



The Insurance Signal

How Climate Volatility Is Repricing
Property Markets – and What It
Means for Long-Term Capital



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March 2026

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Conflict Statement

The author is an advisor to Resilience Investments mentioned on Page 10. He otherwise reports no financial conflicts of interest related to this paper.

Executive Summary

Property insurance is emerging as one of the most immediate and visible barometers of climate risk. As extreme weather becomes more frequent and severe, insurers are raising premiums, tightening underwriting, and withdrawing from historically stable markets. These actions are not temporary corrections. They mark a structural shift, a fundamental repricing of physical risk that is already reshaping real estate values, mortgage access, municipal credit, and the geography of economic growth.

The scale of exposure is significant. Roughly 66% of American households own their homes, directly linking insurance costs to household financial stability.¹ With U.S. residential real estate valued at approximately \$49.7 trillion in 2024, insurance-driven disruption is not merely a household concern but a systemic financial issue.²

The insurance sector's response to climate volatility provides an early, investable signal of a broader repricing of climate-exposed assets, one that many market participants have not yet fully internalized. An insurer can adjust pricing or withdraw within a year; a mortgage may extend for decades. As a result, the cost and availability of insurance can shift materially over the life of an asset, exposing investors to risks that were not apparent at the time of acquisition.

For long-term investors, this creates both defensive imperatives and offensive opportunities, and the two are increasingly inseparable. Understanding where insurance markets are heading is no longer optional. It is a precondition for sound capital allocation in climate-exposed asset classes.

The paper proceeds in three parts. First, it describes the drivers of insurance market repricing and its national scope. Second, it examines implications for capital allocation, including insurance's emerging role as a prerequisite for real asset transactions and a leading indicator that moves ahead of appraisals, credit ratings, and regulatory responses. Third, it explores the emerging opportunity set, including resilience investments, community risk pooling, climate-adjusted financial products, and strategies that treat insurance-market dislocation as an investable thesis.

Key Takeaways for Investors

- **Insurance is becoming a gating variable for real asset investment.** Availability and cost of coverage increasingly determine whether assets can be financed, transacted, or held. If a property is not insurable, it is not investable.
- **Insurance pricing leads other market signals.** Insurers are repricing risk faster than appraisals, credit ratings, zoning decisions, and public sentiment, creating downside risk for laggards and opportunity for investors positioned to act early.
- **Insurability is emerging as a source of competitive advantage.** Assets and communities designed for resilience are more likely to retain coverage, remain financeable, and preserve value as climate volatility increases.
- **Adaptation is an investable theme.** Capital is flowing toward resilience technologies, climate-informed underwriting models, durable real assets, and new risk-transfer mechanisms.
- **Patient capital has structural advantages.** Long-duration investors are uniquely positioned to fund solutions that require time to scale while helping stabilize markets and earning returns commensurate with underlying risk.

Table of Contents

Executive Summary	ii
1 The Repricing: What Is Happening and Why	1
1.1 The Drivers of Rising Premiums	2
1.2 A National Phenomenon	2
1.3 Suppressed Signals and Delayed Repricing	3
2 Investment Implications: Risks, Constraints, and Reallocation	6
2.1 Insurance as Investment Constraint	6
2.2 Government Failures Compound the Problem	7
2.3 Resilience Must Be Collective and Valued Differently	8
3 The Opportunity Set	10
3.1 Emerging Risk-Sharing and Risk-Transfer Models	11
3.1.1 Community-Based Risk Pool Insurance (CBRPI)	11
3.1.2 Insurance-Linked Financial Hedging	12
3.1.3 The Data Opportunity	13
4 Conclusion: Insurance as Signal, Constraint, and Catalyst	15
Acknowledgements; Further Reading	16
References	17

List of Figures

Figure 1: Natural disasters with more than \$1 billion in damages, 2019–2024. Every U.S. state has been touched by a costly disaster.	1
Figure 2: Distribution of Homeowners Insurance Premium Changes Across All U.S. ZIP Codes, 2021–2024.	3

