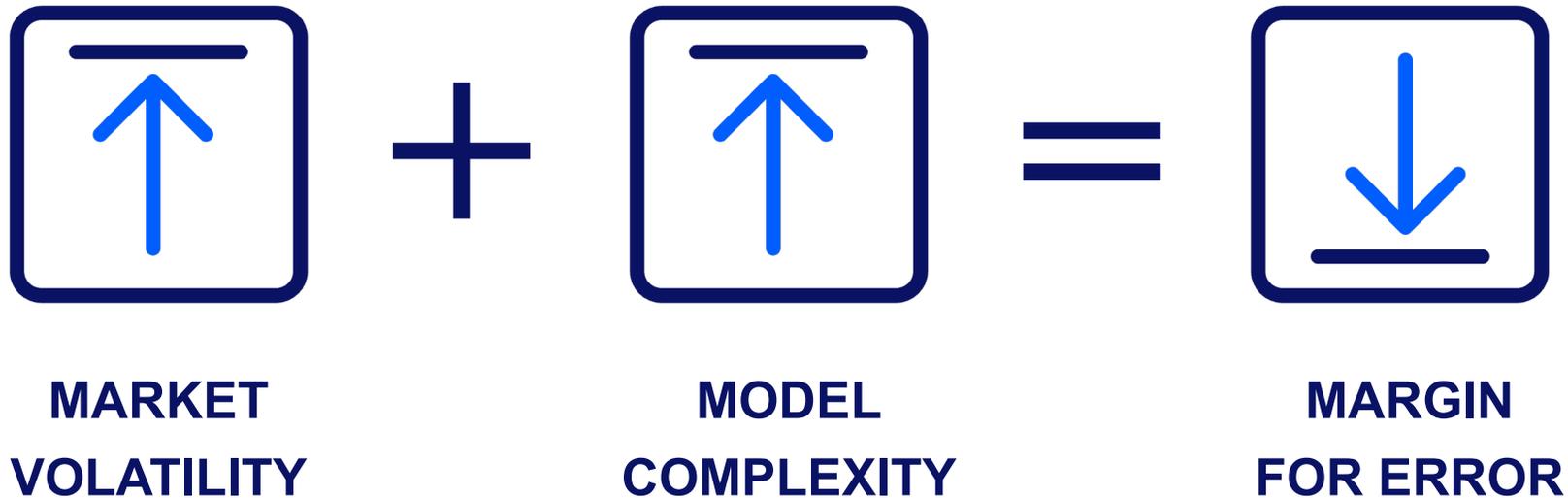# MOODY'S

When "Good Enough" Data Isn't Good Enough

John Clark
Head of Product, Property Intelligence
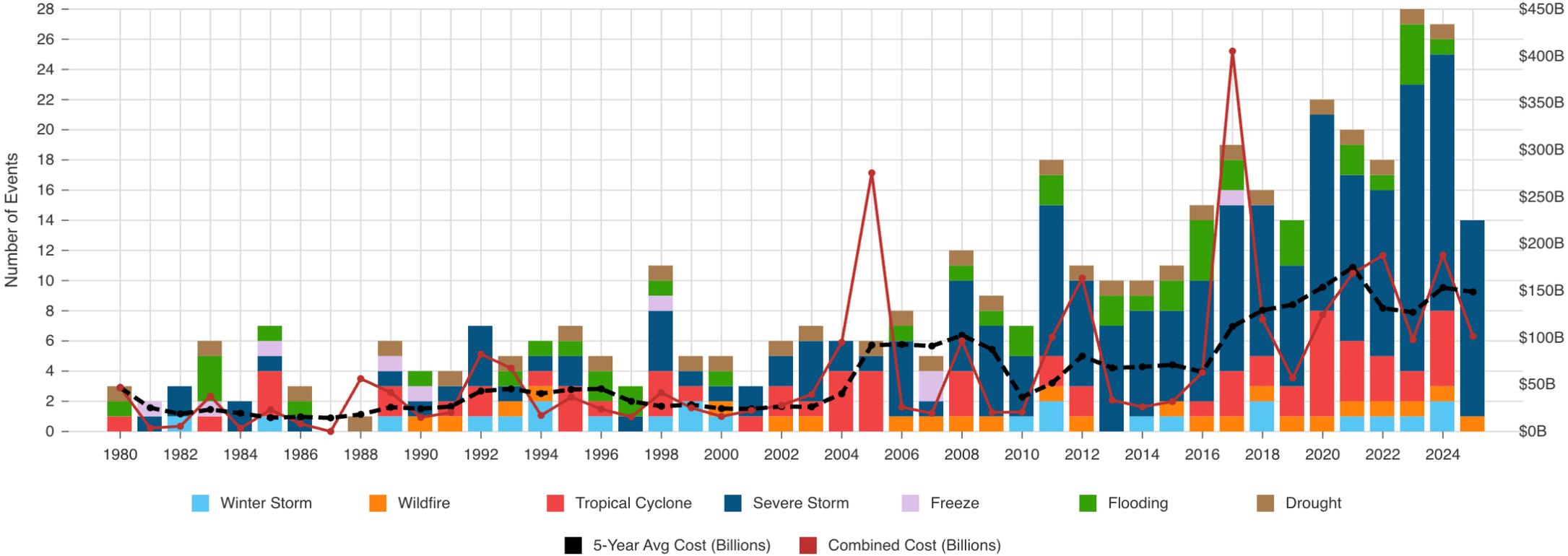
November 10, 2025

