Quantifying the Impact of Extreme Weather Insurance Costs: The LA Wildfires Case Study[1]

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Abstract

A fundamental precept of System-level Investing is that the costs of systemic risks are re-integrated into universal owners' portfolios, even if that reinternalization is difficult to quantify. This study attempts to quantify some of the costs of one specific manifestation of a systemic risk -- the 2025 Los Angeles wildfires (arguably extreme weather event aggrevated by climate change) – were reincorporated into the broader financial markets through a specific transmission mechanism: the insurance sector. Using insurer-level claim data, stock-price reactions, regulatory filings, and FAIR Plan exposure shifts, the analysis treats the disaster as a natural experiment to measure how climate-driven physical losses create both idiosyncratic and systematic (non-diversifiable) financial costs. We first assess the direct impact on publicly listed insurers and estimate a excess stock decline of nearly 4% on the securities of those companies, resulting in an approximate –0.08% immediate shock to the S&P 500 portfolio. We then construct a three-channel systemic-shock framework (premium repricing, availability constraints, and policy-driven recoupment fees) to evaluate the cost passed on to commercial policyholders. Results show that California's commercial market experienced an operating cost increase of 2.16% - 6.43%, with small-to-medium enterprises disproportionately affected. More relevant to the System-level Investing issue, however, is that by scaling California's shock nationally and allocating by corporate revenue share, we estimate a persistent S&P 500 valuation erosion of $16.5 - 21.6 billion (2.9 - 3.8 bps) caused by increased insurance costs, distinct from the one-time market decline in the directly-affected insurance companies' stock. Overall, our analysis

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suggests that climate-driven catastrophes impose a calculable "insurance cost floor" on the real economy and investment portfolios. These results highlight insurance market dislocation as an emerging channel of climate-financial transmission that warrants more academic investigation, as well the interest of regulators and investors.

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1. Introduction

The January 2025 wildfires in Los Angeles were not merely a natural disaster. They represented a systemic economic shock. As flames consumed over 55,000 acres and destroyed more than 16,000 structures, they left behind a staggering financial toll of an estimated $131 billion in total capital losses.

While the physical scars on the landscape are visible, a more insidious crisis is unfolding within the financial infrastructure that underpins the economy.

As Knox and Sørensen (2024) observe, financial markets currently lack the models to quantify how these climate externalities ripple through corporate balance sheets. Consequently, portfolios often carry a dangerous underestimation of risk.

This research seeks to illuminate that blind spot. By treating the LA wildfires as a natural experiment, we trace how physical climate risks transmute into financial costs for the S&P 500 through insurance shocks. The insurance sector incurred $45 billion in insured losses. With major carriers like State Farm and the California FAIR Plan facing multi-billion-dollar payouts, the market shifted abruptly, both in terms of availability and affordability.

While the immediate region felt most of the impact, we were also interested in understanding whether there was a broader, systematic impact on the broader capital markets.

2. Background

The insurance industry serves as a key financial risk mitigation backbone of modern society, acting as the primary buffer against economic volatility in an increasingly unpredictable world. However, a deepening crisis is unfolding in the U.S. property and casualty (P&C) insurance market. For decades, the industry relied on historical data to predict the future, but climate change is rapidly destabilizing these traditional actuarial models (J.P. Morgan, 2025). As natural catastrophes become more frequent and severe, insurers are finding that the past is no longer a reliable map for what lies ahead. Pressure from record-breaking claimes, including the estimated $45 billion in insured claims from the 2025 Los Angeles wildfires, is fundamentally reshaping the market through a continuum of repricing and retreat.

The most immediate response to this volatility is upward pressure on pricing. To offset the soaring cost of capital and catastrophe reinsurance, which doubled between 2018 and 2023, insurers raised premiums (Green Engagement, 2025). In Florida, for instance, this dynamic has pushed average homeowner rates to four times the national average (Isidore, 2023). This surge fuels the “affordability hypothesis”, creating a feedback loop where rising premiums force households to drop coverage or reduce limits. This widens the economic protection gap just as the risks are intensifying (Sastry et al., 2024).

In the most affected regions, the crisis has escalated beyond simple price hikes into a flight to safety, with major carriers strategically withdrawing to protect their profitability and/or solvency. This “insurance retreat” takes many forms, ranging from tightening underwriting standards to exiting markets entirely (Bentley et al., 2025). The impact is especially visible in California, where industry giants like State Farm and Allstate have paused new homeowner policies due to the unsustainable combination of wildfire risk and construction costs (Mac, 2023). This is not an isolated anecdote. Between 2015 and 2023, the number of home insurance policies in California’s highest-risk wildfire zones plummeted by 19% (Deep Sky Research, 2025). A similar exodus has roiled Florida, where repeated hurricane seasons have left a coverage vacuum that threatens the stability of the housing market (Roth, Jr. & Lecomte, 2005; Nevitt & Pappas, 2024).

California's regulated insurance market provides researchers with various mechanisms to understand pricing and availability. The 1988 Insurance Rate Reduction and Reform Act forbids unilateral rate changes by property insurers. Instead, they must submit detailed rate or rule applications to the California Department of Insurance (CDI), where proposed increases are evaluated for excessiveness, inadequacy, and unfair discrimination, and may be contested by publicly funded consumer intervenors. CDI's Sustainable Insurance Strategy dashboard shows that in 2024, average approval time for homeowners' filings was about 281 days, with non-intervened filings processed in roughly 256 days and intervention filings taking around 529 days. Losses from the 2025 Los Angeles wildfires therefore may not translate immediately into higher base premiums; instead, they enter a queue of Proposition 103 prior-approval filings, often accompanied by disputes over forward-looking wildfire catastrophe models and the treatment of reinsurance costs under CDI's recent rate-making reforms.

On the other hand, there is a structurally distinct channel that arises from California's insurer-of-last-resort, the California FAIR Plan Association. Established by statute as a joint reinsurance association run by all admitted property insurers, the FAIR Plan is obliged to provide basic property coverage to policyholders who cannot obtain insurance in the voluntary market As large insurers have restricted new business or non-renewed policies in wildfire-exposed ZIP codes, FAIR Plan exposure has ballooned, effectively concentrating high-risk exposures. In neighborhoods such as Pacific Palisades and Altadena, where non-renewals were already concentrated before the fires, a substantial share of the 2025 loss burden ultimately accrues to the FAIR Plan rather than to traditional carrier balance sheets (UCLA Forecast, 2025).

