixed effects, allowing for a flexible characterisation of the dynamic response to flooding. Importantly, the inclusion of pre-event indicators enables a direct test of whether firms were

already on different acquisition trajectories prior to flood exposure. In this framework, the absence of significant pre-event coefficients provides evidence consistent with the identifying assumption that the timing of flood events is not systematically related to pre-existing trends in firms' acquisition behaviour.

Figure 1 presents the estimated marginal effects from the event-study specification. Panel A displays marginal effects of flooding on the probability of M&A, whereas the effects of flooding on the probability of being an acquirer is depicted in Panel B. The results show no evidence of systematic differential trends in the pre-flood periods, as the coefficients for the lead indicators are close to zero and statistically insignificant. This suggests that firms were not on systematically different acquisition trajectories prior to flood exposure, providing support for the identifying assumption that the timing of flood events is not correlated with pre-existing trends in firms' acquisition behaviour. While some anticipatory response may be expected; given that flood events are often preceded by prolonged rainfall or weather warnings, the absence of consistent pre-event effects indicates that such behaviour does not drive the main results.

Following the flood event, a negative effect on acquisition likelihood emerges in the short run, consistent with the retrenchment hypothesis. Over time, this negative effect attenuates and eventually reverses, with positive and statistically significant coefficients observed in later periods. One explanation for the persistence of effects in these later periods is the use of annual data, which records flood exposure at the yearly level while firms' responses unfold gradually. For example, if a flood occurs late in a given year, firms may only adjust their acquisition decisions in the following year or beyond, as M&A transactions require time for planning and execution. As a result, the impact of a single flood event may appear across multiple subsequent periods in the empirical specification. At the same time, the observed rebound is consistent with a real options interpretation, whereby firms initially delay investment in response to heightened uncertainty and subsequently resume acquisition activity as uncertainty resolves. Taken together, the dynamic pattern suggests that flood exposure leads to a temporary postponement of M&A activity followed by a gradual adjustment over time.

Figure 1. Dynamic Effects of Flood Exposure on Firms' M&A Activity



Notes: This figure presents the dynamic effects of flood exposure on firms' M&A activity estimated using an event-study framework. Panel A reports the marginal effects of flood exposure on the likelihood of engaging in M&A activity (MA), while Panel B reports the marginal effects on the likelihood of becoming an acquirer (ACQ). Flood exposure is defined as an indicator equal to one if the firm's headquarters county experiences at least one declared flooding event during the year. Event time is measured relative to the year of flood exposure, where t denotes the flood year. The plotted coefficients represent marginal effects from logit regressions controlling for firm-level characteristics, State- and Year fixed effects. Vertical lines indicate 95% confidence intervals based on standard errors clustered at the state level.

4.2.2 Placebo Tests

Another endogeneity issue that requires attention is whether the estimated relationship between flood exposure and M&A activity may be driven by spurious correlations arising from broader location-level shocks. In particular, unobserved factors such as regional economic cycles, policy changes, or other contemporaneous events could simultaneously affect firms' acquisition behaviour and be correlated with the timing of flood incidents. Even flood-prone regions may systematically differ in terms of those aforementioned factors; all of which may independently influence firms' acquisition behaviour. If so, the observed effects may reflect omitted regional characteristics rather than the direct effect of flooding exposure.

To address this concern, I implement a placebo test designed to assess whether similar effects would be observed when flood exposure is artificially assigned to firms that did not experience actual flooding. If the baseline results are driven by genuine flood-related shocks, then randomly assigning “pseudo” flood events should not produce systematic effects on M&A activity. Conversely, if placebo flood exposure yields significant results, this would suggest that the baseline findings may be driven by spurious correlations or unobserved factors unrelated to flooding. As such, the placebo test provides a direct way to evaluate whether the estimated effects are truly tied to the timing and occurrence of flood events.

The placebo treatment is constructed by assigning flood events to untreated counties within the same state-year, thereby preserving the overall distribution of flood exposure across states and time while breaking the link between actual flooding and firm outcomes. To ensure a clean comparison, only counties with no recorded flooding in the surrounding periods (i.e., the year before, the year of, and the year after the pseudo-event) are considered as potential donors. Within each state-year, untreated counties are randomly selected to match the number of treated counties, and these observations are assigned a placebo flood indicator (*PLACEBO_FLOOD*). Lagged placebo variables (i.e., *PLACEBO_FLOOD*_{*t*-1}, *PLACEBO_FLOOD*_{*t*-2}, *PLACEBO_FLOOD*_{*t*-3}) are then generated, allowing the regression framework to mirror the original empirical design.

Based on Table 3, the results of the placebo analysis provide no systematic evidence of spurious effects. For the M&A likelihood specification, all placebo coefficients are statistically insignificant across different lag structures. For the acquirer specification, while one coefficient at a longer lag is weakly significant, this effect is isolated and does not persist across other specifications. Importantly, a joint test of the placebo coefficients fails to reject the null hypothesis that they are jointly equal to zero ($p = 0.169$), indicating that the placebo variables do not collectively explain variation in acquisition behaviour.

Table 3. Placebo Tests Using Randomised Flood Assignments

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	<i>MA</i>	<i>MA</i>	<i>MA</i>	<i>ACQ</i>	<i>ACQ</i>	<i>ACQ</i>
<i>PLACEBO_FLOOD</i> _{<i>t-1</i>}	0.001 (0.633)			0.001 (0.468)		
<i>PLACEBO_FLOOD</i> _{<i>t-2</i>}		0.000 (0.908)			-0.000 (0.954)	
<i>PLACEBO_FLOOD</i> _{<i>t-3</i>}			-0.003 (0.131)			-0.004* (0.084)
Control variables of Table 2	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	71,326	71,326	71,326	71,326	71,326	71,326
Pseudo R ²	0.0881	0.0881	0.0881	0.0953	0.0953	0.0953

Notes: This table presents placebo tests using pseudo-flood assignments to assess whether the baseline findings are driven by spurious correlations or artificial treatment assignment. Columns (1)–(3) report results for overall M&A likelihood (MA), while Columns (4)–(6) examine the likelihood of becoming an acquirer (ACQ). The placebo flood variables are constructed by randomly assigning pseudo-flood events to untreated counties within the same state-year while excluding counties experiencing actual flooding in adjacent periods. The specifications re-estimate the baseline models using placebo flood indicators measured at one-, two-, and three-year lags. All regressions include the control variables from Table 2, as well as State- and Year fixed effects. Standard errors are clustered at the state level, and p-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Taken together, these findings suggest that the baseline results are unlikely to be driven by coincidental timing patterns or unobserved state-level shocks. The absence of systematic placebo effects reinforces the interpretation that the observed relationship between flood exposure and M&A activity reflects a genuine causal mechanism tied to the occurrence of flood events. Moreover, the consistency of the results across multiple identification strategies; which include matching, event-study analysis, and placebo testing, provides strong support for the robustness of the empirical specification and strengthens confidence in the validity of the main findings.

4.2.3 PSM Analysis

Another potential identification concern in the baseline specification arises from firms' non-random location choices. While the occurrence of flooding itself is plausibly exogenous, firms have discretion in deciding where to operate. Firms headquartered in counties that experience flooding may systematically differ from those in unaffected counties in terms of size, financial structure, industry composition, and local economic conditions. These differences may, in turn, influence firms' propensity to engage in M&A activity. As a result, the estimated relationship between flood exposure and acquisition likelihood may partly reflect underlying differences between treated and untreated firms, rather than the causal effect of flooding itself.

To address this concern, I employ propensity score matching (PSM), which provides a framework to improve the comparability between flood-exposed and non-exposed firms based on observable characteristics. The matching procedure is implemented using a propensity score estimated from a logit model, where flood exposure is regressed on lagged firm characteristics, including firm size, leverage, liquidity, sales, and profitability, alongside state and year fixed effects. Each flood-exposed firm-year observation is then matched to a non-exposed observation with a similar propensity score using a nearest-neighbour algorithm under the common support condition.

The effectiveness of the matching procedure is assessed using a set of diagnostic tests, reported in Appendix 2. The results indicate that observable firm characteristics exhibit some explanatory power for flood exposure, as reflected in a moderate pseudo-R-squared and the statistical significance of certain covariates in the treatment model. Furthermore, the distribution of propensity score distances suggests that matches are not particularly tight, and mean comparisons reveal that differences in several firm characteristics persist even after matching. Taken together, these findings indicate that the matching procedure does not fully eliminate differences between treated and control groups, and that treatment assignment is partially correlated with observable firm characteristics.