Market volatility and model sophistication have collapsed tolerance for data errors

MARKET VOLATILITY + **MODEL COMPLEXITY** = **MARGIN FOR ERROR**

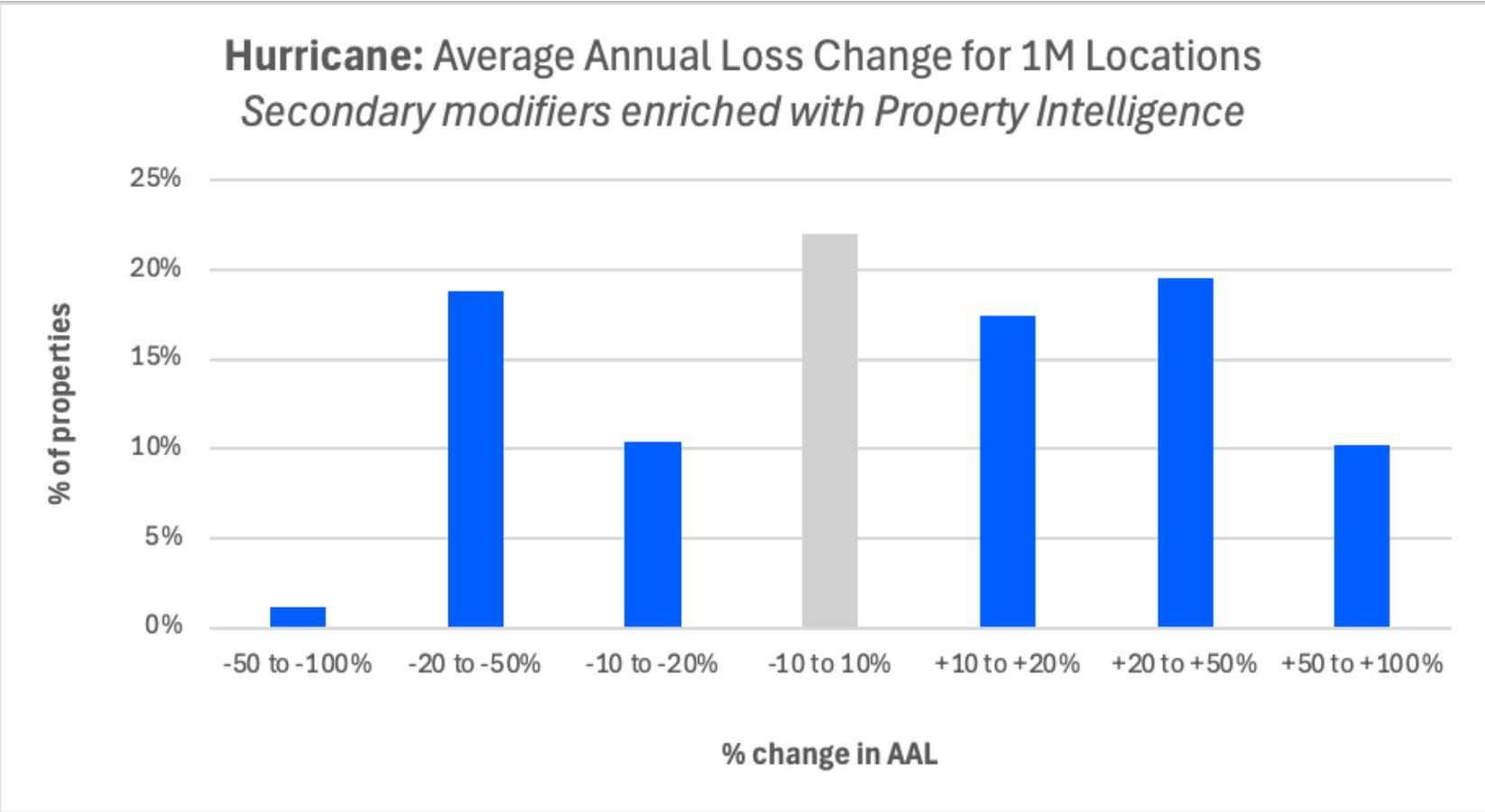# Catastrophe-driven losses have raised the stakes