On 11 February 2025, CDI issued Order 2025-1 approving a $1 billion assessment on FAIR Plan member insurers after the Palisades and Eaton fires generated thousands of claims and an estimated FAIR Plan loss of roughly $4 billion (UCLA Forecast, 2025). On the same day, CDI published Bulletin 2025-4, allowing all member insurer that pays the assessment may, with the Commissioner's prior approval under Proposition 103, submit revenue-neutral rule-change applications to impose TSFs over a two-year period to recover up to 50 percent of assessment amounts up to $1 billion per line of business, and 100 percent of amounts above that threshold, subject to conditions when reinsurance reimbursements are involved. These fees must be separately itemized on policy documents and are explicitly not treated as "premium", cannot be counted as losses in future rate filings, and are levied on admitted insurers' policyholders rather than on FAIR Plan policyholders themselves, turning the FAIR Plan assessment into a pass-through, quasi-tax-like surcharge that reallocates residual-market deficits back onto private-market customers.

Climate volatility has rendered traditional actuarial models and regulatory frameworks less accurate and therefore insufficient. The result has been escalating prices, decreasing availability and a fundamental structural shift in the US property and casualty insurance market.

Regulatorily, while California's Proposition 103 aims to protect consumers, its approval lags have paradoxically accelerated insurer retreats and concentrated risk within the FAIR Plan, creating a solvency crisis for the insurer of last resort. The subsequent introduction of Temporary Supplemental Fees (TSFs) represents a critical pivot in market mechanics, effectively transforming the insurance industry from a capital buffer into a conduit for socializing catastrophe costs. Ultimately, this dynamic illustrates that as private insurers reach the limits of their risk appetite, the financial burden of climate change is being

redistributed across the broader policyholder base through quasi-tax mechanisms, permanently altering the compact between insurers, regulators, and the public.

3. Research Data & Methodology

3.1. The impact on insurance industry and the stock market

This section evaluates how the 2025 Los Angeles wildfires affected the insurance industry through underwriting losses, and stock-market reactions, and the resulting systemic transmission into the broader financial market through increased insurance costs. The analysis focuses on S&P 500-listed insurers with significant confirmed losses and quantifies how these firm-level shocks aggregate into sector-wide and index-wide impacts.

3.1.1 Research Data

The research uses a structured dataset combining financial market indicators and insurer-level stock price responses. Data are primarily drawn from two sources:

1. **Wildfire Insurance Loss:** Wildfire-related insured losses were obtained from the *UCLA Anderson Forecast* (2025), which reports USD 26.7 billion in total economic losses across Southern California. The dataset identifies ten insurers with the largest exposures, including State Farm, the California FAIR Plan, Allstate, Farmers, Mercury Insurance, USAA, Travelers, Chubb, Liberty Mutual, and Berkshire Hathaway. These figures form the basis for determining which firms faced material financial hits.
2. **Market Reaction and Financial Data:** Stock price data for S&P 500-listed insurers were sourced from *Yahoo Finance* (2025). Four listed companies, Allstate (ALL), Chubb (CB), Travelers (TRV), and Berkshire Hathaway (BRK.B), had measurable market reactions on January 10, 2025, when claim exposures became public. These prices were used to compute firm-level percentage declines and a claim-weighted average shock.

Additional reference data, including S&P 500 index performance and the U.S. insurance subindex (IAK ETF), were used to contextualize whether the wildfire shock remained sector-specific or spilled into the broader financial market. The combined dataset includes: reported claim severity (in USD billions), insurer stock price changes (%), market capitalization weights, and index movements. This allows the study to quantify both the micro-level (individual insurer) and macro-level (S&P 500) impacts.

3.1.2 Assumption

Several analytical assumptions were necessary to align the research with available market information and to ensure consistency in interpreting the wildfire-induced shock:

1. **Claim-Weighted Representation of Exposure:** Only four publicly traded insurers among the top ten exposure holders are components of the S&P 500. The analysis assumes that these four firms, ALL, CB, TRV, BRK.B, provide a representative proxy for the market reaction attributable to the wildfire, even though several large private insurers (e.g., State Farm, Farmers, Mercury) absorb significant losses. This implies that market-visible shocks reflect only the listed portion of true industry losses.

2. **Temporal Causality:** It is assumed that stock price reactions observed on January 10, 2025, were primarily driven by public disclosure of wildfire-related claim estimates, as no other competing major financial shocks occurred on that date.
3. **Market Efficiency Assumption:** The methodology assumes semi-strong market efficiency: publicly announced catastrophe losses are incorporated quickly into stock prices, making daily returns an appropriate indicator for short-run economic impact.
4. **No Secondary Effects:** This analysis does not incorporate potential second-order effects such as reinsurance impacts, capital-raising activities, or long-term premium adjustments, focusing only on immediate market reactions.

3.1.3 Method

To quantify the impact of the LA wildfires on the insurance industry, a four-step analytical framework was applied, drawing directly from the empirical workflow used in the research dataset. The summary of calculations of direct loss exposure and its impact to S&P 500 portfolio is as follows:

Table 1. Calculation steps of direct loss exposure of insurance claim to S&P 500 portfolio

Steps	Processes
Step 1: Identification of Insurance Claim	Map all reported insurance claims in LA during the LA wildfires 2025. Filter companies that are listed in the S&P 500
Step 2: Finding the Immediate Market Reaction	Empirical analysis of stock price changes of the mapped insurance company during the disaster. Then, aggregate the stock price changes as a sub-index insurance industry. $$\Delta Price\_weighted = \frac{\Sigma_i(Claims_i \times \%\Delta Pi)}{\Sigma_i Claims_i}$$
Step 3: Comparison with Index and Subindex Movements	Comparing the stock price changes with the Index and Subindex movement during the same time period.
Step 4: S&P 500 Shock Calculation	Shock (%) = W x (ΔP/P) Where: W = weight of all S&P 500 insurance companies that were claimed during the LA 2025 wildfires

1. **Identification of Loss-Exposed Insurers**
   Reported claim amounts from the UCLA study were mapped to insurers, then filtered to isolate companies listed in the S&P 500. This step ensures relevance to financial market indicators.
2. **Estimating Immediate Market Reaction**

Daily stock price changes for each listed insurer (ALL, CB, TRV, BRK.B) on January 10, 2025, were extracted.