Importantly, these patterns do not undermine the identification strategy. Rather, they suggest that flood exposure is not strongly driven by the observable firm characteristics included in the matching model, limiting the extent to which matching can improve covariate balance. This is consistent with the nature of flooding as a geographically determined shock that is only imperfectly related to firm-level attributes. In this context, the limited improvement in balance implies that selection on observables is not the primary source of bias in the baseline estimates. Instead, the treatment variation appears to be largely independent of the observable characteristics considered, supporting the interpretation of flood exposure as a plausibly exogenous shock.

5 Mechanism Channels and Robustness Checks

5.1 Sources of Uncertainty in Flood-Induced M&A Entrenchment

The main results provide evidence in support of the retrenchment hypothesis as an explanation for the negative relationship between flooding and M&A decisions. It is now imperative to dig deeper and shed light on what is a potential mechanism of the uncertainty that increases the

real option value for firms located in areas subject to a flood incident to postpone their M&A decisions.

I argue that there are at least four non-mutually exclusive sources of uncertainty that may shape firms' acquisition responses following flood exposure. First, firms with greater physical asset exposure are more vulnerable to direct damage to tangible assets and disruptions in production processes, which can increase uncertainty regarding future cash flows and asset valuations. Second, firms operating in flood-sensitive industries may experience heightened operational risk due to the nature of their activities, making the consequences of flood events more salient and potentially altering their investment behaviour. Third, the extent of geographic dispersion may influence how strongly firms are affected by localised flood shocks, as firms with more concentrated operations are likely to face greater disruption compared to those with geographically diversified activities. Finally, firms' prior exposure to flood events may shape their expectations and responses through learning and adaptation, whereby repeated experience with such shocks reduces uncertainty and mitigates the need to delay investment. Taken together, these channels provide a framework for understanding how flood-induced uncertainty translates into heterogeneous acquisition responses across firms.

5.1.1 Physical Asset Exposure

Some variations are expected to be explained by differences in firms' exposure to physical assets. Even when firms face similar geographic exposure to flood events, their vulnerability to disruption may differ depending on the extent to which their operations rely on tangible capital. Prior literature highlights the importance of asset tangibility in shaping firms' real and financial decisions. Almeida & Campello (2007) show that tangible assets play a central role in corporate investment by serving as collateral that supports external financing. At the same time, studies in disaster and climate finance suggest that these assets may also increase firms' vulnerability to physical shocks. Using natural disasters as exogenous shocks, Barrot & Sauvagnat (2016) document that disasters disrupt production and propagate through firms' real operations, while Wang (2023) shows that such events lead to widespread damage to physical assets and reduce the value of collateralisable capital. Taken together, these findings suggest that firms with higher asset tangibility may be more exposed to disruption following flood events, as their operations rely more heavily on physical infrastructure and production facilities.

To capture this variation, a new variable *PHYSICAL_ASSET* is constructed based on firms lagged gross asset tangibility. Specifically, the variable is lagged by one year to mitigate potential simultaneity concerns, and firms are then sorted into terciles based on this lagged measure. The indicator variable *PHYSICAL_ASSET* is coded one if the firm belongs to the top tercile of lagged tangibility and zero otherwise. This classification allows for a distinction between firms with relatively high reliance on physical assets and those with lower exposure. By focusing on lagged tangibility, the measure reflects firms' ex ante exposure to physical capital prior to the realisation of flood shocks, ensuring that the classification is not driven by contemporaneous outcomes. This approach is consistent with the literature that treats asset tangibility, typically proxied by the ratio of physical assets to total assets, as a fundamental firm characteristic capturing reliance on tangible capital.

I argue that the negative impact of flooding on the likelihood of M&A is stronger among firms with higher exposure to physical assets. Following flood events, firms that rely more heavily on tangible assets may experience greater disruption to their production facilities, infrastructure, and overall operations, which in turn may lead to a stronger retrenchment in investment activities such as acquisitions. To test this proposition, the baseline regressions are re-estimated by incorporating the indicator variable *PHYSICAL_ASSET* and its interaction with all lagged forms of *FLOOD_DUMMY* (i.e. $FLOOD_DUMMY_{t-i} \times PHYSICAL_ASSET_{t-1}$). The regressions are estimated both without and with the full set of firm-level controls, and marginal effects are computed to facilitate interpretation of the interaction terms. Negative coefficients on the interaction terms are expected, as they would indicate that the decline in acquisition likelihood following flood exposure is more pronounced among firms with higher asset tangibility. Such findings would support the notion that flood shocks operate through a physical disruption channel, whereby damage to tangible assets amplifies firms' retrenchment from M&A activity.

Results in Table 4 provide strong evidence that physical asset exposure plays an important role in shaping firms' acquisition responses to flood events. Consistent with the baseline findings, flood exposure is associated with a reduction in the likelihood of engaging in M&A activity in the short run, as indicated by the negative coefficients on $FLOOD_DUMMY_{t-1}$. This effect diminishes over time and eventually reverses, with $FLOOD_DUMMY_{t-3}$ showing a positive and statistically significant coefficient across both *MA* and *ACQ* specifications. The coefficient on $PHYSICAL_ASSET_{t-1}$ is consistently negative and highly significant, suggesting that firms

with higher tangible asset intensity are generally less likely to engage in acquisitions, potentially reflecting the more rigid and capital-intensive nature of their operations. More importantly, the interaction terms between flood exposure and physical asset intensity are negative and statistically significant across all specifications and time horizons, indicating that the adverse effect of flooding on acquisition likelihood is amplified for firms with greater exposure to physical assets.

Table 4. Physical Asset Exposure and the Effect of Flooding on M&A Activity

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
	<i>MA</i>	<i>MA</i>	<i>MA</i>	<i>ACQ</i>	<i>ACQ</i>	<i>ACQ</i>
<i>FLOOD_DUMMY</i> _{<i>t-1</i>}	-0.003* (0.087)			-0.003** (0.015)		
<i>FLOOD_DUMMY</i> _{<i>t-2</i>}		-0.002 (0.309)			-0.002 (0.153)	
<i>FLOOD_DUMMY</i> _{<i>t-3</i>}			0.005*** (0.005)			0.004*** (0.006)
<i>PHYSICAL_ASSET</i> _{<i>t-1</i>}	-0.003*** (0.004)	-0.003*** (0.004)	-0.003*** (0.004)	-0.003*** (0.010)	-0.003** (0.010)	-0.003*** (0.009)
<i>FLOOD_DUMMY</i> _{<i>t-1</i>} <i>x</i> <i>PHYSICAL_ASSET</i> _{<i>t-1</i>}	-0.306*** (0.004)			-0.290*** (0.007)		
<i>FLOOD_DUMMY</i> _{<i>t-2</i>} <i>x</i> <i>PHYSICAL_ASSET</i> _{<i>t-1</i>}		-0.271** (0.014)			-0.275** (0.016)	
<i>FLOOD_DUMMY</i> _{<i>t-3</i>} <i>x</i> <i>PHYSICAL_ASSET</i> _{<i>t-1</i>}			-0.298*** (0.005)			-0.306*** (0.008)
<i>ASSETS_TOTAL</i>	0.004*** (0.000)	0.004*** (0.000)	0.004*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
<i>LEVERAGE</i>	-0.010*** (0.000)	-0.010*** (0.000)	-0.010*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)
<i>CASH</i>	0.011*** (0.000)	0.011*** (0.000)	0.011*** (0.000)	0.010*** (0.000)	0.010*** (0.000)	0.010*** (0.000)
<i>SALES</i>	0.002*** (0.002)	0.002*** (0.003)	0.002*** (0.003)	0.001*** (0.002)	0.001*** (0.002)	0.001*** (0.002)
<i>ROA</i>	0.001 (0.489)	0.001 (0.483)	0.001 (0.488)	0.002 (0.293)	0.003 (0.284)	0.003 (0.290)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	59,462	59,462	59,462	59,462	59,462	59,462
Pseudo R ²	0.0987	0.0987	0.0987	0.0987	0.0987	0.0987

Notes: This table examines whether firms' exposure to physical assets amplifies the effect of flooding on M&A activity. Columns (1)–(3) report results for overall M&A likelihood (MA), while Columns (4)–(6) examine the likelihood of becoming an acquirer (ACQ). The main variables of interest are the interaction terms between flood exposure and firms' physical asset intensity, measured using the ratio of physical assets to total assets. The interaction terms capture whether firms with greater concentrations of tangible assets exhibit stronger responses to flooding shocks. All specifications are estimated using logit regressions with marginal effects and include firm-level control variables, State- and Year fixed effects. Standard errors are clustered at the state level, and p-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Taken together, these findings support the notion that physical asset exposure constitutes an important source of uncertainty following flood events. Firms with a higher concentration of tangible assets are more vulnerable to direct damage and operational disruptions, which may increase uncertainty regarding asset values, production continuity, and future cash flows. This heightened uncertainty raises the real option value of waiting, leading such firms to delay acquisition decisions more strongly in the aftermath of flooding. Notably, the interaction effects remain negative even in later periods, suggesting that while the average firm begins to resume acquisition activity as uncertainty resolves, firms with high physical asset exposure continue to face persistent disruption or slower recovery. This pattern indicates that physical asset intensity not only amplifies the initial retrenchment response but may also prolong the adjustment process, highlighting the importance of operational vulnerability in understanding firms' heterogeneous responses to climate-related shocks.