List of Tables

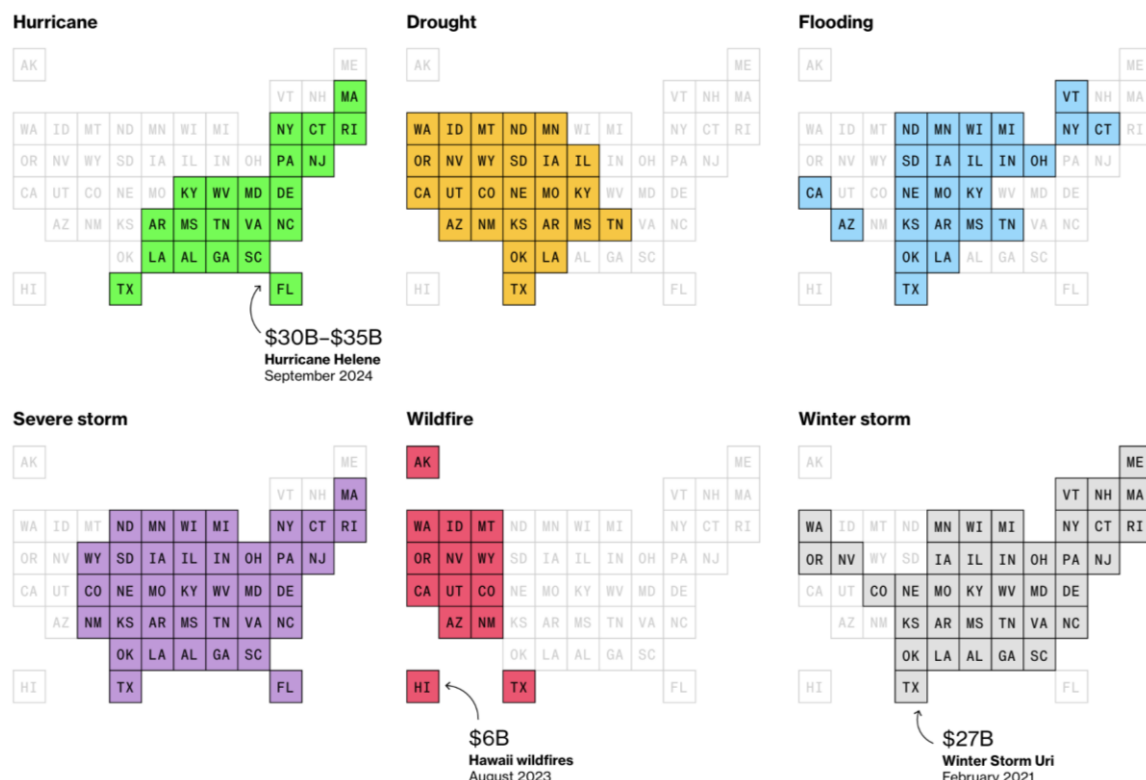
Table 1: How government and institutional shortcomings compound property vulnerability and insurance market stress.	7
Table 2: Investment opportunities created by climate-induced disruption of the property insurance market.	10
Table 3: Break-even timing and cumulative net outcomes for community-based risk pooling by neighborhood size.	11

1 The Repricing: What Is Happening and Why

Property insurance underpins a significant share of modern economic activity. Mortgages require it; lenders price it into credit; and municipalities depend on it to sustain tax bases. For most of the past century, insurers relied on historical weather patterns to estimate future losses, producing relatively stable pricing and broadly available coverage.

That stability is eroding. Extreme weather events are becoming more frequent, more severe, and more correlated across regions, rendering historical data less reliable for evaluating future risk.^{3,4} In 2024 alone, the United States experienced 27 separate billion-dollar weather and climate disasters across every region, with losses totaling \$187.9 billion, the second-highest count since NOAA began tracking in 1980.⁵ These events included diverse perils, from hurricanes and wildfires to floods, tornadoes, and winter storms (see Figure 1). Globally, insured natural-catastrophe losses reached \$137 billion in 2024, well above the ten-year average.⁶

Figure 1: Natural disasters with more than \$1 billion in damages, 2019–2024.⁷ Every U.S. state has been touched by a costly disaster.



Insurers are responding by raising premiums, tightening underwriting standards, and withdrawing from markets where traditional models no longer capture forward-looking variability. These responses are not optional. They reflect a fundamental shift in the physical environment that insurance markets must now price.

Observed losses are incomplete signals. Insured losses capture only what policyholders transfer to carriers. In 2024, global economic losses from natural catastrophes reached \$318 billion, more than twice the \$137 billion in insured losses, leaving an uninsured gap of

\$181 billion.⁸ More important, any given year reflects a single draw from a broader distribution of possible outcomes. A relatively mild year can mask a risk environment that has materially worsened. Because the climate continues to warm and change, the baseline risk is rising even in years when losses are contained.

1.1 The Drivers of Rising Premiums

Property insurance rate increases are significantly outpacing inflation. From 2021 to 2024, average premiums rose approximately 24%, nearly twice the rate of inflation.⁹ In the hardest-hit states, the climb has been far more severe. For example, Utah experienced a 59% rise between 2021 and 2024, while Colorado had a cumulative 77% increase from 2019 through 2024.¹⁰ These pressures are already affecting asset values. Recent research finds that rising insurance costs have reduced home values by approximately 11% in the most exposed ZIP codes over the last six years.¹¹

These increases reflect multiple interacting forces. Construction and repair costs, driven by labor shortages, materials inflation, and stronger building standards, account for roughly 35% of premium growth. General inflation and broader economic pressures raise the cost of claims even when damage levels are unchanged. Population shifts into higher-risk regions heighten exposure to floods, fires, and storms. Climate change itself – through compounding physical hazards – accounts for approximately 20% of premium rises since 2017.ⁱ

This 20% attribution to climate change should not be mistaken for evidence that the problem is principally non-climatic, as climate change is not simply one driver among many. Rather, it functions as a systemic *amplifier* that magnifies every other cost driver. Rising temperatures intensify storms, lengthen wildfire seasons, and worsen flood severity. These shifts, in turn, raise the cost of construction claims, strain reinsurance capacity, and accelerate population movement across risk zones. Climate change compounds volatility, introduces non-stationarity, and undermines the historical loss distributions on which actuarial models depend. An insurer can model inflation with confidence; it cannot model hurricane frequency in the same way when the underlying climate regime is shifting. In this sense, climate risk is the variable that destabilizes all others.