A claim-weighted stock price change was then computed:

$$\Delta Price\_weighted = \frac{\Sigma_i(Claims_i \times \%\Delta Pi)}{\Sigma_i\, Claims_i} \quad (3\text{-}1)$$

3. **Benchmark Comparison with Sector and Index Movements**
   The stock price movements of the loss-exposed insurers were compared with broader financial benchmarks to contextualize their market reaction. This involved collecting the same-day percentage changes of the U.S. Insurance Subindex (IAK ETF) and the overall S&P 500 Index and aligning these series with the firm-level return data. The purpose of this comparison is to distinguish firm-specific shocks from sector-wide or market-wide movements by evaluating whether observed price changes deviate from general index trends. Through this approach, the analysis isolates the relative magnitude of the insurance industry's reaction within the broader financial market environment.
4. **S&P 500 Shock Calculation**
   After computing the claim-weighted stock price change of the affected insurers, this value is multiplied by the aggregate S&P 500 weight of the claimed insurance companies. This step converts firm-specific returns into an aggregate contribution, allowing the analysis to estimate the marginal impact of the wildfire shock on overall market performance. Through this procedure, the study isolates the incremental effect of the insurance industry shock on the S&P 500.

3.2 The impact on general industry

This section details the analytical framework employed to quantify the systemic insurance shock transmitted through California's commercial property insurance market following the 2025 Los Angeles wildfires. The study period is the post-disaster interval from February 1, 2025, to September 30, 2025. The assessment focuses on the impact from three different cost transmission channels that happened in the study period that could influence insured companies: premium changes, availability constraints reflected in residual market displacement, and policy-driven cost recoupment authorized under regulatory mechanisms.

3.2.1 Research Data

Our data was compiled from multiple regulatory sources capturing pricing dynamics, capacity constraints, and cost pass-through mechanisms. In this study, we focus exclusively on three primary commercial insurance lines: Commercial Multiple Peril (CMP), Fire and Allied Lines. These categories were selected because they represent the core insurance lines that cover physical damage and business interruption from fire risks. Specifically, Businessowners lines under CMP (BOPs), designed for small to medium-sized businesses with fewer than 100 employees and revenues under $5 million, bundle general liability, commercial property, and business interruption coverage into simplified packages(NAIC, 2025b). Other CMP policies serve larger enterprises or businesses facing specialized risks, offering more

comprehensive and customizable property beyond standard BOP coverage (NAIC, 2025a). Fire and Allied Lines products provide standalone coverage protecting commercial real and personal property against fire, lightning, windstorm, hail, water damage, explosion, and other specified perils, including business interruption and loss of rents (NAIC, 2025a; Insurance Information Institute, 2025). Aggregating these three categories ensures the dataset covers the complete range of commercial liabilities exposed to the LA wildfire event.

To quantify the impact on these specific commercial lines, we collected filing records from the California Department of Insurance's (CDI) Rate Filing Search(CDI, 2025). The CDI system categorizes commercial insurance lines into 4 different filing types, *Rate*, *Rule Change*, *New Program*, and *Form,* based on the purposes of each submitting application(CDI, 2025). In order to collect data to observe the premium change and proposed recoupment fee, we only collected *Rate and Rule Change* documents that insurance companies submit between Feb 1, 2025 to Sep 30, 2025.

1. **Premium Changes:** To measure direct repricing responses, we filtered specifically for filings designated as "Rate" type. For each insurer group within the target commercial lines, we extracted the most recent *proposed overall rate impact* submitted to the regulator between February 1, 2025, and September 30, 2025. This approach isolates the explicit premium adjustments insurers deemed necessary following the wildfire event.
2. **Recoupment Fees:** To capture policy-driven costs related to the Temporary Supplemental Fee (TSF), we targeted filings designated as "Rule Change". Unlike standard rate adjustments, TSFs are typically submitted as rule modifications to existing policy structures. From these documents, we extracted the specific *TSF percentage* calculated and submitted by the insurers to recoup their assessed share of FAIR Plan losses (CDI, 2025c).

Additionally, to calculate market-wide impacts, we used the data from CDI's report to establish both insurer weights and the aggregate market baseline. First, to weight individual insurer rate changes relative to their market presence, we collected each insurance group's market share from 2024 California Property and Casualty Market Share Report (CDI, 2025b). Second, to establish the denominator for the availability shock metric, we calculated the statewide commercial property market size using data from 1991-2024 CALIFORNIA P&C HISTORICAL PREMIUM AND LOSS report (CDI, 2025a). This baseline aggregates premiums from Fire ($2.5 billion), Allied Lines ($1.1 billion), and the Non-Liability Commercial Multiple Peril ($4.1 billion).

To measure changes in insurance availability, we collected commercial exposure and premium data from the California FAIR Plan official website at two time points: before (t_0) and after (t_1) the Los Angeles wildfires. The FAIR Plan serves as a direct indicator of market capacity constraints, as businesses unable to obtain coverage in the standard market are displaced into this residual mechanism. We calculated the FAIR Plan's commercial rate per $100 of exposure to convert exposure increases into premium-equivalent values comparable to direct market pricing.

3.2.2 Assumption

The following structural and methodological assumptions are necessary to align the analytical framework with the available market data:

1) **Market-Share Weighting Validity:** To weight insurer impacts, we utilize the *2024 California Property and Casualty Market Share Report* (CDI, 2025b). We assume that total Property and Casualty (P&C) market share figures provide a valid proxy for an insurer's specific presence in commercial property lines. This implies that a carrier's overall P&C market size is proportional to its exposure in the commercial sector.
2) **Regulatory Approval Bounds:** Given California's prior-approval environment, we construct an upper-bound scenario (assuming all pending filings are approved as filed) and a lower-bound scenario (including only filings approved by the data collection date). We assume actual market outcomes will fall within this transparent range.
3) **Comprehensive Channel Coverage:** We assume that the three transmission channels—pricing, availability, and recoupment—collectively capture the full scope of systemic cost increases. The additive structure of our model assumes these channels operate independently without significant nonlinear interaction effects.
4) **FAIR Plan as the Sole Residual Mechanism:** We assume that the California FAIR Plan serves as the exclusive alternative for commercial enterprises unable to secure coverage in the voluntary market. This assumption explicitly implies that policyholders displaced from the admitted market do not migrate to the Excess and Surplus (E&S) lines. Consequently, growth in FAIR Plan commercial exposure is interpreted as capturing the full extent of capacity contraction in the standard market, and its premium-equivalent value provides a valid measure of the implicit cost associated with reduced availability.
5) **Temporal Causality:** Filings and exposure shifts observed within the study window (February–September 2025) are assumed to be causally attributable to the January 2025 wildfires, given the temporal proximity and absence of confounding catastrophic events.

3.2.3 Method

We developed a composite measurement framework that integrates the three transmission channels into a unified system-level shock indicator. Each channel is quantified using market-share weighted aggregation methods and combined additively.