The role of physical asset exposure can also be interpreted within the real options framework as a source of persistent uncertainty. Firms with a higher concentration of tangible assets are more vulnerable to direct damage and operational disruptions following flood events, which increases uncertainty regarding asset values, production capacity, and future cash flows. In turn, this heightened uncertainty raises the value of waiting, leading such firms to delay acquisition decisions more strongly. The empirical finding that the interaction between flood exposure and physical asset intensity remains negative even in later periods suggests that the uncertainty associated with asset-heavy operations is more persistent and slower to resolve. As a result, the option value of delaying investment remains elevated for longer, prolonging the retrenchment in acquisition activity among these firms.

5.1.2 *Flood-Sensitive Industries*

To the extent that firms experiencing flooding in their respective headquarter locations exhibit lower likelihood of engaging in M&A transactions, some variations are expected to be explained by the sensitivity of their industries to water exposure. That is, there might be systematic differences between the impact of flooding on certain industry sectors and others even though these firms may have the same physical exposure to flooding. Linking firms' investment response to the saliency of extreme rainfall conditions, Rao et al. (2022) document variations in firms' investment behaviour depending on whether they operate in industries sensitive to excess or deficit rainfall. In particular, they show that firms operating in excess-rain-sensitive industries tend to increase investment following extreme rainfall events, despite

experiencing adverse performance outcomes. The authors attribute this response to the saliency of rainfall shocks, whereby managers in rain-sensitive industries become more attentive to the implications of extreme weather conditions based on their prior experience with such events. This suggests that industry characteristics shape how firms interpret and respond to environmental shocks, leading to heterogeneous investment behaviour.

To capture this variation, a new indicator variable, *FLOOD_SENSITIVE*, is constructed to identify firms operating in industries that are more vulnerable to disruption following flood events. This variable is coded one if the firm belongs to industries whose operations are closely tied to water exposure, and zero otherwise. As Rao et al. (2022) focus on a sample of Indian firms, their industry classification is adapted by mapping the sector descriptions used in their study to the corresponding two-digit Standard Industrial Classification (SIC) codes applied to U.S. firms. This results in the identification of flood-sensitive industries including agriculture and food processing, mining, manufacturing of chemical products, construction, tourism, electricity generation and transmission, and transportation. The indicator *FLOOD_SENSITIVE* is then incorporated into the baseline specification in both its standalone form and its interaction with lagged flood indicators ($FLOOD_DUMMY_{t-i} \times FLOOD_SENSITIVE_t$), allowing the analysis to distinguish between firms with differing exposure to flood-related operational risks.

As firms are more exposed to disruption from flood events, they may also be more accustomed to dealing with such risks and therefore more likely to respond proactively. In particular, managers in flood-sensitive industries may interpret flood events as signals of persistent environmental risk and respond by engaging in strategic investment, including M&A, to adapt or mitigate future exposure. To test this proposition, the interaction terms between *FLOOD_DUMMY* and *FLOOD_SENSITIVE* are examined across different lag structures. Positive coefficients on these interaction terms are expected, as they would indicate that the decline in acquisition likelihood following flood exposure is less pronounced for firms in flood-sensitive industries. Using M&A as a proxy for investment, such findings would suggest that firms operating in these industries are more likely to respond to flood shocks by undertaking strategic expansion, consistent with the salience-driven investment response documented by Rao et al. (2022).

Table 5 displays the results from testing the role of firms' sensitivity to flood in mitigating the negative impact of flooding on M&A. The results on industry flood sensitivity indicate that the negative impact of flooding on M&A likelihood is not uniform across sectors but varies systematically depending on firms' exposure to water-related disruption. In particular, firms operating in flood-sensitive industries experience a less severe decline in the likelihood of becoming M&A acquirers following flood events. While the baseline results suggest a general retrenchment in acquisition activity after flooding, this effect is attenuated among firms whose operations are more directly affected by excessive water conditions. This pattern suggests that industry characteristics play an important role in shaping how firms respond to environmental shocks, even when they are subject to similar geographic exposure.

Table 5. Flood-Sensitive Industries and the Effect of Flooding on M&A Activity

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
	<i>MA</i>	<i>MA</i>	<i>MA</i>	<i>ACQ</i>	<i>ACQ</i>	<i>ACQ</i>
<i>FLOOD_DUMMY</i> _{<i>t-1</i>}	-0.003** (0.034)			-0.003*** (0.005)		
<i>FLOOD_DUMMY</i> _{<i>t-2</i>}		-0.001 (0.518)			-0.001 (0.370)	
<i>FLOOD_DUMMY</i> _{<i>t-3</i>}			0.006*** (0.001)			0.005*** (0.000)
<i>FLOOD_SENSITIVE</i>	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)
<i>FLOOD_DUMMY</i> _{<i>t-1</i>} <i>x FLOOD_SENSITIVE</i>	-0.487*** (0.000)			-0.530*** (0.000)		
<i>FLOOD_DUMMY</i> _{<i>t-2</i>} <i>x FLOOD_SENSITIVE</i>		-0.463*** (0.000)			-0.503*** (0.000)	
<i>FLOOD_DUMMY</i> _{<i>t-3</i>} <i>x FLOOD_SENSITIVE</i>			-0.499*** (0.000)			-0.555*** (0.000)
<i>ASSETS_TOTAL</i>	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.007*** (0.000)	0.007*** (0.000)	0.007*** (0.000)
<i>LEVERAGE</i>	-0.004** (0.016)	-0.004** (0.016)	-0.004** (0.016)	-0.002 (0.280)	-0.002 (0.276)	-0.002 (0.276)
<i>CASH</i>	0.008*** (0.008)	0.008*** (0.008)	0.008*** (0.008)	0.006** (0.018)	0.006** (0.018)	0.006** (0.019)
<i>SALES</i>	-0.002*** (0.003)	-0.002*** (0.003)	-0.002*** (0.003)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)
<i>ROA</i>	0.011*** (0.003)	0.011*** (0.003)	0.011*** (0.003)	0.012*** (0.002)	0.012*** (0.002)	0.012*** (0.002)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	71,326	71,326	71,326	71,326	71,326	71,326
Pseudo R ²	0.100	0.100	0.100	0.100	0.100	0.100

Notes: This table examines whether the effect of flooding on M&A activity varies across firms operating in industries with sensitivity to excess water condition. Columns (1)–(3) report results for overall M&A likelihood (MA), while Columns (4)–(6) examine the likelihood of becoming an acquirer (ACQ). Flood-sensitive industries are defined as industries whose operations are highly vulnerable to excess water exposure and flood-related disruptions. The main variables of interest are the interaction terms between flood exposure and the flood-sensitive

industry indicator. The interaction terms capture whether firms operating in industries with greater operational sensitivity to flooding exhibit stronger reductions in M&A activity following disaster exposure. All specifications are estimated using logit regressions with marginal effects and include firm-level control variables, State- and Year fixed effects. Standard errors are clustered at the state level, and p-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

These findings can be interpreted as evidence of a more proactive or adaptive response among firms in flood-sensitive industries. Because such firms are more accustomed to dealing with water-related risks, their managers may be more attentive to the implications of flood events and more prepared to respond strategically. Rather than retreating from investment, these firms may view flood shocks as signals of persistent environmental risk and respond by engaging in M&A activities to diversify operations, acquire more resilient assets, or strengthen their competitive position. This behaviour is consistent with a salience-driven response, where prior exposure and industry-specific experience shape managerial decision-making. Overall, the results suggest that while flooding generally discourages acquisition activity, firms in flood-sensitive industries are relatively more resilient and may even use M&A as a tool for adaptation in the face of climate-related risks.