The history of billion-dollar disasters in the United States each year from 1980 to 2025, showing event type (colors), frequency (left-hand vertical axis), and cost (right-hand vertical axis) adjusted for inflation to 2025 dollars.

Enhanced exposure data improves modeled loss accuracy

In combination, enhanced exposure data drives major location-level change

Hurricane: Average Annual Loss Change for 1M Locations
Secondary modifiers enriched with Property Intelligence

Y-axis: % of properties (0% to 25%)
X-axis: % change in AAL

Categories: -50 to -100%, -20 to -50%, -10 to -20%, -10 to 10%, +10 to +20%, +20 to +50%, +50 to +100%

48% of individual locations change AAL by more than 20%

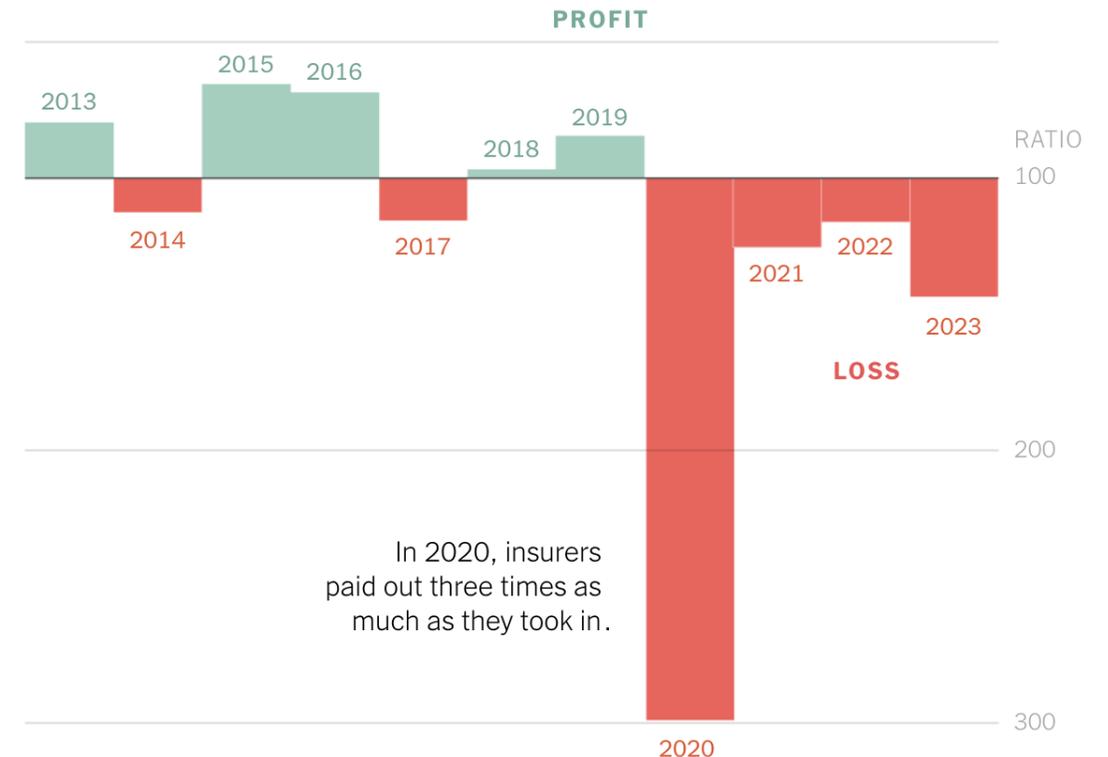Moody's RMS North Atlantic Hurricane (NAHU) Catastrophe Model