1) Direct Pricing Changes

To measure the immediate repricing response, we calculated market-weighted rate changes across all commercial property "Rate" filings. For each insurer group i, the proposed rate change is weighted by its market share. The formulas below show the upper-bound (3-2) which assumes every pending request is approved, and lower-bound (3-3) market impact which includes only approved filings.

$$\overline{\%\Delta R^{max}} = \sum_{i=1}^{N} (Proposed\%_i \times MarketShares_i) \tag{3-2}$$

$$\overline{\%\Delta R^{min}} = \sum_{i=1}^{N} (Approved\%_i \times MarketShares_i) \tag{3-3}$$

The calculation will reflect the direct price change approved through rate-filing procedures. This represents the explicit revisions to policy rates that insurers request and regulators authorize. It captures how companies immediately reprice coverage in response to heightened loss expectations, increased reinsurance costs, or updated catastrophe models following the wildfire.

2) Availability Changes via Residual Market Inflow

We treated growth in the FAIR Plan commercial exposure as evidence of voluntary market capacity tightening. This shift was valued at the FAIR Plan's own pricing and scaled by the statewide premium base. First, we calculated the FAIR Plan's commercial rate per $100 of exposure at time :

$$RP\$100_{FAIR,tl}^{Commercial} = \frac{Premium_{FAIR,tl}^{Commercial}}{Exposure_{FAIR,tl}^{Commercial}} \times 100 \tag{3-4}$$

Next, we computed the availability shock (U_{avail}) as the premium-equivalent value of the exposure increase, scaled by California's total commercial property premium base (β_{CA}):

$$U_{avail} = \frac{\frac{(\Delta Exposure_{FAIR}^{Commercial})}{100} \times RP\$100_{FAIR,tl}^{Commercial}}{\beta_{CA}} \tag{3-5}$$

The result will show the indirect price pressure caused by changes in insurance availability. When underwriting capacity tightens and more risks are displaced into the California FAIR Plan, firms face higher effective costs of obtaining coverage even if nominal rates remain unchanged. This indirect component measures how market accessibility and capacity constraints contribute to the overall cost burden experienced by insurance policyholders.

3) Policy-Driven Cost Transmission (TSF)

Using the "Rule Change" filings data, we applied the same market-share weighting methodology to quantify the TSF impact. Additionally, we also considered the Upper- (3-6) and lower- (3-7) bound scenarios to reflect regulatory uncertainty.

$$\overline{TSF\%} = \sum_{i}^{N} (ProposedTSF\%_i \times MarketShares_i) \quad (3\text{-}6)$$

$$\overline{TSF\%} = \sum_{i}^{N} (ApprovedTSF\%_i \times MarketShares_i) \quad (3\text{-}7)$$

The TSF% calculation result will capture the policy-driven cost pass-through resulting from Temporary Supplemental Fees (TSFs). TSFs are short-term surcharges authorized by the California Department of Insurance that allow admitted insurers to recoup a portion of FAIR Plan assessments following catastrophic losses. Filed as rule changes under Proposition 103, these surcharges are expressed as a percentage of premium and are generally collected for one or two policy years. TSFs therefore serve as a regulatory bridge between residual-market financing and direct policyholder costs, expanding the scope of systemic stress beyond base-rate changes and availability shifts.

4) Composite System Shock

With these three factors, we can composite the total market stress by summing the pricing, availability, and recoupment channels:

$$System\ Shocks\ \% = \overline{\%\Delta R} + U_{avail} + \overline{TSF\%} \quad (3\text{-}8)$$

This composite indicator captures the total cost increase experienced by commercial purchasers. It aggregates explicit rate revisions $\%\Delta R$, indirect price pressure from capacity constraints U_{avail}, and policy-mandated cost pass-through $TSF\%$. This methodology maintains a market-level analysis, mirroring how investors experience post-event repricing as a system-wide phenomenon.

4.Results

4.1. Impact on Insurance Industry Due to Claims

The 2025 Los Angeles wildfires brought economic losses across Southern California, inflicting widespread destruction on residential, commercial, and public properties. According to the *UCLA Anderson Forecast* (2025), total insured losses reached approximately USD 26.7 billion, concentrated among ten major insurers. To systematically estimate how these wildfire-related losses translated into financial market impacts, particularly within the S&P 500, a four-step analytical approach was used.

Step 1 involved identifying all major insurance claim data reported in the UCLA study and filtering for companies listed in the S&P 500. Step 2 examined the immediate market reaction by tracking each listed insurer's stock price movements around the wildfire event, followed by aggregation into a claim-weighted average to represent the insurance sub-index response. Step 3 compared these stock price changes with broader market indicators, specifically, the overall S&P 500 Index and the U.S. Insurance Subindex (IAK ETF), to assess whether the shock was localized or systemic. Finally, Step 4 calculated the resulting S&P 500 shock, expressed as a percentage change derived from the weighted decline of the insurance sector within the total market capitalization.

4.1.1 Identification of Insurance Claim

The 2025 LA wildfires brought enormous economic losses across Southern California, inflicting widespread destruction on residential, commercial, and public properties. According to the UCLA Anderson Forecast (2025), total insured losses reached approximately USD 26.7 billion, concentrated among ten major insurers. The largest exposures came from State Farm (USD 7.6 billion) and the California FAIR Plan (USD 4.8 billion), followed by Allstate (USD 2.47 billion), Farmers Insurance (USD 2.15 billion), Mercury Insurance (USD 2 billion), USAA (USD 1.8 billion), Travelers (USD 1.7 billion), Chubb (USD 1.5 billion), Liberty Mutual (USD 1.4 billion), and Berkshire Hathaway (USD 1.3 billion). The following table highlights the most significant claims that occurred during the 2025 LA Wildfires:

Table 2. LA Wildfires 2025 Insurance Provider and Claims Data

Insurance Company	**Estimated 2025 LA Wildfire Claims in Billion USD**
State Farm	7.6
California FAIR Plan (Residual Market Insurer of Last Resort)	4.8
Allstate	2.47
Farmers Insurance	2.15
Mercury Insurance	2
USAA	1.8
Travelers	1.7
Chubb	1.5
Liberty Mutual	1.4
Berkshire Hathaway (Geico & General Re)	1.3
Total	**26.72**

4.1.2 Finding the Immediate Market Reaction

To measure the market response to the wildfire losses, daily price data from Yahoo Finance (2025) were observed for January 10, 2025, the day when insurers publicly confirmed significant claim exposures. It is important to acknowledge that the timing of stock price reactions may not perfectly coincide with the exact date of the public notice. Investors can incorporate information gradually, both in anticipation of formal disclosure and in the days that follow, so the true market adjustment may be

distributed over a short event window rather than concentrated on a single trading day. In many event-study settings, this is captured by using a range of dates around the announcement. In this study, however, we use January 10, 2025 as a representative event day for consistency in data collection. As a result, the reported percentage changes should be interpreted as an approximation of the immediate market reaction within that broader decision window, rather than as a precise measure of the full adjustment process. The four S&P-listed insurers showed the following changes:

Table 3. S&P 500 Listed Insurance Provider and Stock Price Changes

Company	**Ticker**	**Claim in Bill USD**	**Stock price changes**
Allstate Corporation	ALL	2.47	-5.60%
Chubb Ltd.	CB	1.5	-4.30%
Travelers Companies,Inc.	TRV	1.7	-3.40%
Berkshire Hathaway (Geico & GeneralRe)*	BRK.B	1.3	-1.20%
Total		6.97	

*berkshire hathaway is index reaction, and only small portion impact from Geico and GeneralRe

Based on that, we calculated claim-weighted stock price changes as follows:

$$\Delta Price\_weighted = \frac{\Sigma_i(Claims_i \times \%\Delta Pi)}{\Sigma_i\, Claims_i} \Delta Price\_weighted$$

$$= \frac{(2.47\ x\ -5.6) + (1.5\ x\ -4.3) + (1.7\ x\ -3.4) + (1.3\ x\ -1.2)}{6.97}$$

$$\Delta Price\_weighted = \frac{-27.2622}{6.97}$$

$$\Delta Price\_weighted = -3.96\%$$

The claim-weighted decline among the four firms was approximately $\mathbf{-4\%}$. This represents the direct market impact on insurers most exposed to the disaster.

4.1.3 Comparison with Index and Subindex Movements

While these insurers experienced steep declines, the iShares U.S. Insurance ETF (IAK), which tracks a broader basket of American insurance companies, fell by about −1.2 percent on the same day (Yahoo Finance, 2025).

Table 4. Market Movement Comparison with Index and Subindex

Level	**Approx. Change (%)**	**Comment**
Exposed firms (ALL, CB, TRV, BRK.B)	$\approx -4\ \%$	Direct losses from LA wildfires

Insurance subindex (IAK ETF)	≈ −1.2 %	Broader sector, smaller exposure

4.1.4 S&P 500 Shock Calculation

Using the combined S&P 500 weight of the four exposed insurers as explained in Table 5. (approximately 2% of the index), the impact on the S&P 500 is obtained by multiplying claim-weighted stock price changes by the exposed insurers. This decomposition implies an aggregate S&P 500 shock of about **–0.08 percent**, which corresponds to roughly **USD 46 billion** in market value losses.

Table 5. Stock Weight of Four Exposed Insurers

Company	**Ticker**	**Stock Weight**
Allstate Corporation	ALL	0.1%
Chubb Ltd.	CB	0.2%
Travelers Companies,Inc.	TRV	0.1%
Berkshire Hathaway (Geico & GeneralRe)*	BRK.B	1.6%
Total		2.0%

4.2. Impact on General Companies Due to Change of Insurance Cost

By aggregating data from direct rate filings, residual market shifts, and regulatory recoupment requests from CDI's Rate Filing Search(CDI, 2025), we estimate the total percentage increase in insurance costs for the California commercial property market following the 2025 Los Angeles wildfires.

4.2.1. Pricing change after LA wildfire

To quantify the immediate repricing of risk, we analyzed commercial property rate filings submitted to the California Department of Insurance (CDI) between February 1, 2025, and September 30, 2025. The dataset comprises 12 distinct filings across the BOP, CMP, and Fire & Allied Lines categories, representing insurers groups that collectively hold 21.84% of the statewide commercial market.

Table 1 summarizes the weighted impact of these rate adjustments. The results indicate a significant upward shift in pricing baselines:

1) **Whole market Impact**: Table 1 summarizes the weighted impact for the general market, inclusive of small-to-medium enterprises (SMEs) reliant on Businessowners Policies. The results indicate a significant upward shift in pricing baselines:

    A. **Lower-Bound Impact :** Based on filings already approved by the CDI, we used formula 3-3 to calculate the minimum market premium shock. It shows that the market-wide weighted average premium rate increase is 0.27%.
    B. **Upper-Bound Impact :** When including pending filings currently under regulatory review, the results of potential weighted average premium increase rises to 5.12%. The

calculation is calculated based on formula 3-2. This figure captures the full extent of insurers' requested repricing in response to updated loss expectations.

2) **Impact on small-to-medium enterprises (SME) and Large Corporations:** We performed a secondary segmentation to assess the impact on SME and large corporate entities (e.g., S&P 500 constituents). Since standard Businessowners Policies (BOP) typically impose eligibility caps on revenue and employee count, they are generally not applicable to large corporations and we only included this type of insurance when calculating the impact on SMEs.

   A. SME Lower-Bound: Including BOPs and Fire and Allied lines, the lowest overall impact on SMEs is 0.45%.

   B. **Large Corporate Lower-Bound:** Excluding BOPs, the realized rate increase for large firms is 0.39%.

   C. **SME Lower-Bound:** The potential maximum market impact on SMEs is 4.30%.

   D. **Large Corporate Upper-Bound:** The potential maximum rate increase for large firms adjusts to 1.39%.

Table 6. Weighted Analysis of Direct Rate Filings (Post-Wildfire)

Insurance Group	type	Product	Latest Propose Rate Change	Market Share	Market Impact	Status
Chubb Ltd Grp	MULTI-PERIL	BUSINESSOWNERS	14.60%	3.09%	0.45%	Approved
LIBERTY MUT GRP	MULTI-PERIL	COMMERCIAL MULTIPLE PERIL	10.90%	3.61%	0.39%	Approved
BERKSHIRE HATHAWAY GRP	MULTI-PERIL	BUSINESSOWNERS	45.80%	6.17%	2.83%	Pending
FEDERATED MUT GRP	MULTI-PERIL	BUSINESSOWNERS	29%	0.22%	0.06%	Pending
OREGON MUT GRP	MULTI-PERIL	BUSINESSOWNERS	26.30%	0.09%	0.02%	Pending
CNA Ins Grp	MULTI-PERIL	BUSINESSOWNERS	25.90%	1.35%	0.35%	Pending
ACP Ins Mgmt LLC Grp	MULTI-PERIL	BUSINESSOWNERS	15.50%	0.06%	0.01%	Pending
NATIONWIDE CORP GRP	FIRE AND ALLIED LINES	COMMERCIAL PROPERTY	14.20%	1.75%	0.25%	Pending
OREGON MUT GRP	FIRE AND ALLIED LINES	COMMERCIAL PROPERTY	32%	0.09%	0.03%	Pending
ICW Grp Assets Inc Grp	FIRE AND ALLIED LINES	COMMERCIAL PROPERTY	28%	0.80%	0.23%	Pending
The Hanover Ins Grp	FIRE AND ALLIED LINES	COMMERCIAL PROPERTY	19.50%	0.41%	0.08%	Pending
Travelers Grp	MULTI-PERIL	COMMERCIAL MULTIPLE PERIL	10.00%	4.21%	0.42%	Pending