5.1.3 Geographic Dispersion

The baseline identification is based on flooding events occurring in the county where the firm headquarters is located. Consequently, the effect of flooding on M&A likelihood is derived using firm headquarters as a proxy for the firm's location. Some firms, however, may not have their operations concentrated in their headquarters. As their economic activities are more dispersed geographically, firms in certain industries may have assets, employees, and production facilities spread across multiple locations, making them relatively less affected by local risk factors, including climate-related events, compared to geographically concentrated firms. García & Norli (2012) argue that firms with geographically diversified operations are less exposed to localised shocks, as losses in one region may be offset by activities in other regions. Supporting this view, Huynh et al. (2020) find that the adverse impact of drought on expected returns is weaker for industries with geographically dispersed operations. Similarly, Benincasa et al. (2024) show that firms with greater geographic diversification experience relatively smaller losses from weather-related events, as the scale of local disruptions is mitigated when operations are spread across multiple locations. Taken together, these studies suggest that geographic dispersion plays an important role in shaping firms' exposure to climate-related shocks.

To capture this variation, the baseline specifications are re-estimated by incorporating an additional indicator variable to identify firms belonging to industries characterised by geographic dispersion. Following Nguyen et al. (2023), industries with primary three-digit SIC codes between 200 and 399, as well as those in SIC 737, are considered to be more geographically concentrated. Using this classification, the indicator variable *DISPERSED_IND* is defined as one for firms operating in industries outside these categories, and zero otherwise. This approach allows for a distinction between firms whose operations are likely to be geographically diversified and those that are more locally concentrated. By classifying firms at the industry level, the measure captures structural differences in operational dispersion that are unlikely to be driven by short-term firm-level decisions.

I argue that the negative impact of flooding on the likelihood of M&A is weaker for firms operating in geographically dispersed industries. Because these firms have operations distributed across multiple locations, they are less dependent on any single geographic area and therefore less vulnerable to localised disruptions caused by flood events. As a result, they may be better able to maintain their investment activities, including acquisitions, even when their headquarters location is affected by flooding. To test this proposition, the indicator variable *DISPERSED_IND* is added to Equation (1) in its standalone form as well as its interaction form with all lagged forms of *FLOOD_DUMMY* ($FLOOD_DUMMY_{t-i} \times DISPERSED_IND_t$). Positive coefficients on the interaction terms are expected, as they would indicate that the decline in acquisition likelihood following flood exposure is less pronounced for geographically dispersed firms. Such findings would support the notion that geographic diversification mitigates the adverse effects of localised climate shocks on corporate investment decisions.

Results in Table 6 explain the role from having diversified locations in mitigating the negative impact of flooding on M&A. The results on geographic dispersion indicate that the negative impact of flooding on M&A likelihood is mitigated for firms operating in industries characterised by more geographically dispersed operations. While the baseline findings suggest that firms located in flood-affected counties are less likely to engage in acquisition activities, this decline is less pronounced for firms whose assets and operations are spread across multiple locations. In particular, the effect appears to be more evident in longer-lagged periods, suggesting that the benefits of geographic diversification may not be immediate but materialise over time as firms adjust to the consequences of flood exposure. These findings highlight the

importance of considering firms' operational structure when assessing the impact of localised climate shocks.

Table 6. Geographic Dispersion and the Effect of Flooding on M&A Activity

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	<i>MA</i>	<i>MA</i>	<i>MA</i>	<i>ACQ</i>	<i>ACQ</i>	<i>ACQ</i>
<i>FLOOD_DUMMY</i> _{<i>t-1</i>}	-0.003** (0.032)			-0.003*** (0.005)		
<i>FLOOD_DUMMY</i> _{<i>t-2</i>}		-0.001 (0.490)			-0.001 (0.346)	
<i>FLOOD_DUMMY</i> _{<i>t-3</i>}			0.006*** (0.001)			0.005*** (0.000)
<i>DISPERSED_IND</i>	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)
<i>FLOOD_DUMMY</i> _{<i>t-1</i>} <i>x</i> <i>DISPERSED_IND</i>	-0.404*** (0.000)			-0.419*** (0.000)		
<i>FLOOD_DUMMY</i> _{<i>t-2</i>} <i>x</i> <i>DISPERSED_IND</i>		-0.422*** (0.000)			-0.438*** (0.000)	
<i>FLOOD_DUMMY</i> _{<i>t-3</i>} <i>x</i> <i>DISPERSED_IND</i>			-0.456*** (0.000)			-0.480*** (0.000)
<i>ASSETS_TOTAL</i>	0.009*** (0.000)	0.009*** (0.000)	0.009*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)
<i>LEVERAGE</i>	-0.001 (0.386)	-0.001 (0.388)	-0.001 (0.381)	-0.000 (0.989)	-0.000 (0.991)	-0.000 (0.985)
<i>CASH</i>	0.006* (0.098)	0.006* (0.097)	0.006 (0.101)	0.003 (0.211)	0.003 (0.209)	0.003 (0.219)
<i>SALES</i>	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
<i>ROA</i>	0.014*** (0.000)	0.014*** (0.000)	0.014*** (0.000)	0.015*** (0.000)	0.015*** (0.000)	0.015*** (0.000)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	71,326	71,326	71,326	71,326	71,326	71,326
Pseudo R ²	0.099	0.099	0.099	0.099	0.099	0.099

Notes: This table examines whether geographic dispersion moderates the effect of flooding on M&A activity. Columns (1)–(3) report results for overall M&A likelihood (MA), while Columns (4)–(6) examine the likelihood of becoming an acquirer (ACQ). Geographically dispersed industries are defined as industries whose operations are naturally spread across multiple geographic regions, thereby reducing dependence on a single local area. The main variables of interest are the interaction terms between flood exposure and the geographic dispersion indicator. The interaction terms capture whether firms operating in geographically dispersed industries exhibit weaker sensitivity to localised flooding shocks when making M&A decisions. All specifications are estimated using logit regressions with marginal effects and include firm-level control variables, State- and Year fixed effects. Standard errors are clustered at the state level, and p-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

The observed pattern is consistent with the notion that geographic diversification enhances firms' resilience to localised disruptions. Firms with dispersed operations are less dependent on any single geographic area and therefore better able to absorb shocks affecting their headquarters location. As a result, they may experience less severe operational disruption and

maintain greater capacity to pursue investment opportunities, including M&A activities. The delayed significance of the effect further suggests that geographic dispersion may facilitate recovery and adaptation over time, allowing firms to gradually re-engage in acquisition markets after an initial period of adjustment. Overall, the results support the view that geographic diversification serves as a risk-mitigation mechanism, reducing firms' sensitivity to climate-related shocks and moderating the extent of retrenchment in M&A activity.

5.1.4 *Learning & Adaptation*

Other variations are expected to be explained by differences in firms' prior exposure to similar events. Firms encountering flooding for the first time may respond differently compared to those that have experienced such events repeatedly in the past. A growing body of literature in environmental and behavioural economics suggests that individuals and organisations learn from extreme events and update their beliefs about risk accordingly. For instance, Kousky (2010) shows that experiencing a flood significantly increases perceived risk, which in turn influences subsequent economic decisions. Similarly, Gallagher (2014) documents that flood exposure leads to a sharp increase in insurance demand, although this effect diminishes over time as memories of the event fade.

More broadly, this pattern is consistent with the salience-based view of decision-making proposed by Myers et al. (2013), which argues that individuals place greater weight on risks that are recently experienced or highly salient. In financial markets, Bakkensen & Barrage (2022) further demonstrate that heterogeneity in climate risk beliefs shaped by past exposure can influence economic behaviour and asset pricing. Together, these studies suggest that disaster experience plays a critical role in shaping expectations, risk perceptions, and subsequent economic decisions. As a result, firms with prior exposure to flooding may be better able to anticipate and adapt to such shocks, while firms encountering flooding for the first time may respond more strongly due to heightened uncertainty and lack of experience.

To capture this variation, two indicator variables, *FIRST* and *REPEAT*, are constructed to distinguish between first-time and recurring flood exposure at the county level. Specifically, *FIRST* takes the value of one if a flood event occurs in a county that has not experienced flooding within the past five years, and zero otherwise. *REPEAT* is coded one if the county has experienced at least one flood event within the same five-year window prior to the current event, and zero otherwise. Both variables are set to zero for observations where no flood occurs.

This classification allows for a distinction between firms facing an unexpected flood shock and those operating in environments where flooding is a recurring phenomenon. The baseline specification is then augmented by replacing *FLOOD_DUMMY* with these experience-based indicators, allowing the effects of first-time and repeated flood exposure on acquisition likelihood to be examined separately.