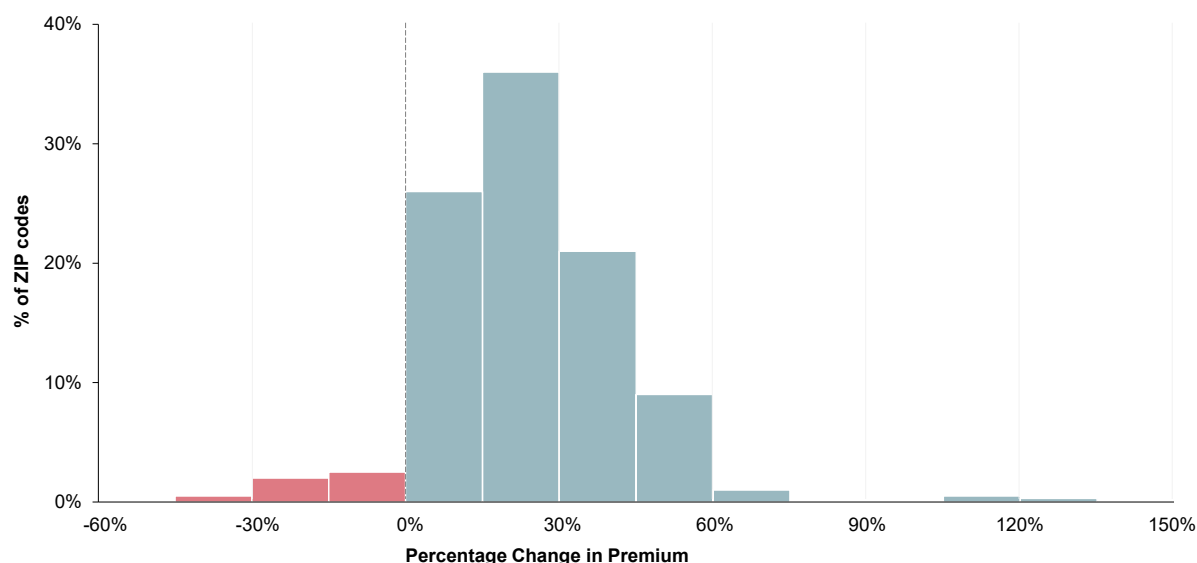
The distinction between first-order drivers of claims cost and second-order drivers of insurability is critical for investors. Inflation explains near-term cost pressures, but climate volatility determines long-term insurability. When risks become correlated across regions and over time, the insurance function itself begins to degrade.

1.2 A National Phenomenon

Insurance stress is no longer a regional issue. Premiums have risen in approximately 95% of U.S. ZIP codes (see Figure 2). The national average rose 24% from 2021 to 2024, compared to a cumulative inflation rate of roughly 13% over the same period, including in areas historically considered low-risk.¹² All 50 states have experienced severe, federally declared, climate-related disasters in recent years.¹³

ⁱ Keys and Mulder (2024), *supra* note 11, at Figure 3.

Figure 2: Distribution of Homeowners Insurance Premium Changes Across All U.S. ZIP Codes, 2021–2024.¹⁴



The concept of “climate havens” is fading. Locations once viewed as insulated are increasingly exposed, and almost no geography is exempt. Asheville, North Carolina, a city 2,000 feet above sea level and 250 miles from the coast, was once viewed as a climate haven until severe flooding during Hurricane Helene challenged that assumption. Similarly, states less frequently associated with climate disasters, including Arizona, Illinois, Nebraska, Pennsylvania, and Utah, recorded some of the largest premium increases. For investors, this means climate risk is systemic rather than diversifiable through geography alone.

Regulation further distorts risk signals. In states where premium increases are capped, insurers might not be able to price risk accurately, leaving the most exposed properties underpriced, including coastal and fire-prone assets. Insurers respond by raising rates in less-regulated states, effectively shifting costs onto lower-risk policyholders. Federal Reserve researchers have documented this dynamic, finding that insurers systematically cross-subsidize operations in heavily regulated states by raising premiums in states with lighter regulation.¹⁵ Risk is not reduced; its costs are redistributed.

1.3 Suppressed Signals and Delayed Repricing

In theory, insurance prices should signal risk, encouraging safer building, smarter land use, and more disciplined capital allocation. In practice, these signals are often muted, distorted, or actively suppressed.

The relationship between insurers and regulators is more nuanced than is commonly understood. Insurance regulation began as a solvency exercise, ensuring that carriers could pay claims.^{16,17} Over decades of stable, predictable losses, the focus shifted from solvency (protecting policyholders against insurer failure) to affordability (protecting them from big rate hikes). That legacy now works against signal transmission. A regulatory apparatus built to shield consumers from excessive premiums may be ill-suited to allow prices to rise to reflect genuinely increasing risk. Some states limit how quickly insurers can raise premiums or restrict their ability to incorporate forward-looking climate models into rate filings.¹⁸ While insurance commissioners generally understand these constraints, legislators and consumers

are often less attuned to the actuarial realities. The result is that, in many markets, insurers have been unable to price premiums high enough to reflect the risks they face. This problem compounds over time. Research estimates that rates would have grown 20 percentage points faster in the most regulated states absent regulatory friction – a gap that has only widened as climate losses accelerate beyond what regulatory systems were designed to absorb.¹⁹

The irony is unavoidable. The same consumer-protection impulse that drove rate regulation – shielding households from unaffordable premiums – now accelerates the very outcome it was designed to prevent. By suppressing the price signal, regulation delays the adaptation needed to make coverage sustainable, ultimately leaving households more exposed, not less.