Note. Market share data sourced from CDI (2024). Approved Rate Change reflects finalized regulatory decisions; Proposed Rate Change reflects the potential adjustment

4.2.2. Availability change after LA wildfire: Residual-market inflow as a premium-equivalent share

The data extracted from California FAIR Plan websites shows that there is a substantial surge in commercial risk exposure in 2025. Total commercial insurance exposure in the residual market rose from $26.6 billion in September 2024 (*t0*) to $49.4 billion in September 2025 (*t1*) (see figure 1). This represents a net displacement of $22.8 billion in exposure that was unable to secure coverage in the voluntary market. At time *t1*, the FAIR Plan reported $218.1 million in commercial direct written premiums against this exposure base (see figure 2).

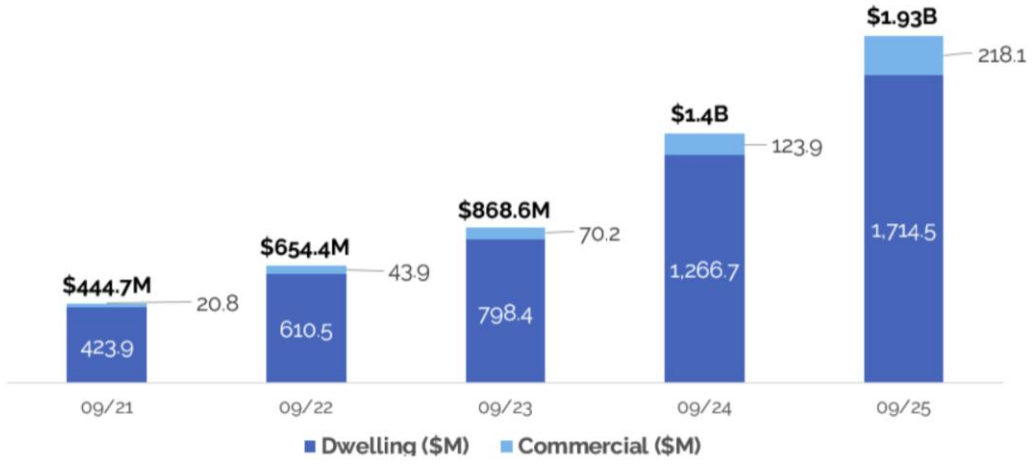

Figure 1. The written premium change from 2024~2025

Source: California FAIR Plan Official Website

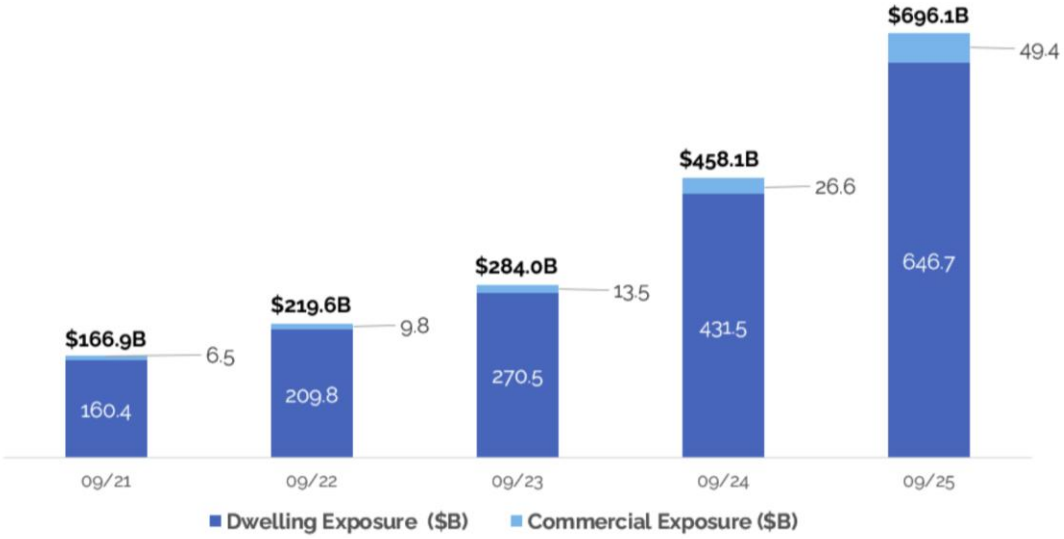

Figure 2. The exposure change from 2024~2025

Source: California FAIR Plan Official Website

Besides the residual market data, we collected specific "Property-Only" market data to set the baseline from CDI's *1991-2024 CALIFORNIA P&C HISTORICAL PREMIUM AND LOSS* report. As detailed in Table 7, we aggregated β_{CA} from three specific lines: Fire ($2.50 billion) , Allied Lines ($1.11 billion) , and the Non-Liability Commercial Multiple Peril ($4.08 billion). The resulting aggregate baseline is $7.70 billion.

First, we calculated the FAIR Plan's implied rate at $t1$ to be approximately $0.44 per $100 of exposure. By applying this rate to the net displaced exposure ($\Delta Exposure_{FAIR}^{Commercial}$ = $22.8 billion), we derived a premium-equivalent implicit cost of $100.7 million. When this cost is divided by the statewide market baseline ($7.70 billion), the resulting system-wide availability shock is about 1.31% (See Table 7).

Table 7. Derivation of Availability Shock and Market Baseline Construction

Metric	Variable	Value	Source
Residual Market Shift	$Exposure_{FAIR,t1}^{Commercial}$	$49.4 Billion	(California, Fair Plan Association, 2025)
	$Exposure_{FAIR,t0}^{Commercial}$	$26.6 Billion	(California, Fair Plan Association, 2025)
	$\Delta Exposure_{FAIR}^{Commercial}$	$22.8 Billion	Calculated (t1−t0)
Residual Market Cost	$Premium_{FAIR,t1}^{Commercial}$	$218.1 Million	(California, Fair Plan Association, 2025)
	Implied Rate per $100 (R)	$0.44	Calculated
	Implicit Cost of Unavailability	$100.7 Million	$\Delta Exposure_{FAIR}^{Commercial}$ × ($0.44÷100)
Statewide Baseline	Fire	$2,504,547,235	(CDI, 2025a)
	Allied Lines	$1,109,288,292	(CDI, 2025a)
	CMP Non-Liability	$4,082,980,799	(CDI, 2025a)
	Total Market Premium Base	$7,696,816,326	Sum of Lines
Final Result	Availability Shock (Uavail)	1.31%	Implicit Cost /Market Base

4.2.3 Policy-driven cost transmission after the LA wildfire: Temporary Supplemental Fees (TSFs)

The third transmission channel captures the specific "Rule Change" filings submitted to implement Temporary Supplemental Fees (TSF). These fees are designed to recoup assessments levied by the FAIR Plan following catastrophic losses.