MOODY'S

4

Cat losses and underinsurance have raised the stakes

The New York Times

As Insurers Around the U.S. Bleed Cash From Climate Shocks, Homeowners Lose

> Across the country, insurers are facing more `bad years` than `good years` . If this trend continues, it could destabilize the broader economy.

Profitability of homeowners insurance in **Iowa**

PROFIT

2013   2015   2016   2018   2019

2014   2017

RATIO
100

2021   2022
2023

LOSS

200

In 2020, insurers paid out three times as much as they took in.

300

2020

Cat losses and underinsurance have raised the stakes

The New York Times

As Insurers Around the U.S. Bleed Cash From Climate Shocks, Homeowners Lose

Across the country, insurers are facing more bad years than good years. If this trend continues, it could destabilize the broader economy.

Where Insurers Are Losing Money

States where homeowners insurance was **unprofitable**.

2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Colo.	Colo.	Mass.	Colo.	Calif.	Calif.	Colo.	Ala.	Colo.	Ark.	Ark.
Ga.	Iowa	R.I.	Mont.	Colo.	Colo.	Fla.	Ark.	Iowa	Ariz.	Colo.
Ill.	Ill.	S.D.	N.D.	Fla.	Conn.	Ill.	Del.	Idaho	Fla.	Ga.
Miss.	Mich.		Neb.	Ga.	DC	Minn.	Fla.	Ky.	Ga.	Hawaii
Mont.	Mont.		N.M.	Iowa	Fla.	Mont.	Ga.	La.	Iowa	Iowa
Neb.	Neb.		Texas	Idaho	Ga.	ND	Iowa	Mich.	Md.	Ill.
Okla.	S.D.		Wyo.	Ill.	Idaho	Neb.	Ill.	Minn.	Minn.	Ind.
S.D.	Vt.			Minn.	Md.	Wyo.	La.	Texas	Mont.	Ky.
				Neb.	NC		Minn.		Neb.	Mich.
				N.M.	S.D.		Miss.		N.M.	Minn.
				S.D.	Va.		Ore.		Ohio	Mo.
				Texas	Wyo.		S.D.		S.D.	Miss.
							Tenn.		Wash.	Ohio
							Utah		Wis.	Okla.
							Wyo.			Tenn.
										Utah
										Wash.
										Wis.