When insurers cannot price risk adequately, they may seek to exit, but, in most states, exiting is not a switch they can flip. Regulators typically require a gradual wind-down, halting new policy issuance first, then non-renewing a portion of existing policies each year.²⁰ Major carriers have followed this path in Florida and California. The result is a slow retreat rather than an abrupt departure, a real but incremental signal, one that markets, regulators, and policymakers can easily overlook.

Because the underlying risk remains and coverage is often still required, state-run “insurers of last resort” are forced to step in. Florida’s Citizens Insurance and California’s FAIR Plan provide coverage, often at subsidized rates. These programs preserve access to insurance in the short term, but they can mask the true cost of risk, delay adaptation, and shift future losses onto taxpayers.

The financial fragility of these programs is itself an investor signal. Prior to the 2025 Los Angeles wildfires, California’s FAIR Plan insured roughly \$450 billion in property value but held only \$375 million in capital and approximately \$5.7 billion in reinsurance.^{21,22} It ultimately required a \$1 billion bailout: \$500 million assessed to private insurers operating in California (costs likely to be passed on to policyholders in California and other states) and \$500 million recovered through surcharges on California policyholders.ⁱⁱ

The net effect of this regulatory architecture is that insurance stress appears sudden and localized when it is, in fact, an early signal of systemic repricing across climate-exposed geographies. A common shorthand captures the dynamic: prices rise like a rocket but fall like a feather. Insurers raise premiums quickly when losses mount, but regulatory lag, conservative modeling, and reinsurer caution mean that premiums rarely decline commensurately, even when physical risk is reduced through resilience investments.

This pattern is most evident in commercial real estate, where lighter rate regulation allows premiums to rise with risk. For individual homeowners, the dynamic is often reversed: regulation suppresses the upward signal altogether, preventing premiums from increasing to reflect genuine risk rather than merely slowing their eventual descent.ⁱⁱⁱ In both cases, the signal is distorted, just in opposite directions.

ⁱⁱ The FAIR Plan required a \$1 billion bailout, with \$500 million assessed to private insurers and \$500 million surcharges on all California policyholders, according to the Yale Law Journal.

ⁱⁱⁱ This distinction reflects the author’s analytical assessment of rate regulation patterns across lines; personal lines rate regulation varies significantly by state.

Even where prices can move freely, resilience improvements translate slowly into financial relief. Reinsurers typically require several consecutive low-loss years before relaxing attachment points, creating a lag between physical progress and pricing recognition. For investors in adaptation capital, this asymmetry matters, as returns depend on not only when underlying risk improves but also when the market acknowledges it.

Transparency efforts have advanced but continue to face resistance. First Street, a leading modeler of climate financial risk, has made property-level risk data accessible through platforms like Zillow. After real estate agents complained that visible risk scores depressed sales, Zillow replaced direct displays with external hyperlinks, effectively hiding material risk information from buyers at the point of purchase, when it is most consequential.²³

Wider market signals reinforce this dynamic. J.P. Morgan has noted that “persistent home insurance inflation is becoming an acute challenge for home buyers and homeowners,” and the Senate Budget Committee has warned that spiraling insurance costs could trigger a collapse in property values, with as much as \$25 trillion in total exposure at risk.^{24,25}

While this paper focuses on residential markets, where the political pressure to suppress risk signals is most pronounced, commercial real estate faces a parallel but distinct challenge. Commercial insurance is less regulated and more directly priced to risk, yet the market remains opaque. Coverage terms vary widely, and exclusions are poorly understood by borrowers and lenders. Climate risk is inconsistently integrated into underwriting across property types and geographies. The repricing dynamic is the same; its visibility is not.

2 Investment Implications: Risks, Constraints, and Reallocation

For investors, the disruption in property insurance markets is not primarily a consumer-protection story or a regulatory puzzle. It is a repricing event, one that is revaluing exposed assets, reshaping access to financing, and creating new categories of both risk and opportunity.

2.1 Insurance as Investment Constraint

In recent decades, asset owners came to take insurance for granted, treating it as a routine expense rather than a forward-looking assessment of risk. Once a background condition of real estate transactions, it is now a defining constraint.

Higher premiums increase carrying costs, compress yields, and alter debt-service ratios. Non-renewals can render properties unfinanceable. Insurer withdrawal from a region can depress transaction volumes and property values across an entire market, regardless of the physical condition of any individual asset. In short, if an asset is not insurable, it is not investable.

This dynamic is particularly consequential for long-horizon holders. A property that is insurable today may not be insurable next year or over the life of the loan if the risk trajectory of its region deteriorates. Loan terms horizons of 10, 20, or 30 years far exceed the timeframe over which insurability is now changing. Emerging evidence from commercial lending reinforces this concern. Climate risk is beginning to appear in long-duration loan pricing but not in short-duration pricing, transforming property insurance climate risk from a continuous pricing signal into a binary availability constraint. Neither banks nor insurers are well-suited for this shift. Banks are better equipped to manage binary risk but struggle with probability distributions. Insurers are experts in probability distributions but less equipped to operate under binary constraints. The result is a structural gap between the two institutions best positioned to manage the transition.

The implicit government backstop for housing, through Fannie Mae, Freddie Mac, FHA mortgage guarantees, and the tax deductibility of mortgage interest, has historically ensured that private insurance costs would not make homeownership unaffordable. That social contract is now under strain. If insurance costs continue to outpace income growth in climate-exposed areas, the gap between subsidized mortgage access and unsubsidized insurance costs will widen, putting downward pressure on residential real estate values and the securities backed by those assets.