I argue that the negative impact of flooding on the likelihood of M&A is stronger for firms experiencing a flood for the first time, while firms exposed to repeated flood events may exhibit a weaker response or even a reversal over time. First-time flood exposure may generate heightened uncertainty and risk aversion, leading firms to delay or avoid engaging in acquisition activities. In contrast, firms that have experienced floods in the past may adapt by developing mitigation strategies, improving operational resilience, or updating their expectations about disaster risks, thereby reducing the perceived cost of engaging in M&A. As a result, these firms may be more likely to re-enter the acquisition market following repeated exposure. Consistent with this reasoning, stronger negative coefficients are expected for *FIRST*, while the effect of *REPEAT* is expected to be weaker or potentially positive in longer lagged periods. Such findings would support the notion that firms' responses to flood shocks depend not only on the occurrence of the event itself but also on their prior experience and adaptation to climate-related risks.

From Table 7, the effect of recurring flood events on M&A activity reveals a clear distinction between firms experiencing flooding for the first time and those exposed to repeated events. Firms located in counties affected by a first-time flood exhibit a statistically significant decline in acquisition likelihood in the immediate aftermath, with estimates indicating a reduction of approximately 0.5 percentage points in the probability of engaging in M&A activity. This finding is consistent across both MA and ACQ specifications and supports the notion that unexpected disaster shocks increase uncertainty and induce a delay in major investment decisions. In contrast, the response of firms exposed to repeated flooding differs notably over time. The immediate effect of recurring flood exposure is economically small and statistically insignificant, suggesting that prior experience may mitigate the initial uncertainty associated with such events. More importantly, in later periods, both first-time and repeated flood exposure are associated with positive and statistically significant effects on acquisition likelihood, with recurring floods exhibiting a larger magnitude (around 0.9 to 1.1 percentage points) compared to first-time events.

Table 7. Past Experience and the Effect of Flooding on M&A Activity

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	<i>MA</i>	<i>MA</i>	<i>MA</i>	<i>ACQ</i>	<i>ACQ</i>	<i>ACQ</i>
<i>REPEAT</i> _{<i>t-1</i>}	0.000 (0.914)			0.000 (0.867)		
<i>FIRST</i> _{<i>t-1</i>}	-0.005** (0.029)			-0.005*** (0.005)		
<i>REPEAT</i> _{<i>t-2</i>}		0.000 (0.954)			-0.001 (0.680)	
<i>FIRST</i> _{<i>t-2</i>}		-0.001 (0.512)			-0.001 (0.462)	
<i>REPEAT</i> _{<i>t-3</i>}			0.011*** (0.000)			0.009*** (0.000)
<i>FIRST</i> _{<i>t-3</i>}			0.003* (0.058)			0.003** (0.033)
<i>ASSETS_TOTAL</i>	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.007*** (0.000)	0.007*** (0.000)	0.007*** (0.000)
<i>LEVERAGE</i>	-0.003* (0.063)	-0.003* (0.061)	-0.003* (0.062)	-0.001 (0.481)	-0.001 (0.471)	-0.001 (0.473)
<i>CASH</i>	0.010*** (0.002)	0.010*** (0.002)	0.010*** (0.002)	0.008*** (0.003)	0.008*** (0.003)	0.008*** (0.003)
<i>SALES</i>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
<i>ROA</i>	0.012*** (0.002)	0.012*** (0.002)	0.012*** (0.002)	0.013*** (0.001)	0.013*** (0.001)	0.013*** (0.001)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	71,326	71,326	71,326	71,326	71,326	71,326
Pseudo R ²	0.097	0.097	0.097	0.097	0.097	0.097

Notes: This table examines whether prior flooding experience moderates the effect of flooding on M&A activity. Columns (1)–(3) report results for overall M&A likelihood (MA), while Columns (4)–(6) examine the likelihood of becoming an acquirer (ACQ). The main variables of interest distinguish between first-time and repeated flooding exposure. FIRST identifies firms headquartered in counties experiencing flooding for the first time during the sample period, while REPEAT captures firms located in counties with prior flooding experience. All specifications are estimated using logit regressions with marginal effects and include firm-level control variables, State- and Year fixed effects. Standard errors are clustered at the state level, and p-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

These patterns suggest that firms' responses to flood shocks are shaped not only by the occurrence of the event itself but also by their accumulated experience with similar shocks. First-time exposure appears to trigger a short-term retrenchment driven by heightened uncertainty and lack of preparedness, whereas repeated exposure does not generate an additional immediate contraction in acquisition activity. Over time, however, firms with prior flood experience exhibit a stronger tendency to re-engage in M&A activity, consistent with learning and adaptation effects. Firms operating in flood-prone environments may gradually develop mitigation strategies, enhance operational resilience, and update their expectations regarding disaster risks, thereby reducing uncertainty and facilitating investment decisions. The larger positive effect associated with repeated flood exposure in later periods further suggests

that accumulated experience may not only offset the initial negative shock but also lead to a more proactive strategic response. Overall, the results indicate that the impact of flooding on M&A activity is dynamic and experience-dependent, with initial negative effects giving way to recovery and eventual expansion as firms adapt to recurring environmental risks.

Within the real options framework, the learning and adaptation channel captures how uncertainty evolves with experience and, therefore, how the value of waiting changes over time. Firms exposed to flooding for the first time face greater uncertainty due to limited information and lack of preparedness, which increases the incentive to postpone acquisition decisions. However, repeated exposure to similar shocks enables firms to update their expectations, develop mitigation strategies, and improve their ability to manage disaster-related risks. This process reduces uncertainty and, consequently, lowers the value of waiting. The empirical evidence that firms with prior flood experience exhibit a faster recovery in acquisition activity is consistent with this interpretation, suggesting that learning and adaptation accelerate the resolution of uncertainty and facilitate earlier re-entry into the M&A market.

5.2 Robustness Checks

5.2.1 Flood Duration

It could be argued that representing flooding events solely as dummy variables may lead to potential misspecification of the primary variable of interest. Specifically, the variable *FLOOD_DUMMY* may fail to account for the heterogeneity of flooding occurrences within a given year, thereby omitting critical information that might differentiate the severity of one incident from another. By relying solely on frequency, this approach assumes equal weight across all flood events, potentially overlooking variations in their impacts.

To address this limitation, I propose an alternative measure of flood severity that incorporates average duration, with the rationale that longer durations are among potential indications of greater severity. For instance, the Colorado Front Range Flood of 2013; despite not being driven by unusually intense rainfall, caused substantial damage due to its extended duration, illustrating how longer-lasting events can have meaningful economic consequences beyond immediate physical intensity. The FEMA database provides the start and end dates for each flood event declaration, enabling calculation of flood duration in number of days. As the duration of flooding increases, affected counties may require extended recovery times,

impacting businesses within these areas. Prolonged disaster periods likely result in additional operational challenges, including prolonged factory shutdowns, disruptions in distribution due to infrastructure damage, increased absenteeism as workers face commuting difficulties, and lost sales. In line with findings by Huynh et al. (2020), which demonstrate a positive relationship between drought duration and firms' cost of equity capital, flood duration can serve as a close approximation of flood intensity. Additionally, McBean et al. (1988) report that floods lasting beyond 24 hours lead to a 6% increase in total damage to residential areas, hence emphasising the economic impact of extended inundation times.

Table 8 presents the results from re-estimating Equation (1), focusing on *AVG_DURATION* as the primary variable of interest. Consistent with the baseline approach, the multinomial logit models incorporate various lagged forms of *AVG_DURATION* to examine the relationship between the duration of prior flooding events and firms' subsequent decisions to engage in M&A activities. For any given observation, $AVG_DURATION_{t-i}$ is calculated by dividing the total duration of all flooding events that occurred during year $t-i$ by the total number of incidents in the respective year. This measure, however, accounts for cumulative effects over longer periods. For instance, to define $AVG_DURATION_{t-2}$, the total flood durations and the total number of incidents are aggregated across years $t-1$ and $t-2$. Since duration serves as a proxy for flood intensity, it is hypothesised that the coefficients for all forms of $AVG_DURATION_{t-i}$ will be negative, reflecting the anticipated adverse effects of prolonged flooding on firms' M&A activity.

Overall, the findings remain broadly consistent with the baseline results, although the magnitude of the effects is economically small when expressed in marginal probability terms. The coefficients on $AVG_DURATION_{t-1}$ are generally negative in the immediate aftermath of flooding, indicating a reduction in the likelihood of engaging in M&A activity, while coefficients at longer lags tend to become less negative or turn positive. This dynamic pattern is consistent with the retrenchment hypothesis and the real options interpretation, whereby firms delay investment under heightened uncertainty and resume acquisition activity as uncertainty resolves over time. Although the estimated marginal effects appear close to zero due to rounding, they reflect statistically significant changes in acquisition probability at a finer scale. This highlights the importance of considering not only the occurrence of flooding events but also their duration, as prolonged flooding episodes may amplify disruption and uncertainty.