Our analysis identified 21 TSF filings applicable to commercial property lines. Unlike standard rate changes which adjust for future risk, these fees represent a retrospective cost recovery passed directly to policyholders, which is a short-term and temporary impact.

1) **Lower-Bound TSF:** The weighted average of currently authorized recoupment fees calculated based on formula 2-5 is 0.1301%.
2) **Upper-Bound TSF:** Assuming approval of all pending TSF requests, the total policy-driven surcharge amounts to 0.817% of the market premium base. This result is calculated based on the formula 2-6.

Table 8. Weighted Analysis of Temporary Supplemental Fee (TSF) Filings

Parent Group	Latest Proposed TSF %	Market Share (2024)	Market Impact	Collection Period	CDI Status
Allstate Insurance Company	0.38%	4.91%	0.0186%	One year	Approved
WR Berkley Corp GRP	0.22%	0.60%	0.0013%	Two years	Approved
MERCURY GEN GRP	0.19%	4.14%	0.0079%	Two years	Approved
Church Mutual Insurance Company, S.I.	0.31%	0.09%	0.0003%	Two years	Approved
Fairfax Insurance Group	0.27%	0.77%	0.0021%	Two years	Approved
Federated Mutual Insurance Company	0.27%	0.23%	0.0006%	One year	Approved
Grange Insurance Group	0.23%	0.17%	0.0004%	One year	Approved
Nationwide Insurance	0.38%	2.37%	0.0089%	Two years	Approved
Sentry Insurance Group	2.34%	0.35%	0.0082%	Two years	Approved
State Farm General Insurance	0.81%	9.69%	0.0785%	Two years	Approved
WT Holdings Grp	0.07%	0.16%	0.0001%	Two years	Approved
The Hartford Ins. Group	0.14%	2.22%	0.0031%	One year	Approved
AmTrust Group	0.20%	1.15%	0.0023%	Two years	Pending
American Intl Grp (AIG)	2.16%	0.99%	0.0212%	Two years	Pending
Assurant, Inc. Group	0.80%	0.52%	0.0042%	Two years	Pending
AUTO OWNERS GRP	0.09%	0.45%	0.0004%	Two years	Pending
Berkshire Hathaway	10.28%	6.17%	0.6345%	Two years	Pending
Chubb Ltd Grp	0.13%	3.09%	0.0039%	Two years	Pending
Farmers Insurance Group	0.23%	7.48%	0.0172%	One years	Pending
MS & AD Insurance Group	0.67%	0.46%	0.0030%	Two years	Pending

Tiptree Fin Grp	0.17%	0.12%	0.0002%	Two years	Pending

4.2.4. Composite System Shock

Table 9 presents the aggregate results of the systemic shock assessment. By summing the impacts from direct pricing, availability constraints, and policy-driven recoupment, we estimate that the California commercial property insurance market experienced a permanent cost shock ranging from 2.16% to 6.43% and in short-term, the number is 2.29% to 7.25%. Crucially, since policy-driven recoupment fees (TSFs) function as retrospective cost recovery mechanisms typically collected over a limited one- to two-year window, they represent a temporary financial surcharge. This structural difference enables us to further decompose the total impact into a "short-term shock" and a "permanent shock" driven by enduring base rate revisions and availability constraints.

Table 9. Composite System Shock

Transmission Channel	Metric	Whole Market	Large Corp	SMEs
Direct Pricing	$\%\Delta R$	0.85% – 5.12%	0.39% – 1.39%	0.45%-4.30%
Availability	U_{avail}	1.31%	1.31%	1.31%
Permanent System Shock	Σ	2.16% - 6.43%	1.7% - 2.7%	1.76%- 5.61%
Recoupment Fees	TSF%	0.13%-0.82%	0.13%-0.82%	0.13%-0.82%
Short-term System Shock	Σ	2.29% – 7.25%	1.83%- 3.52%	1.89% - 6.43%

The aggregated results reveal a divided market reality where the burden of post-disaster adjustments falls heavily on the general industry. While the short-term systemic shock for Large Corporations remains relatively contained between 1.83% and 3.52%, Small-to-Medium Enterprises (SMEs) face a significantly steeper cost escalation. Their total cost shock ranges from 1.89% up to 6.43%. On the other hand, the permanent systemic shock for Large Corporations is between 1.7% and 2.7%, and the SMEs' is from 1.76% up to 5.61%. The gap between Large Corporations and SMEs indicates that insurers are more aggressively raising rates within the Businessowners Policy lines to stabilize their portfolios. Through this result, we know that commercial entities will confront a material increase in operating expenses upon policy renewal. The data suggests that the cost of risk in California has fundamentally shifted, and SMEs will bear the majority of this financial pressure through higher premiums and restricted market access.

5. Valuation impact

To quantify the materiality of the insurance shock on S&P 500 shareholder value, we employed a top-down extrapolation model. This framework scales the calculated California-specific premium shock

to a national level based on the state's share of the U.S. commercial insurance market, allocates the cost burden to the S&P 500 sector, and applies a current market valuation multiple to estimate the aggregate market capitalization erosion.

First, we established the direct annual cost increase for the California commercial property market using the results from Section 3.2.4. The influenced commercial insurance line premium in California is calculated at $7.70 billion, derived from aggregating Fire, Allied Lines, and Non-Liability CMP premiums. Then, we applied the short-term large corporate Upper-Bound Shock of 3.52%. This rate reflects the specific pricing pressure on non-BOP commercial lines combined with availability and recoupment costs. Therefore, we can calculate the total premium shock in the California market would be $271 million.

Next, we assumed that the pricing signals observed in California act as a bellwether for systemic climate repricing, we then extrapolated this localized shock to the national level using empirically derived market share data. According to CDI's *2024 CALIFORNIA P&C PREMIUM AND LOSS SUMMARY*, California's total Property and Casualty direct written premium was $106.6 billion. When measured against the total U.S. P&C market volume of approximately $975.0 billion (NAIC, 2025), California represents 10.9% of the national market. Scaling the California-specific shock by this factor yields an implied national commercial property premium shock of $2.48 billion, representing the potential aggregate cost increase across the U.S. economy if similar risk-adjusted pricing corrections were applied nationwide.