This dynamic extends to municipal bond markets, with implications that many fixed-income investors have been slow to price. The transmission mechanism is straightforward. As insurance costs rise and coverage retreats, property values in exposed areas stall or decline, eroding the tax base available to service general obligation debt. Municipalities that have already stretched their balance sheets to fund resilience infrastructure then face rising borrowing costs precisely when their fiscal capacity is most constrained. This is not a theoretical risk. Since 2018, home prices in New Orleans have risen only 14%, below inflation, while the national average increased roughly 55% over the same period. Municipalities in similarly exposed regions are, in effect, conducting a slow-moving fiscal

experiment whose results will arrive unevenly and with little warning. For municipal credit investors, insurance market data is becoming a leading indicator, one that increasingly merits attention alongside traditional credit metrics.

2.2 Government Failures Compound the Problem

Insurers price the world as they assess it, but pricing alone is insufficient to produce the behavioral changes that mitigate risk without corresponding regulatory discipline. Building codes go unenforced, flood zone maps become outdated, and many lenders proceed as though policy exclusions (most notably for flood damage) do not exist until a claim is denied. Many underlying drivers of insurance losses originate outside the insurance sector – in government decisions about land use, building standards, infrastructure investment, and risk pricing. The table below highlights entities that commonly shape property risk and insurance markets, along with areas for improvement. Without reform to these upstream decisions, exposure will expand faster than markets can adapt.

Table 1: How government and institutional shortcomings compound property vulnerability and insurance market stress.

Entity	Where the System Breaks Down	Impact on Insurance Markets
State Insurance Regulators	Rate caps, political pressure, slow approvals, limits on non-renewals, and restrictions on forward-looking models	Suppress price signals, drive carrier losses, and trigger market exits
State Residual Market Plans	Subsidized pricing and rapidly growing exposure that concentrate risk on thinly capitalized entities	Delay adaptation and shift catastrophic losses to taxpayers and other policyholders
Local Governments & Zoning Boards	Permit development in floodplains, the wildland-urban interface, and vulnerable coastal zones	Expand exposure faster than insurers can price it, increasing systemic loss potential
Homeowners Associations (HOA)	Restrict or delay property-level resilience improvements (e.g., storm shutters, vegetation management) through aesthetic rules built for a stable climate, not a volatile one	Prevent individual property owners from reducing risk, undermining insurer confidence in the pool, accelerating non-renewals, and rendering some developments uninsurable.
Building Code Authorities	Enforce outdated or weakly enforced codes that lag current hazard realities	Enable greater structural vulnerability, leading to higher insured losses per event
FEMA & NFIP	Price flood insurance below market rates using outdated maps; NFIP carries billions in debt	Encourage development in flood-prone areas and mask true flood risk from buyers and lenders
Infrastructure Agencies	Underinvest in stormwater, electrical grids, firebreaks, and evacuation routes	Turn manageable hazards into catastrophic disasters, amplifying claims
Federal Housing Agencies	Fannie Mae, Freddie Mac, and FHA require insurance but fail to integrate climate risk into guarantee pricing	Assume that insurance will remain affordable, widening the gap between subsidized mortgage access and market insurance costs

2.3 Resilience Must Be Collective and Valued Differently

Resilience is fundamentally a collective problem. Disasters propagate through shared infrastructure, and a single hardened property is unlikely to insulate itself from the failure of surrounding systems. Collective hardening enables communities to withstand and recover from events that would overwhelm any individually resilient property.^{iv} Underinvestment in resilience imposes significant economic cost. Research suggests communities may forgo up to \$33 in economic value for every \$1 not spent.²⁶

Stories from the 2025 Los Angeles wildfires about the survival of individual homes, often built with fire-resistant materials that add only 2–3% to construction costs, reinforce the importance of hardening but overlook a crucial point. Homes that remain standing amid neighborhood devastation are often rendered uninhabitable by cascading factors, such as extreme heat, toxic smoke, damaged infrastructure, and contaminated debris. Insurers' catastrophe models reflect this reality.²⁷ Firms like [Verisk](#) and [Moody's RMS](#) incorporate ZIP-code-level variables – including building code compliance rates, defensible space, fire department capacity, roadway design, and vegetation management – because community-level characteristics largely determine whether a neighborhood will survive a disaster. Insurers underwrite portfolios, not individual properties. Resilience must scale with risk.

Implementing effective resilience may not lead to immediate premium reductions. Insurance pricing relies on years of validated loss data and conservative modeling assumptions, which inherently lag improvements in physical risk.²⁸ This lag is compounded by a more fundamental distortion. In many high-risk markets, insurance remains underpriced relative to forward-looking risk, reflecting regulatory constraints, outdated catastrophe models, and political resistance to actuarially sound rates. As a result, resilience investment is often evaluated against an artificially low cost of risk. Until premiums reflect true exposure, the financial case for mitigation will be systematically understated. Resilience reduces risk from a higher baseline than current pricing implies. When that baseline is suppressed, the apparent benefit is smaller than it actually is. For investors, there is a clear implication: resilience ROI should be assessed against forward-looking risk, not current premiums.