MOODY'S

6

Cat losses and underinsurance have raised the stakes

Underinsurance rates after the 2021 Marshall Fire in Colorado

Policyholders with ratios below 100% are **underinsured**

Coverage ratios above 100% suggest **overinsurance**
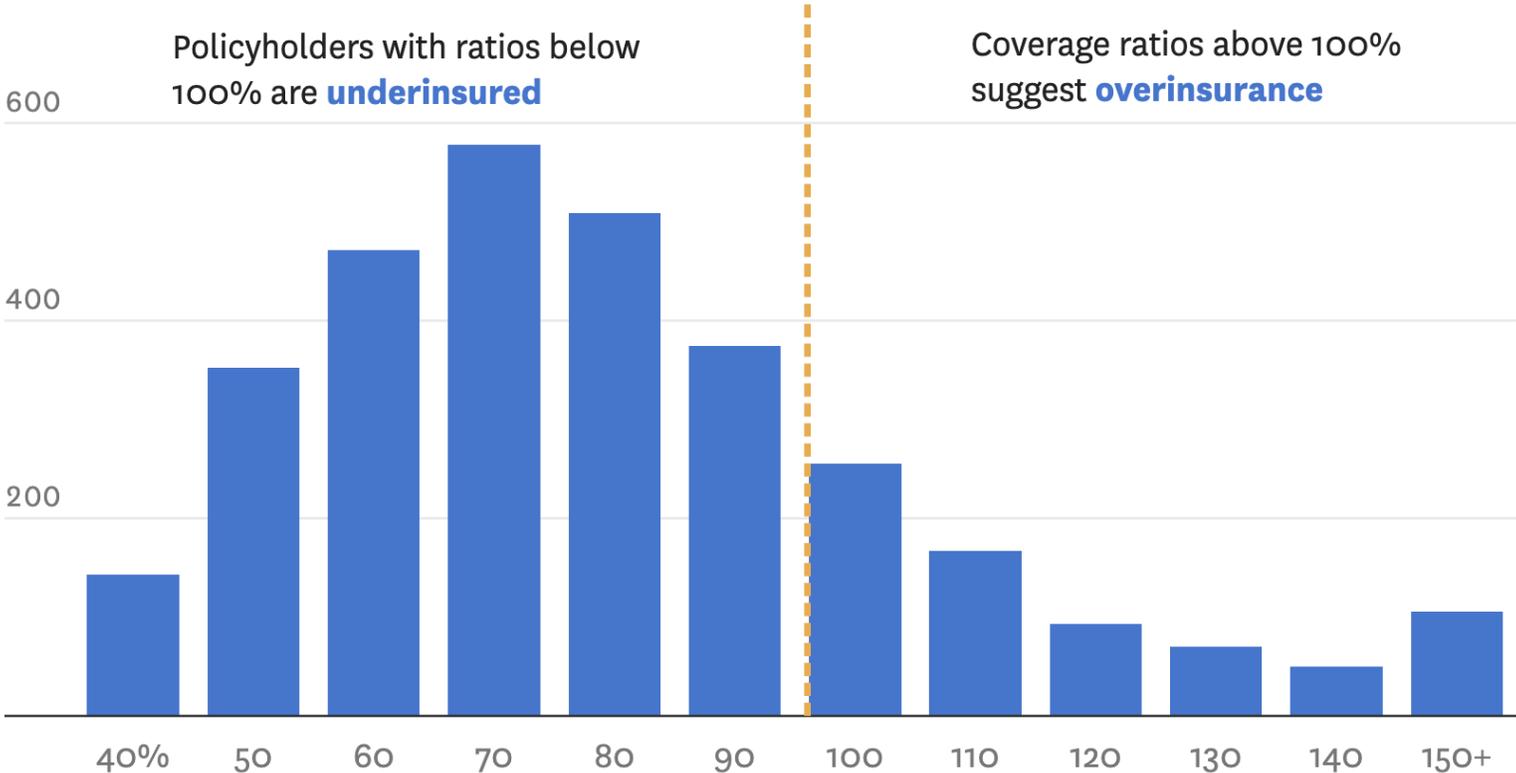
Coverage ratio values indicate the bottom of the range.

Chart: Nami Sumida/S.F. Chronicle · Source: Cookson, J. Anthony and Gallagher, Emily and Mulder, Philip, Coverage Neglect in Homeowners Insurance

The industry relies on powerful tools to quantify risk

Replacement Cost Estimators

Catastrophe Models

The industry relies on powerful tools to quantify risk

CATASTROPHE MODELS

Model Inputs →

Event Set	Hazard	Attributes	Vulnerability	Financial
Labor Cost	Materials	Attributes	Environmental	Economic

→ **Model Output**

REPLACEMENT COST ESTIMATORS

Your results are only as good as your inputs

"The property-specific building attributes drive all system assumptions and the subsequent components used to calculate the estimate. **The quantity and quality of this information will influence reliability of the estimate**... The more building attributes used, the more reliable the replacement cost estimate."

— **Xactware executives**

CAPE Property Intelligence

Quality, reliability, and risk relevance

Data inputs

- Satellite imagery
- Aerial imagery
- Public records
- Permits
- Valuations
- Hazard data
- Claims
- Occupancy

Scalable machine learning

VEGETATION ZONE 1	10%
ROOF CONDITION	FAIR
ROOF GEOMETRY	FLAT
ROOF MATERIAL	MEMBRANE
NUMBER OF STORIES	1
INTERIOR AREA	10,500 SQ FT