Table 8. Flood Duration and M&A Activity

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	<i>MA</i>	<i>MA</i>	<i>MA</i>	<i>ACQ</i>	<i>ACQ</i>	<i>ACQ</i>
<i>AVG_DURATION</i> _{<i>t-1</i>}	-0.000** (0.025)			-0.000** (0.010)		
<i>AVG_DURATION</i> _{<i>t-2</i>}		-0.000 (0.692)			-0.000 (0.820)	
<i>AVG_DURATION</i> _{<i>t-3</i>}			0.000** (0.041)			0.000*** (0.009)
<i>ASSETS_TOTAL</i>	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.007*** (0.000)	0.007*** (0.000)	0.007*** (0.000)
<i>LEVERAGE</i>	-0.003* (0.061)	-0.003* (0.061)	-0.003* (0.062)	-0.001 (0.471)	-0.001 (0.470)	-0.001 (0.473)
<i>CASH</i>	0.010*** (0.002)	0.010*** (0.002)	0.010*** (0.002)	0.008*** (0.003)	0.008*** (0.003)	0.008*** (0.002)
<i>SALES</i>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
<i>ROA</i>	0.012*** (0.002)	0.012*** (0.002)	0.012*** (0.002)	0.013*** (0.001)	0.013*** (0.001)	0.013*** (0.001)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	71,326	71,326	71,326	71,326	71,326	71,326
Pseudo R ²	0.096	0.096	0.096	0.096	0.096	0.096

Notes: This table presents robustness tests using average flood duration as an alternative measure of flood exposure. Columns (1)–(3) report results for overall M&A likelihood (MA), while Columns (4)–(6) examine the likelihood of becoming an acquirer (ACQ). The main explanatory variables are the lagged average flood duration measures, calculated as the average number of days associated with declared flooding events within a firm's headquarters county during the year. All specifications are estimated using logit regressions with marginal effects and include firm-level control variables, State- and Year fixed effects. Standard errors are clustered at the state level, and p-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Given the nature of the FEMA data, where a large proportion of observations correspond to non-flooding periods, the distribution of the duration variable is highly skewed, with most values concentrated at zero and relatively few observations capturing positive durations. This feature implies that the variation in $AVG_DURATION_{t-i}$ is driven primarily by the occurrence and length of flood episodes rather than continuous changes across all firms. As a result, the estimated coefficients should be interpreted as capturing the marginal effect of additional flood duration conditional on experiencing a flood event. The persistence of the negative short-run effect, followed by attenuation and eventual reversal, suggests that longer-duration flooding contributes to an increase in uncertainty that delays acquisition decisions, but this effect diminishes over time as firms adjust and recover. Overall, the results reinforce the view that both the timing and intensity—proxied by duration—of flood exposure play a role in shaping firms' dynamic investment behaviour.

5.2.2 Major Floods Consideration

The final alternative measure is motivated by historical evidence strengthening one important argument that significant impacts only resulting from several major disasters. For example, Ouazad & Kahn (2022) focus only on top 15 disasters that have caused more than 1 billion dollars in estimated damages. Whereas, the final sample in Barrot & Sauvagnat (2016) are left with 41 U.S. major disasters that lasts less than 30 days with total estimated damages above \$1 billion in 2013 constant dollars. Within the FEMA database, one variable named “Declaration Type” is available to indicate whether a disaster is categorised as an “Emergency” or a “Major Disaster”, thus, making categorisation of flood severity level possible. An “Emergency” declaration authorises the federal government to provide supplemental assistance to State and local or Indian tribal government efforts in providing emergency services, such as the protection of lives, property, public health, and safety, or to lessen or avert the threat of a catastrophe in any part of the United States. On the other hand, a “Major Disaster” declaration means that the disaster is beyond the combined capacities of state and local governments to respond. In this case, a wide range of federal assistance programmes is required for the recovery of individuals and public infrastructure, including funds for both emergency and permanent work. While the distinction between Emergency and Major Disaster is based on the range of government aids that follows; rather than the intensity of the flood event itself; incorporating the two different classifications into the model may inform the implications of heterogeneity in disaster severity to M&A decision making.

To validate the effect of these extreme events, it may be useful to introduce a separate measure for major disasters, thereby isolating the differential impact of significant flooding incidents. Accordingly, *MAJOR_FLOOD* is defined as a binary variable that takes the value of one for each major disaster reported in the FEMA database and zero otherwise. For each observation, *MAJOR_FLOOD* is defined in three different lagged forms to maintain consistency in defining variables. Similar to *AVG_DURATION*, which follows an accumulation rule for longer lagged periods, the same rule is applied to *MAJOR_FLOOD*. However, unlike *AVG_DURATION*, which is continuous, *MAJOR_FLOOD* remains binary, indicating the occurrence of at least one major disaster within the specified lag period. For instance, *MAJOR_FLOOD_{t-2}* is calculated by summing the frequency of major disasters in years $t-1$ and $t-2$. Then, the value of *MAJOR_FLOOD_{t-2}* will be set to 1 if the summation yields a positive value, regardless of the actual frequency. If no major disaster is identified, *MAJOR_FLOOD_{t-2}* will remain zero.

Table 9 presents the results from re-estimating Equation (1), focusing on *MAJOR_FLOOD* as the primary variable of interest. Consistent with the retrenchment hypothesis, the coefficients on *MAJOR_FLOOD_{t-1}* are negative and statistically significant across specifications, indicating that exposure to major flood events is associated with a reduction in the likelihood of firms engaging in M&A activity in the immediate aftermath. This pattern mirrors the baseline findings, suggesting that large-scale flooding events amplify the short-run contraction in acquisition activity. While the estimated marginal effects are economically small in magnitude; reflecting the probabilistic nature of the dependent variable and the scaling of marginal effects, they remain precisely estimated and directionally consistent. Importantly, the negative impact diminishes over longer horizons, and in some cases reverses, further reinforcing the real options interpretation whereby firms delay investment under heightened uncertainty and gradually resume acquisition activity as uncertainty resolves. Overall, the results indicate that the effect of flooding is not only robust to alternative measurement but may be more pronounced when focusing specifically on major flood events.

Table 9. Major Flooding Events and M&A Activity

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
	<i>MA</i>	<i>MA</i>	<i>MA</i>	<i>ACQ</i>	<i>ACQ</i>	<i>ACQ</i>
<i>MAJOR_FLOOD_{t-1}</i>	-0.003* (0.054)			-0.003** (0.017)		
<i>MAJOR_FLOOD_{t-2}</i>		-0.001 (0.608)			-0.001 (0.540)	
<i>MAJOR_FLOOD_{t-3}</i>			0.005*** (0.000)			0.005*** (0.000)
<i>ASSETS_TOTAL</i>	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.007*** (0.000)	0.007*** (0.000)	0.007*** (0.000)
<i>LEVERAGE</i>	-0.003* (0.061)	-0.003* (0.061)	-0.003* (0.059)	-0.001 (0.473)	-0.001 (0.471)	-0.001 (0.464)
<i>CASH</i>	0.010*** (0.002)	0.010*** (0.002)	0.010*** (0.002)	0.008*** (0.003)	0.008*** (0.003)	0.008*** (0.003)
<i>SALES</i>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
<i>ROA</i>	0.012*** (0.002)	0.012*** (0.002)	0.012*** (0.002)	0.013*** (0.001)	0.013*** (0.001)	0.013*** (0.001)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	71,326	71,326	71,326	71,326	71,326	71,326
Pseudo R ²	0.096	0.096	0.096	0.096	0.096	0.096

Notes: This table presents robustness tests using major flooding events as an alternative measure of flood exposure. Columns (1)–(3) report results for overall M&A likelihood (MA), while Columns (4)–(6) examine the likelihood of becoming an acquirer (ACQ). The main explanatory variables are lagged indicators for major flooding events, defined using the Federal Emergency Management Agency (FEMA) classification for disasters requiring extensive federal assistance programs to support the recovery of affected individuals and public infrastructure. All specifications are estimated using logit regressions with marginal effects and include firm-level

control variables, State- and Year fixed effects. Standard errors are clustered at the state level, and p-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

An additional insight from these results relates to the role of extreme events in shaping aggregate patterns. Major flood events are, by definition, relatively rare, yet their economic impact is disproportionately large compared to more moderate flooding incidents. The findings suggest that these high-intensity events play a meaningful role in driving the observed relationship between flood exposure and M&A activity. This is consistent with a broader empirical pattern in event-based studies, where infrequent but severe shocks account for a substantial share of variation in outcomes. In the context of this study, the stronger and more precisely estimated effects associated with *MAJOR_FLOOD* indicate that firms' investment responses are particularly sensitive to large-scale disruptions, reinforcing the importance of accounting for event intensity when analysing the impact of environmental shocks on corporate decision-making.