Even where risk declines, pricing may not follow quickly. Catastrophe modeling firms update assumptions only after several years of evidence, and reinsurers rarely credit resilience efforts in near-term pricing. Such investments are difficult to verify, inconsistently documented across jurisdictions, and unsupported by the multi-year loss histories that actuarial models require to validate effectiveness. The result is a familiar dynamic: physical risk may decline long before premiums follow. The economic value of resilience is therefore better captured through avoided losses, preserved property values, and continued access to coverage than through near-term insurance savings.^v

^{iv} “Hardening” refers to the retrofitting or constructing a home with materials and techniques designed to resist damage from natural disasters, such as wildfires, hurricanes, or earthquakes.

^v The formula for the net benefit of resilience (NBR) is: $NBR = (\text{Damage avoided}) + (\text{Change in property value}) + (\text{Insurance-related benefits such as higher likelihood of coverage availability and renewal})$. A community-level evaluation could also include lower emergency costs, lower borrowing costs, and more stable public finances. $\text{Return on resilience investment} = NBR / \text{Cost of resilience projects}$.

This disconnect reflects a broader market failure. Markets have not yet developed a robust framework to value, let alone monetize, community resilience. Insurers are beginning to offer incentives that link resilience investments to premium reductions, but these remain limited and inconsistent. This represents an opening for investors to develop and fund credible frameworks for valuing, and ultimately pricing, community resilience.

More fundamentally, resilience should not be evaluated as a near-term insurance cost-reduction strategy. It is an asset-level and market-level intervention. The relevant question is not whether resilience lowers next year's premium or even next year's risk, but whether it preserves insurability, sustains property values, and keeps markets functioning as risks intensify. Investors who treat resilience as a line-item expense seeking near-term payback are operating with the wrong frame; those who view it as a requirement for long-term asset viability are positioned to capture returns that the former group will miss.

3 The Opportunity Set

The disruption in property insurance markets is creating a distinct set of investment opportunities. They favor investors with long return horizons and a focus on durability, resilience, and structural adaptation. The table below outlines the main categories, with illustrative companies and instruments.

Table 2: Investment opportunities created by climate-induced disruption of the property insurance market.

Category	Climate-Resilience Function	Format	Sample Opportunities
Climate-Forward Insurance Startups	Underwrite using property-level climate data and reward resilience upgrades	Venture Capital	Stand – homeowners insurance for climate-exposed properties using forward-looking hazard models FutureProof – property insurer pricing asset-level climate and resilience risk Neptune Flood – private flood insurance for high-risk locations
Mitigation & Adaptation Technologies	Manufacture and implement disaster-resistant materials and advanced water-management systems	Venture / Private Equity	InventWood – densified, Class-A fire-rated engineered wood AquaFence / FloodBreak – modular flood barriers Terranova – robotic ground stabilization for sinking, flood-prone land
Resilient Real Estate & Communities	Build to best-practice standards for long-term durability and differentiated risk-adjusted returns	Real Estate	Redbrick LMD – mixed-use developments integrating low-carbon materials and community-level resilience Resilience Investments – climate-resilient real asset manager Babcock Ranch – master-planned FL community designed around hurricane and grid resilience
Resilience-Focused Municipal Bonds	Support regions investing in climate-hardening infrastructure through GO and revenue bonds	Bonds	Breckinridge – climate-integrated muni portfolios factoring physical risk into credit selection Miami Forever Bonds – funding sea-level-rise and stormwater projects NY Environmental Bond Act – state GO bonds for flood-risk reduction Forest Resilience Bonds (Blue Forest) – wildfire-risk-reduction financed by utilities
Resilience & Adaptation Public Companies	Provide large-scale products and services that help buildings and infrastructure adapt to physical climate risk	Public Equity	Home Depot – home-hardening products and fire-resistant materials Ecolab – water-efficiency solutions reducing contamination risk Trane Technologies – efficient HVAC and building systems for extreme heat resilience
Climate-Risk Analytics & Data	Translate physical risk into investment-grade analytics for portfolio	Venture / Subscription	First Street – property-level climate risk data Climate X – physical climate risk for financial institutions

Category	Climate-Resilience Function	Format	Sample Opportunities
	allocation and risk management		Jupiter Intelligence – hyperlocal climate risk analytics for asset managers

3.1 Emerging Risk-Sharing and Risk-Transfer Models

3.1.1 Community-Based Risk Pool Insurance (CBRPI)

Traditional insurance struggles with highly correlated climate risk. One emerging approach, community-based risk pool insurance (CBRPI), shifts the unit of insurance from the individual property to a community. Under CBRPI, homeowners or municipalities aggregate premiums into a locally governed pool that absorbs routine losses, purchases reinsurance for catastrophic events, invests reserves, and reinvests surplus into local resilience projects, such as flood-retention or vegetation management.

Historical mutual insurance models offer a precedent. In the late 1800s and early 1900s, U.S. farmers facing limited or unaffordable coverage formed local “farm mutual” insurance societies, pooling risk and enforcing loss-prevention standards. Between 1870 and 1900, roughly 1,100 county farm mutual fire insurers were established, peaking at nearly 2,000 by the mid-1920s before consolidating into today’s regional and national carriers.²⁹

Modern CBRPI adapts this logic to climate-correlated risks within contemporary reinsurance markets. It does not eliminate climate risk or catastrophe losses, nor does it replace the need for reinsurance or public intervention. Its value lies in improving price transparency, making premium growth slower and more predictable, and strengthening incentives for collective risk mitigation.