Property-level risk intelligence

- Underwriting eligibility
- Pricing
- Inspection Optimization
- Renewal monitoring
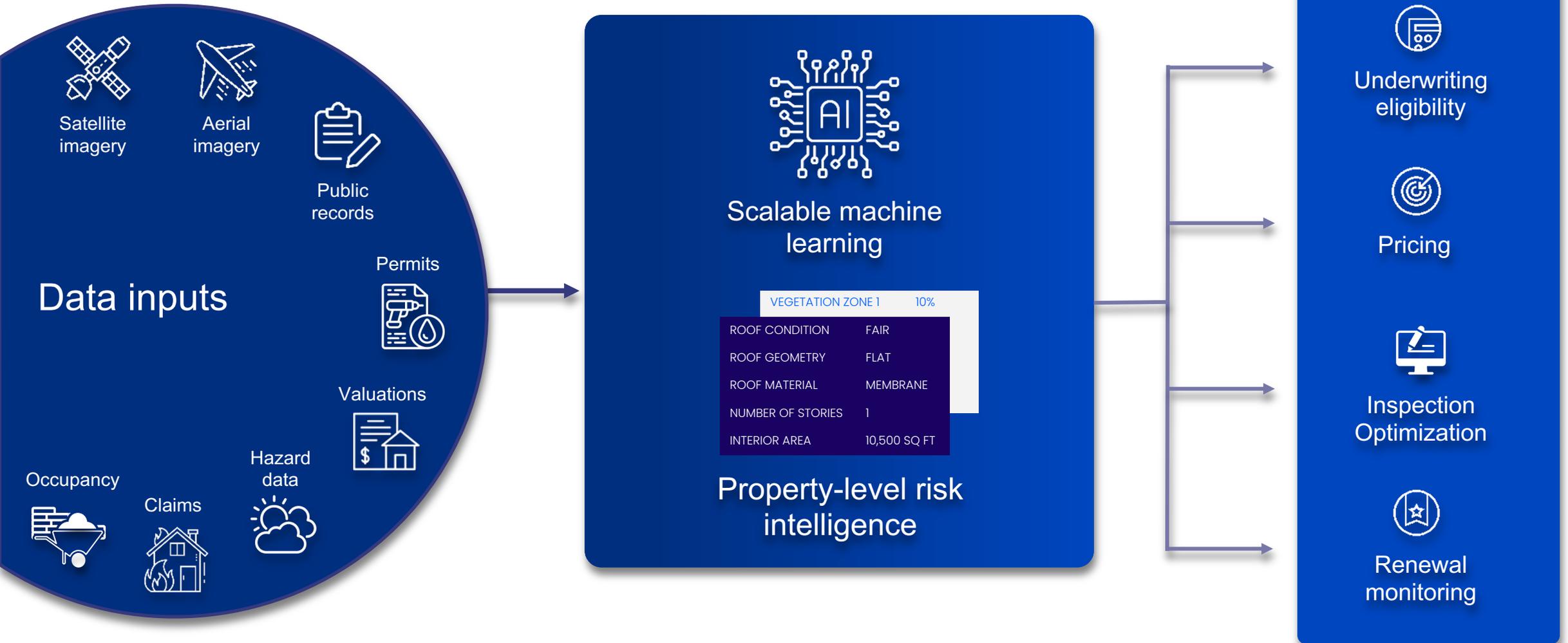
Your results are only as good as your inputs

Traditional data sources vs. enhanced property intelligence

Default Property Data

Roof Condition	?
Roof Age	9 years
Living Area	1550 sq. ft.
Quality Grade	Economy
Roof Geometry	Hip
Exterior Cladding	Vinyl
Defensible Space	?

Enhanced Property Intelligence

Roof Condition	Good
Roof Age	12 years
Living Area	2130 sq. ft.
Quality Grade	Economy
Roof Geometry	Mixed
Exterior Cladding	Vinyl
Defensible Space	17 ft.

We evaluated the impact of data quality on model results

Replacement cost and modeled loss by peril

1

3 representative portfolios, each with 1 million homes

Random sample of real properties from across the United States

- **Portfolio A:** High hurricane exposure
- **Portfolio B:** High convective storm exposure
- **Portfolio C:** High wildfire exposure

We evaluated the impact of data quality on model results

Replacement cost and modeled loss by peril

1

3 representative portfolios, each with 1 million homes

Random sample of real properties from across the United States

- **Portfolio A:** High hurricane exposure
- **Portfolio B:** High convective storm exposure
- **Portfolio C:** High wildfire exposure