After getting the national premium shock, we allocated a portion of this national cost burden specifically to the S&P 500 index based on its domestic economic footprint. According to FactSet (2025) data, the S&P 500 generated a total LTM revenue of $17.97 trillion, with 57.9% of this revenue derived specifically from the United States. This translates to an S&P 500 U.S. Revenue Base of approximately $10.41 trillion. When benchmarked against the total U.S. business turnover of $22.86 trillion, calculated using the latest trailing twelve-month data from the Census Bureau, the S&P 500 accounts for approximately 45.54% of total U.S. commercial activity. Applying this allocation factor to the national premium shock yields an incremental annual insurance cost of $1.13 billion specifically attributable to the S&P 500 index. This allocation methodology rests on the structural assumption that commercial property insurance expenditures are positively correlated with corporate revenue generation.

Finally, to estimate the long-run shareholder value erosion, we apply a Discounted Cash Flow (DCF) perpetuity framework, treating the annual insurance cost shock as a permanent reduction in Free Cash Flow to the Firm (FCFF).

For the discount rate, we employ a Weighted Average Cost of Capital (WACC) of 8.48% and an effective tax rate of 6.75%, sourced from Damodaran's (2025) Total Market (excluding financials) dataset. We use the Total Market WACC as our best available proxy for S&P 500 constituents. This approach is justified given that S&P 500 companies represent approximately 80% of total U.S. market capitalization, making the Total Market metrics heavily weighted toward these large-cap firms.

Then, we set the terminal growth rate at 3.6%, based on Congressional Budget Office's (2025) long-term economic projections. The CBO reports that real GDP growth averaged 2.5% per year over the past 30 years, but projects it will average only 1.6% per year over the next 30 years. Combining this 1.6%

real growth projection with the Federal Reserve's 2% long-term inflation target (2025) yields a nominal growth rate of 3.6%. The valuation impact is calculated as follows:

$$Short-term\ Valuation\ Erosion = \frac{1.13\ B\ \times (1-6.75\%)}{8.48\% - 3.6\%} = 21.57\ billion \tag{4-1}$$

Relative to the S&P 500's aggregate market capitalization of $56.31 trillion, this represents a reduction of 0.038%, or approximately 3.8 basis points. By the same logic, the valuation framework can be extended by substituting the permanent large corporate upper bound premium increase to estimate the upper range of structural enterprise value erosion. The permanent valuation erosion on S&P 500 after the event is 16.54 billion, about 2.9 basis points decrease.

$$Permanent\ Valuation\ Erosion = \frac{866\ M\ \times (1-6.75\%)}{8.48\% - 3.6\%} = 16.54\ billio \tag{4-2}$$

6. Conclusion

The 2025 Los Angeles wildfires serve as a critical natural experiment for understanding how climate-driven catastrophes transmit financial stress through the insurance market and into diversified investment portfolios. Our analysis confirms that negative impacts are indeed transmitted through an insurance shock. While the current valuation adjustment on the S&P 500 appears modest, with a permanent impact of approximately 2.9 basis points, this should not be interpreted as negligible. Rather, it represents a "cost floor" for climate risk-related insurance costs, given the assumptions and calculations in this analysis. There is no reason to believe that this "cost floor" will reverse, and so may represent a permanent value impairment to the broader market; it would be interesting for further research to track the impact over time to see if it remains at 2.9 basis points, or increases or decreases over time.

The analysis also reveals a sharp bifurcation in pricing pressure generally, beyond the large capitalization companies which comprise the S&P 500. While the systemic availability cost is shared across the market, the burden of direct rate adjustments falls disproportionately on Small-to-Medium Enterprises (SMEs). Regulatory filings indicate a clear strategic pattern where insurers are aggressively correcting rates within the Businessowners Policy (BOP) segment, utilizing these standardized products as the primary lever for immediate portfolio remediation. In contrast, rate structures for large corporate programs (CMP) remain relatively stable. Consequently, the most severe inflationary adjustments are being concentrated on smaller commercial entities, creating a distinct tier of financial stress that is significantly higher than the impact observed for large corporations.

It is important to note that this study is dependent upon data contained in regulatory filings, FAIR Plan exposure data, and insurer-level disclosures, and bounded by a specific post-disaster window. Actual long-term underwriting shifts and macroeconomic feedbacks may diverge from our estimates. Furthermore, our reliance on market-share proxies and extrapolations involves simplifying assumptions that may not fully capture the granular variations across specific industries or policy types. Despite these

limitations, the findings provide a clear signal that insurance market dislocation is transitioning from an operational issue to a valuation driver, and suggests that this may be a fruitful area for further research.

For systemic investors, these findings offer critical empirical evidence of the transmission mechanism through which physical climate risks propagate into diversified portfolios such as the S&P 500 via the insurance sector. By quantifying the "cost floor" established by insurance market contractions, this analysis quantifies the financial impact of a single severe weather event on a broadly diversified investor, as represented by the S&P 500. Given the increasing frequency of extreme weather events, these types of impacts are likely to compound. If future events occur simultaneously or cluster closely, the interaction with other market stressors could amplify these friction costs beyond linear projections, creating a non-trivial cumulative impact on capital markets.

Crucially, the analytical framework used here provides investors with a replicable method for monitoring regional market health. By tracking leading indicators, such as the velocity of commercial rate filings and the rate of residual market displacement, investors can identify localized economic stress signals before they fully materialize in corporate earnings. This capability allows for more precise risk pricing and dynamic portfolio adjustments, ensuring that capital allocation strategies remain resilient as regional insurance markets recalibrate to intensifying climate hazards.

Future research should extend this analysis by examining the downstream effects of insurance withdrawal on local entities and their subsequent transmission to capital markets. Specifically, further study is needed to explore how reduced insurance availability impacts the residential and commercial mortgage market, property valuations, and municipal bond creditworthiness. Additionally, developing multi-event time-series models would allow researchers to capture the non-linear cumulative effects of clustered catastrophes. By integrating more granular data on firm-level insurance budgets and SME financial capacity, future work can more precisely quantify how climate-driven insurance shocks propagate from local economies up to the broader financial system. Finally, this study examined a single specific set of extreme weather events; it would be useful for further research to examine the collective impact of multiple climate-accelerated events to understand if the impact on the "cost floor" is linearly additive, if there are compounding impacts, or if the impacts are non-cost-based, for instance in withdrawal from a geography of or a line of underwriting.

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