Model results and limitations. To illustrate the economics, consider a neighborhood of 1,000 single-family homes with an average value of \$500,000. At a baseline premium growth rate of approximately 7.4% annually (the annualized rate implied by the 24% three-year increase through 2024), average premiums would exceed \$5,000 per home by 2030. Under a CBRPI structure, community pooling slows the growth of annual premiums relative to the baseline path, generating growing per-home savings over time. However, the model shows that break-even, the point at which cumulative net economic benefits turn positive, occurs only at significant scale and over extended horizons:

Table 3: Break-even timing and cumulative net outcomes for community-based risk pooling by neighborhood size.

Community Size	Break-Even Year	Net Benefit at Year 30	Notes
100 homes	Not achieved	Still negative	Premium savings insufficient to offset fixed costs
250 homes	Not achieved	Still negative	Scale too small for reinsurance efficiency
500 homes	>30 years	Near zero	Approaches break-even at extended horizon

Community Size	Break-Even Year	Net Benefit at Year 30	Notes
1,000 homes	~28–30 years	Slightly positive	Driven by baseline premium escalation
2,000 homes	~26–28 years	Positive	Meaningful only over long horizon
5,000 homes	~25–26 years	Materially positive	Greatest per-home premium stabilization

These results suggest that CBRPI functions economically more like long-lived community infrastructure than traditional insurance. Private community pools cannot, on their own, rapidly absorb highly correlated climate risk without external capital, public backstops, or cross-regional risk sharing.

This has important implications for how CBRPI should be structured and financed. Rather than viewing it as a conventional insurance product, it is better understood as a *community-owned asset*, one that persists even as individual homeowners come and go. Municipalities could subsidize initial pool capitalization from operating funds, mandate participation to achieve scale, or offer tax incentives for premium contributions. Federal policy could reinforce these structures through favorable tax treatment for homeowner contributions. Local lenders that retain mortgage exposure may also have a natural incentive to support pool formation and stability.

3.1.2 Insurance-Linked Financial Hedging

A second emerging approach treats insurance-market disruption not as a problem to be solved but as a signal to be traded. A structural window exists in which markets tied to insurance availability and affordability, including home values, municipal credit, local tax bases, begin to weaken *before* risk is fully reflected in regulated insurance prices. This temporal mismatch is investable.

Firms such as [DeltaTerra Capital](#), in partnership with [Intercontinental Exchange](#) (ICE), have developed analytics that translate physical climate risk into financial risk at the property, loan, deal, and bond level.³⁰ DeltaTerra’s approach treats insurance markets as a leading indicator and constructs hedges through correlated financial instruments, including regional housing indices, mortgage-backed securities, credit risk transfer (CRT) instruments, and municipal credit, rather than taking positions on individual catastrophe outcomes. The objective is not to hedge a specific disaster but to position for the delayed repricing that occurs as insurers, reinsurers, and regulators are forced to converge toward forward-looking risk.

DeltaTerra’s founder, David Burt, who helped develop some of the short positions chronicled in Michael Lewis’s *The Big Short*, testified before the Senate Budget Committee on the systemic risks of climate-driven insurance repricing. The firm’s research estimates that declining housing affordability due to rising insurance costs could lead to more than \$1.2 trillion in home value losses. For institutional investors in mortgage-backed securities and CRT markets, this risk is already measurable. DeltaTerra’s analysis shows that while only 2% of outstanding CRT balances are tied to the Miami metro area, those loans account for an estimated 12% of projected CRT bond losses from climate-driven insurance repricing.

For family offices and long-term asset owners, these strategies raise a natural question: can similar hedging mechanisms be made accessible to a broader range of investors, including homeowners seeking to protect their equity in exposed areas? Today, these tools are institutional-grade and largely inaccessible outside subscription-based platforms. But the underlying logic, that insurance repricing creates a measurable, tradeable financial risk, is likely to drive innovation in climate-linked financial products over the next decade.

The temporal mismatch between annual insurance contracts and the multi-decade horizons of mortgages and municipal bonds points to a largely unrealized opportunity for product innovation. A 30-year mortgage is underwritten once; the insurance environment it depends on is renegotiated every year. Bridging that gap could take several forms:

- multi-year insurance contracts that offer rate stability in exchange for verified resilience investments
- insurance-contingent mortgage covenants that adjust terms as coverage availability evolves, or
- climate-adjusted underwriting standards for GSE-backed loans that explicitly incorporate projected insurance costs alongside current premiums.^{vi}

None of these solutions exists at scale today, but the structural demand is clear. Long-duration assets need long-duration risk signals. The investors, lenders, and insurers that develop these structures early stand to benefit both from the products themselves and from the advantages of shaping—and leading—new market standards.

3.1.3 The Data Opportunity

One of the strongest near-term investment theses in this space is data. This opportunity, however, rests on a condition the market has not fully established: open, publicly accessible baseline climate information. Spencer Glendon, founder of Probable Futures, has argued that some proprietary climate analytics firms risk behaving like what he calls “mooncussers” – pirates who extinguished lighthouses to profit from shipwrecks – by monetizing private risk knowledge rather than helping illuminate it. His point is that markets cannot demand detailed analytics for risks they do not yet recognize. Even commercial data providers benefit from a public baseline that helps markets recognize climate risk before demand for more advanced analytics emerges.³¹

Over the next five years, increasingly sophisticated datasets will provide more localized estimates, across time and geography, of chronic climate changes and tail risk. Firms that can translate raw hazard science into decision-grade analytics for insurers, lenders, real estate investors, and municipal bond buyers will occupy a critical position in the climate-risk value chain, serving as intermediaries between climate science and capital allocation. Early-stage examples include First Street and Climate X. The addressable market will grow as regulatory mandates, investor demand, and insurer needs converge.