5.2.3 *The Exclusion of Coastal Areas Effect*

A potential concern in interpreting the baseline results is that flood exposure may be conflated with risks specific to coastal areas, where flooding is often associated with seawater intrusion, storm surges, and hurricane-related events. In such settings, flooding may not represent an isolated environmental shock but rather part of a broader set of extreme weather phenomena that could simultaneously affect firms' operations and investment decisions. As a result, the observed negative relationship between flooding and M&A activity may partly reflect exposure to coastal disaster risk rather than flooding per se. To address this concern, it is important to isolate inland flooding events by excluding counties located along coastal areas. By isolating the effect of flooding from parallel disaster channels, this approach allows for a cleaner identification of flood events on the likelihood that firms engage in M&A transactions or act as acquirers.

To classify counties into coastal and inland groups, this study employs the publicly available *Coastline Counties List* provided by the U.S. Census Bureau, using the 2016 version as the most recent release. This dataset identifies coastal counties based on their five-digit FIPS codes and specifies the corresponding body of water bordering each county, including both saltwater coastlines and the Great Lakes. The inclusion of counties bordering the Great Lakes is consistent with the definition adopted under the Coastal Zone Management Act (CZMA), which recognises the Great Lakes as coastal zones due to their economic and environmental

significance. As discussed by Lawrence (1997), these inland water bodies are subject to similar regulatory frameworks and environmental risks as ocean coastlines. Therefore, treating Great Lakes counties as coastal is both conceptually and institutionally justified, ensuring a comprehensive classification of areas exposed to coastal-related flooding risks.

Using this classification, a *COAST* indicator is constructed by matching the FIPS codes in the Census dataset with the firm-level sample. Counties identified as bordering either ocean coastlines or the Great Lakes are coded as *COAST*, while all others are classified as inland. The model in Equation (1) is then re-estimated after excluding all coastal counties (i.e., *COAST* =1), effectively restricting the sample to inland firms only. This subsample analysis ensures that the estimated flood effects are driven by inland flooding incidents, thereby removing the influence of coastal-specific disaster mechanisms. All specifications are maintained as in the baseline, including firm-level controls and fixed effects, to ensure comparability of results.

Table 10 reports regression results using the inland-counties sample and the findings are consistent with the baseline findings. In particular, flood exposure continues to exhibit a negative and statistically significant effect on M&A likelihood in the immediate aftermath, followed by a gradual attenuation and eventual reversal in later periods. This dynamic pattern holds across both measures of acquisition activity, indicating that the real option mechanism is robust to the exclusion of coastal counties. The persistence of this temporal pattern suggests that firms' tendency to delay investment following flood exposure is not driven by coastal disaster risks but instead reflects a broader response to uncertainty induced by flooding events. Overall, these findings strengthen the causal interpretation of the baseline results by demonstrating that the documented effects are not confounded by coastal-specific environmental risks.

Table 10. Exclusion of Coastal Areas

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	<i>MA</i>	<i>MA</i>	<i>MA</i>	<i>ACQ</i>	<i>ACQ</i>	<i>ACQ</i>
<i>FLOOD_DUMMY</i> _{<i>t-1</i>}	-0.004** (0.027)			-0.004** (0.022)		
<i>FLOOD_DUMMY</i> _{<i>t-2</i>}		0.000 (0.945)			0.000 (0.960)	
<i>FLOOD_DUMMY</i> _{<i>t-3</i>}			0.004** (0.026)			0.004*** (0.008)
<i>ASSETS_TOTAL</i>	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)
<i>LEVERAGE</i>	-0.003 (0.246)	-0.003 (0.245)	-0.003 (0.245)	-0.001 (0.618)	-0.001 (0.615)	-0.001 (0.615)
<i>CASH</i>	0.007 (0.108)	0.007 (0.109)	0.007 (0.113)	0.007* (0.057)	0.007* (0.057)	0.007* (0.060)
<i>SALES</i>	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
<i>ROA</i>	0.019*** (0.002)	0.019*** (0.002)	0.019*** (0.002)	0.018*** (0.007)	0.018*** (0.007)	0.018*** (0.007)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	44,633	44,633	44,633	44,633	44,633	44,633
Pseudo R ²	0.104	0.104	0.104	0.104	0.104	0.104

Notes: This table presents robustness tests excluding firms headquartered in counties bordering coastal areas and the Great Lakes region. Columns (1)–(3) report results for overall M&A likelihood (MA), while Columns (4)–(6) examine the likelihood of becoming an acquirer (ACQ). The baseline specifications are re-estimated after excluding counties potentially exposed to additional flooding risks associated with coastal flooding, storm surges, and large water-body proximity. All specifications are estimated using logit regressions with marginal effects and include firm-level control variables, State- and Year fixed effects. Standard errors are clustered at the state level, and p-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

6 Further Discussions

While the baseline results provide support for a retrenchment response following flood exposure, financial constraints represent an important complementary channel through which flood shocks may influence firms' acquisition behaviour. Prior literature suggests that adverse shocks can tighten external financing conditions, reduce collateral values (Wang, 2023), and increase the cost of capital (Javadi & Masum, 2021), thereby limiting firms' ability to undertake large investments such as M&A transactions (Erel et al., 2012; Malmendier & Tate, 2008; Williamson & Yang, 2021). Under this framework, firms facing greater financial constraints are expected to exhibit a stronger decline in acquisition activity following flood exposure, as their limited access to external finance constrains their ability to respond to heightened uncertainty. Because these firms already face tighter repayment obligations and lower flexibility in raising additional external funds, they may be more likely to postpone acquisition activities in the aftermath of flood events.

To capture this possible mechanism, the model specification is re-estimated by incorporating an indicator variable *HIGH_LEV* to proxy for financial constraints. Based on firms' lagged leverage, the indicator *HIGH_LEV* is coded one if the firm belongs to the top tercile of lagged leverage and zero otherwise, thereby identifying firms with relatively higher financial constraints. *HIGH_LEV* is then added to Equation (1) and interacted with all lagged forms of *FLOOD_DUMMY* ($FLOOD_DUMMY_{t-i} \times HIGH_LEV_t$). Negative coefficients on the interaction terms are expected, as they would indicate that the decline in acquisition likelihood following flood exposure is more pronounced among highly leveraged firms.

Appendix 3 reports the results for considering firms' financial constraints. Contrary to prediction, the empirical results do not support the financial constraint channel. The interaction between flood exposure and high leverage is consistently positive across specifications, indicating that the negative effect of flooding on the likelihood of engaging in M&A is less pronounced among highly leveraged firms. In other words, while flood exposure is associated with a reduction in acquisition probability overall, this decline appears to be weaker for firms with higher leverage ratios. This pattern stands in contrast to the expectation that financially constrained firms should retrench more aggressively following adverse shocks and suggests that leverage does not operate purely as a proxy for financial fragility in this context.

Importantly, this pattern emerges contemporaneously rather than gradually over time. Whereas the baseline results reveal a dynamic pattern characterised by an immediate decline in acquisition activity followed by a delayed recovery, the leverage interaction suggests that highly leveraged firms do not exhibit the same waiting behaviour. This distinction implies that financial pressure may alter firms' responses to uncertainty by reducing the option value of waiting and increasing the urgency of strategic action. One possible interpretation of this finding is that leverage captures not only financial constraints but also firms' capacity or incentives to engage in strategic adjustment following disaster shocks. Unlike financially flexible firms; which may delay acquisition decisions under heightened uncertainty in line with the real options framework, highly leveraged firms may have stronger incentives to actively respond to operational disruptions. As a result, these firms may engage in acquisitions, restructuring activity, or strategic consolidation more immediately following flood exposure in an attempt to preserve operational viability, secure synergies, or stabilise financial conditions. In this sense, acquisitions may serve as a mechanism for strategic survival rather than discretionary investment, particularly in environments where inaction could exacerbate

financial distress. Alternatively, leverage may reflect firms' existing access to credit markets or established relationships with lenders, enabling them to maintain acquisition activity despite adverse conditions.