2

2 scenarios: "Default" data vs. CAPE Property Intelligence

MOODY'S

We evaluated the impact of data quality on model results

Replacement cost and modeled loss by peril

1

3 representative portfolios, each with 1 million homes

Random sample of real properties from across the United States

- **Portfolio A:** High hurricane exposure
- **Portfolio B:** High convective storm exposure
- **Portfolio C:** High wildfire exposure

2

2 scenarios: "Default" data vs. CAPE Property Intelligence

Evaluated impact on valuation and modeled loss

3

- **Valuation:** Internal Moody's replacement cost model
- **Modeled loss:** Moody's RMS catastrophe models
  - North Atlantic Hurricane (NAHU)
  - North America Severe Convective Storm (NASCS)
  - North America Wildfire (NAWF)

MOODY'S

Insurance Solutions

Mapping CAPE Analytics Residential Property Attributes to Moody's Property Attributes

OCTOBER 7, 2025

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Valuation

Data quality and replacement cost

Square footage is central to replacement cost estimation

Inaccurate or outdated default values drive major valuation errors

Percent Change in Valuation Factoring Area Change
1 million single family homes
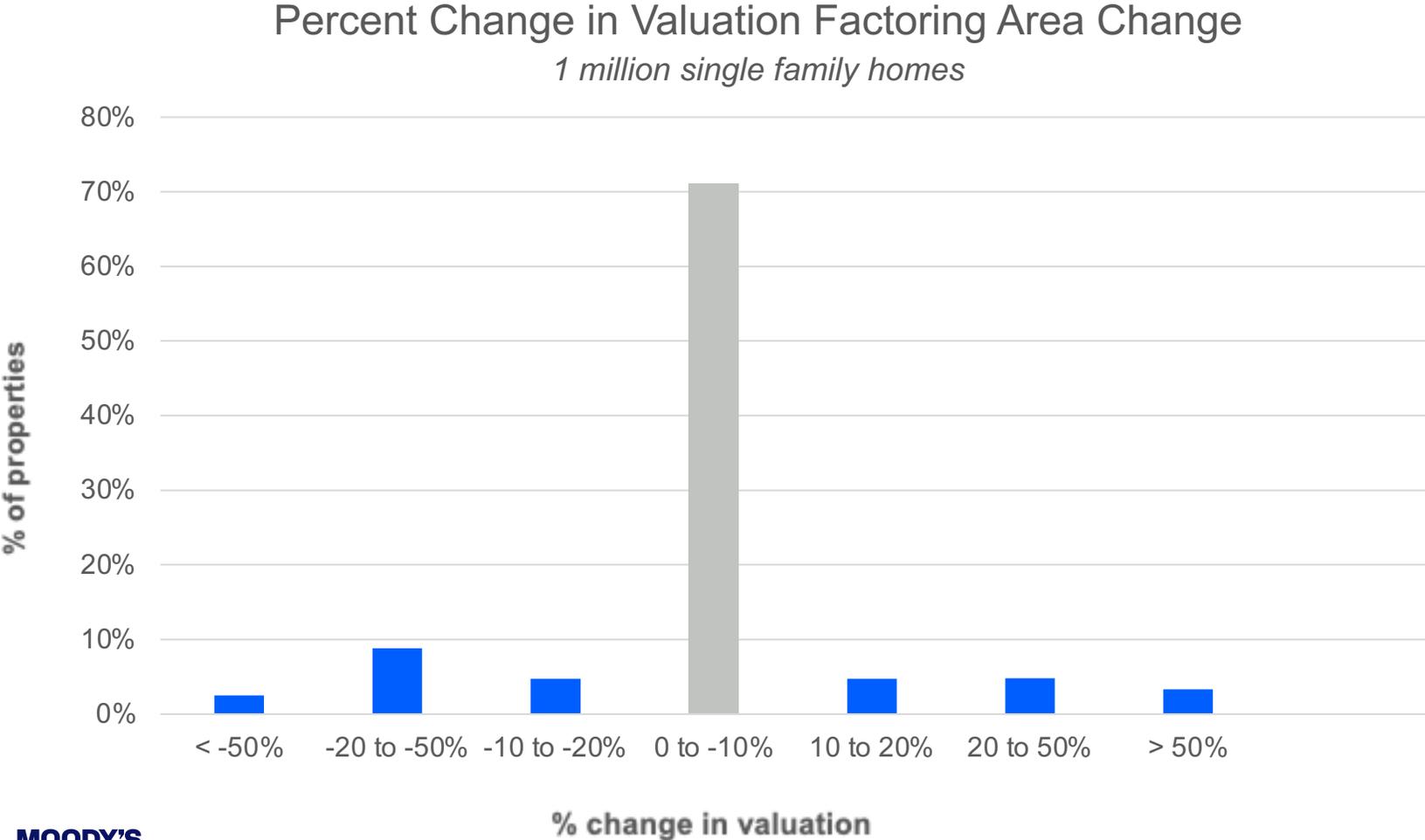
25%