^{vi} Government-Sponsored Enterprises (GSE) – primarily Fannie Mae, Freddie Mac, and the Federal Housing Administration (FHA) – purchase or guarantee the majority of U.S. residential mortgages, setting underwriting standards that shape lending practices nationwide.

AI is accelerating this shift from diagnostic to predictive analytics, particularly for near-term pricing, but its application to long-term climate strategy is more contested than is generally recognized. Where firms once translated static climate models into property-level risk scores, the next generation ingests real-time satellite imagery, IoT sensor feeds, and continuously updated weather projections. The result is dynamic risk assessments that compress repricing lags and enable more granular, parcel-level differentiation.

These models rely on pattern recognition, which assumes a degree of continuity between past and future conditions. As climate warming pushes conditions beyond historical ranges, that assumption weakens. Leading climate modelers acknowledge that beyond certain warming thresholds, often cited around 1.5°C, physics-based models may be more reliable guides than data-trained algorithms, even though both approaches carry substantial uncertainty. The divergence is not theoretical. Different climate analytics firms have produced materially different assessments for the same location, particularly on variables such as drought and water availability.

The risk for investors is not simply that AI-driven risk scores may be wrong but that they may convey a false impression of precision, rewarding apparent exactitude over genuine uncertainty. The more defensible near-term investment thesis lies not in the algorithms themselves but in the infrastructure that makes their outputs usable. This includes platforms that translate probabilistic risk ranges into bankable resilience investments; financial products that allow property owners to hedge repricing risk; and capital structures that support resilience investments years before risks become acute.

A further complication is the emergence of AI-driven emulators of large-scale physical climate models, tools that can run scenario suites at low computational cost but whose emergent properties are not yet well understood, even by their developers. The gap between technical capability and interpretive capacity remains wide.

4 Conclusion: Insurance as Signal, Constraint, and Catalyst

Property insurance is no longer a background expense. It is a signal of climate risk, a binding constraint on economic activity, and a catalyst for innovation in resilience and finance.

The central argument of this paper is that the insurance sector's repricing of climate risk is not a temporary market dislocation but an early expression of a broader revaluation of climate-exposed assets. This revaluation will unfold over decades. The underlying physical drivers – rising temperatures, shifting precipitation patterns, and increasing tail risk – are persistent.^{vii} The financial systems that have yet to fully reflect them, from mortgage markets to municipal credit to real estate appraisal, will adjust unevenly and at different speeds. Insurance is moving first, and faster than downstream systems can accommodate.

Investors who understand this dynamic have a distinct advantage. They can stress-test portfolios for insurance-driven value corrections, identify assets and regions where repricing has further to run, deploy capital into resilience and adaptation infrastructure, and position in financial instruments that benefit as the gap between regulated prices and actuarial reality closes.

Government involvement in insurance markets will almost certainly increase. The scale of correlated climate risk already exceeds what purely private insurance markets can absorb in the most exposed geographies, and the political economy of housing ensures continued public intervention. As this paper's analysis of regulators, residual market plans, federal housing programs, and local land-use decisions makes clear, that intervention is as likely to suppress signals and delay adaptation as to stabilize markets. Treating government backstops as purely stabilizing forces can lead to underestimates of the distortions they introduce. The private-sector framing of insurance has always been incomplete. What has changed is the cost of ignoring that incompleteness.

For investors, the implications are direct. Climate volatility reprices real assets, reshapes financial products, and rewards long-duration capital that can fund adaptation. The insurance signal is clear. The question is who acts on it, and how.

^{vii} This amplifier dynamic appears to generalize beyond property insurance. Emerging evidence from commercial lending suggests that climate risk increases the spread on loans where other risk factors are already present – compounding rather than simply adding to existing exposure. The corollary is also observable in asset classes where climate risk is not yet priced at all, such as infrastructure, where buyers may be acquiring assets at prices that implicitly assume insurance costs and availability will remain stable.

Acknowledgements; Further Reading

I am grateful to [Barney Schauble](#) (greenthread), [Spencer Glendon](#) (Probable Futures), [Abby Ross](#) (The Resiliency Company), [Rachel Baum](#) (Institute for Risk Management and Insurance Innovation), and my CREO colleague [Dan Matross](#) for their insightful feedback on this paper.

The following organizations publish data and research on climate risk and insurance:

- [First Street](#) – Property-level climate risk data, modeling, and research.
- [Insurance for Good](#) – Ideas, resources, and capacity-building for more informed insurance policy and regulation.
- [Insurance Institute for Business & Home Safety](#) – Research on building performance under extreme weather.
- [Probable Futures](#) – Open-source climate data and visualization tools for planning and decision-making.
- [The Resiliency Company](#) – Funding and support for efforts to shift markets and minds toward resiliency.
- [UNC Institute for Risk Management and Insurance Innovation](#) – Academic research on insurance market dynamics and climate-risk transfer.

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