7 Conclusions

This chapter provides novel evidence on the impact of flooding on merger and acquisition activity. Specifically, I argue and provide empirical evidence that firms located in flood-affected counties become less likely to engage in deal transactions following flooding events. This pattern is initially reflected in the baseline logit regression results, which show that firms exposed to flooding experience a lower likelihood of participating in M&A activity in the year following a flood relative to firms located in unaffected areas. These findings suggest that heightened uncertainty and perceived risk associated with flood exposure reduce firms' incentives to undertake strategic investment decisions.

Experiencing operational disruptions due to flooding carries important implications for corporate investment behaviour, particularly by increasing the real option value of delaying acquisition decisions. Consistent with this interpretation, I find that firms located in flood-affected areas are significantly less likely to become acquirers in M&A transactions. Moreover, the negative effect persists for up to two years following flood exposure before gradually reversing beginning in the third year after the disaster event. This delayed reversal is consistent with a "catch-up" effect, whereby firms initially postpone acquisition activity under heightened uncertainty but subsequently resume strategic investments once conditions become more stable and uncertainty begins to dissipate.

In the final part of the analysis, I examine several potential sources of flood-induced uncertainty that may increase firms' incentives to delay M&A investments. In particular, I provide evidence related to asset tangibility, operational characteristics, and learning mechanisms. First, I show that firms with a higher proportion of fixed assets experience a more pronounced decline in M&A likelihood following flooding events, suggesting that exposure to physically vulnerable and less redeployable assets amplifies firms' sensitivity to uncertainty shocks. Second, I document heterogeneous effects associated with firms' operational characteristics by showing that the negative impact of flooding on M&A activity is stronger among firms with operations that are highly sensitive to excess water exposure, as well as firms with geographically concentrated operations. These findings indicate that firms facing greater operational

vulnerability are more likely to delay strategic investments following environmental disruptions. Finally, I find that the negative effect of flooding on future M&A activity is less pronounced among firms with prior flooding experience. This evidence is consistent with repeated exposure generating learning opportunities, allowing firms to adapt more effectively to disaster-related uncertainty over time.

Overall, the findings of this chapter carry important implications for both academics and practitioners. The empirical evidence demonstrates that flooding has real economic consequences for corporate investment and strategic decision-making by contributing to short-term retrenchment in M&A activity and value-creating investments. More broadly, this chapter highlights the importance of the M&A setting as a useful framework for examining the heterogeneous effects of natural disasters on corporate behaviour. The results also open several avenues for future research regarding the characteristics of firms that are more resilient or vulnerable to environmental shocks. For instance, future studies may further examine whether specific thresholds in firms' financial or operational conditions influence their strategic responses to natural disasters, including their willingness to engage in merger and acquisition activity under heightened uncertainty.

Appendix

Appendix 1. Variable Definitions

Variable	Description	Source
Panel A : Research Variables		
<i>MA</i>	An indicator variable that takes the value of one if a firm becomes an M&A acquirer in a given year and zero otherwise	SDC
<i>ACQ</i>	An indicator variable that takes the value of one if a firm becomes an acquirer in a completed M&A in a given year and zero otherwise	SDC
<i>TGT</i>	An indicator variable that takes the value of one if a firm becomes an target in a completed M&A in a given year and zero otherwise	SDC
<i>FLOOD_DUMMY</i>	An indicator variable that takes the value of one if a firm experiences at least one flood incident in any given year and zero otherwise	FEMA Disaster Declaration
Panel B : Firm Characteristics		
<i>ASSETS_TOTAL</i>	The natural logarithm of total value of assets in millions dollars	Compustat
<i>LEV</i>	The ratio of total debt to total assets.	Compustat
<i>CASH</i>	The ratio of total cash scaled by total assets.	Compustat
<i>SALES</i>	The natural logarithm of sales.	Compustat
<i>ROA</i>	The ratio of net profit scaled by total assets.	Compustat

Appendix 2. Propensity Score Matching (PSM) Diagnostics

Panel A: PSM Diagnostics - Treatment Model						
Variable	Before matching			After matching		
<i>ASSETS_TOTAL</i>	0.019**			0.019**		
	(0.041)			(0.049)		
<i>LEVERAGE</i>	0.003			0.003		
	(0.582)			(0.570)		
<i>CASH</i>	-0.042			-0.041		
	(0.625)			(0.635)		
<i>SALES</i>	-0.021***			-0.020**		
	(0.009)			(0.011)		
<i>ROA</i>	-0.008			-0.007		
	(0.367)			(0.389)		
State FE	Yes			Yes		
Year FE	Yes			Yes		
Pseudo R ²	0.148			0.148		
Panel B: PSM Diagnostics - Propensity Score Distance						
Mean difference	0.127					
Median difference	0.115					
Maximum difference	0.541					
Panel C: PSM Diagnostics Covariate Balance						
Variable	Before matching			After matching		
	Treated	Control	t-stat	Treated	Control	t-stat
<i>ASSETS_TOTAL</i>	6.348	6.182	-4.916	6.344	6.168	5.190
<i>LEVERAGE</i>	0.933	0.894	-1.258	0.934	0.888	-1.480
<i>CASH</i>	0.130	0.145	5.828	0.131	0.142	4.777
<i>SALES</i>	5.377	5.285	-2.567	5.374	5.29	-2.347
<i>ROA</i>	-0.289	-0.269	0.930	-0.29	-0.263	1.225

Notes: This table presents diagnostic tests for the propensity score matching (PSM) procedure used to improve comparability between flood-exposed and non-exposed firms. Panel A reports treatment-model estimates before and after matching, where flood exposure is regressed on lagged firm characteristics, including total assets, leverage, cash holdings, sales, and profitability, alongside state and year fixed effects. Panel B reports the distribution of propensity score distances between matched treated and control observations. Panel C presents covariate balance statistics before and after matching by comparing mean values between treated and control groups. Standard errors are clustered at the state level, and p-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Appendix 3. Financial Constraints and the Effect of Flooding on M&A Activity

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	MA	MA	MA	ACQ	ACQ	ACQ
<i>FLOOD_DUMMY_{t-1}</i>	-0.003** (0.026)			-0.003*** (0.003)		
<i>FLOOD_DUMMY_{t-2}</i>		-0.001 (0.429)			-0.001 (0.311)	
<i>FLOOD_DUMMY_{t-3}</i>			0.006*** (0.002)			0.005*** (0.001)
<i>HIGH_LEV_{t-1}</i>	0.004*** (0.005)	0.004*** (0.005)	0.004*** (0.005)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
<i>FLOOD_DUMMY_{t-1} x HIGH_LEV_{t-1}</i>	0.262** (0.011)			0.252*** (0.005)		
<i>FLOOD_DUMMY_{t-2} x HIGH_LEV_{t-1}</i>		0.233** (0.019)			0.236*** (0.005)	
<i>FLOOD_DUMMY_{t-3} x HIGH_LEV_{t-1}</i>			0.254*** (0.009)			0.254*** (0.003)
<i>ASSETS_TOTAL</i>	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.007*** (0.000)	0.007*** (0.000)	0.007*** (0.000)
<i>LEVERAGE</i>	-0.009*** (0.000)	-0.009*** (0.000)	-0.009*** (0.000)	-0.006*** (0.006)	-0.006*** (0.006)	-0.006*** (0.006)
<i>CASH</i>	0.010*** (0.004)	0.010*** (0.004)	0.010*** (0.004)	0.007*** (0.006)	0.007*** (0.006)	0.007*** (0.006)
<i>SALES</i>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
<i>ROA</i>	0.011*** (0.003)	0.011*** (0.003)	0.011*** (0.003)	0.012*** (0.002)	0.012*** (0.002)	0.012*** (0.002)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	71,326	71,326	71,326	71,326	71,326	71,326
Pseudo R ²	0.097	0.097	0.097	0.097	0.097	0.097

Notes: This table examines whether financial constraints moderate the effect of flooding on merger and acquisition (M&A) activity. Columns (1)–(3) report results for overall M&A likelihood (MA), while Columns (4)–(6) examine the likelihood of becoming an acquirer (ACQ). The main variables of interest are the interaction terms between flood exposure and the high-leverage indicator (HIGH_LEV), which identifies firms with relatively high leverage ratios and greater financial constraints. The interaction terms capture whether financially constrained firms exhibit different strategic responses to flooding shocks when making M&A decisions. All specifications are estimated using logit regressions with marginal effects and include firm-level control variables, State- and Year fixed effects. Standard errors are clustered at the state level, and p-values are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

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