of properties are under- or over-valued by 10% or more

MOODY'S

A handful of primary factors drive valuation

9 primary building characteristics

"that will give you the most reliable estimate with the fewest data points" in 360Value

- Year built
- Total finished square feet
- Quality grade
- Number of stories
- Foundation type

- Finished percentage of lowest level
- Exterior wall finish
- Garage/carport
- Fireplaces

Default values are often wrong

Primary attributes vary in quality across carrier portfolios

Public Records

Real Estate Listings

Agents

Homeowners

Verified square footage

Multi-source data integrated with recent imagery to verify or improve Living Area
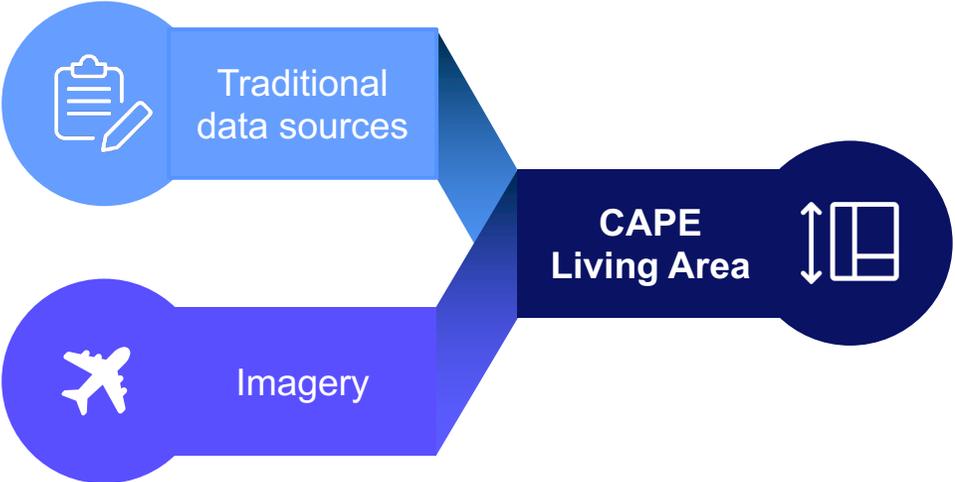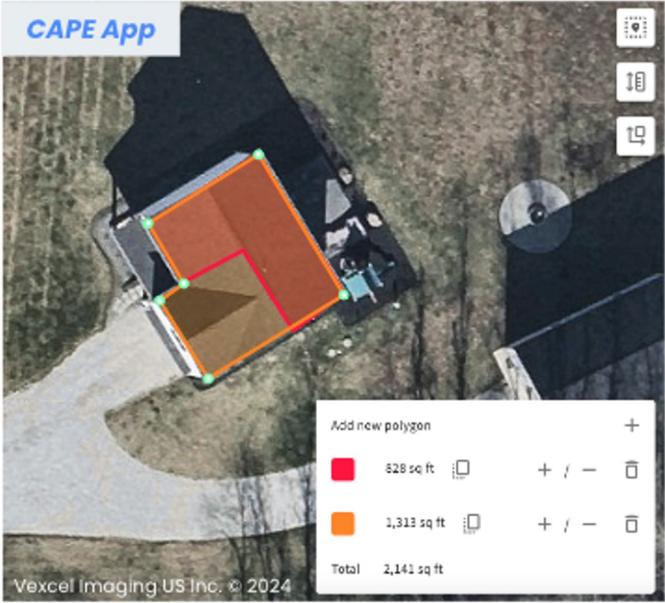
Valuation impact varies widely

Modifying a single factor reveals material changes that differ by state (or portfolio)

Share of properties undervalued by at least 10% (hurricane exposed portfolio)

MOODY'S
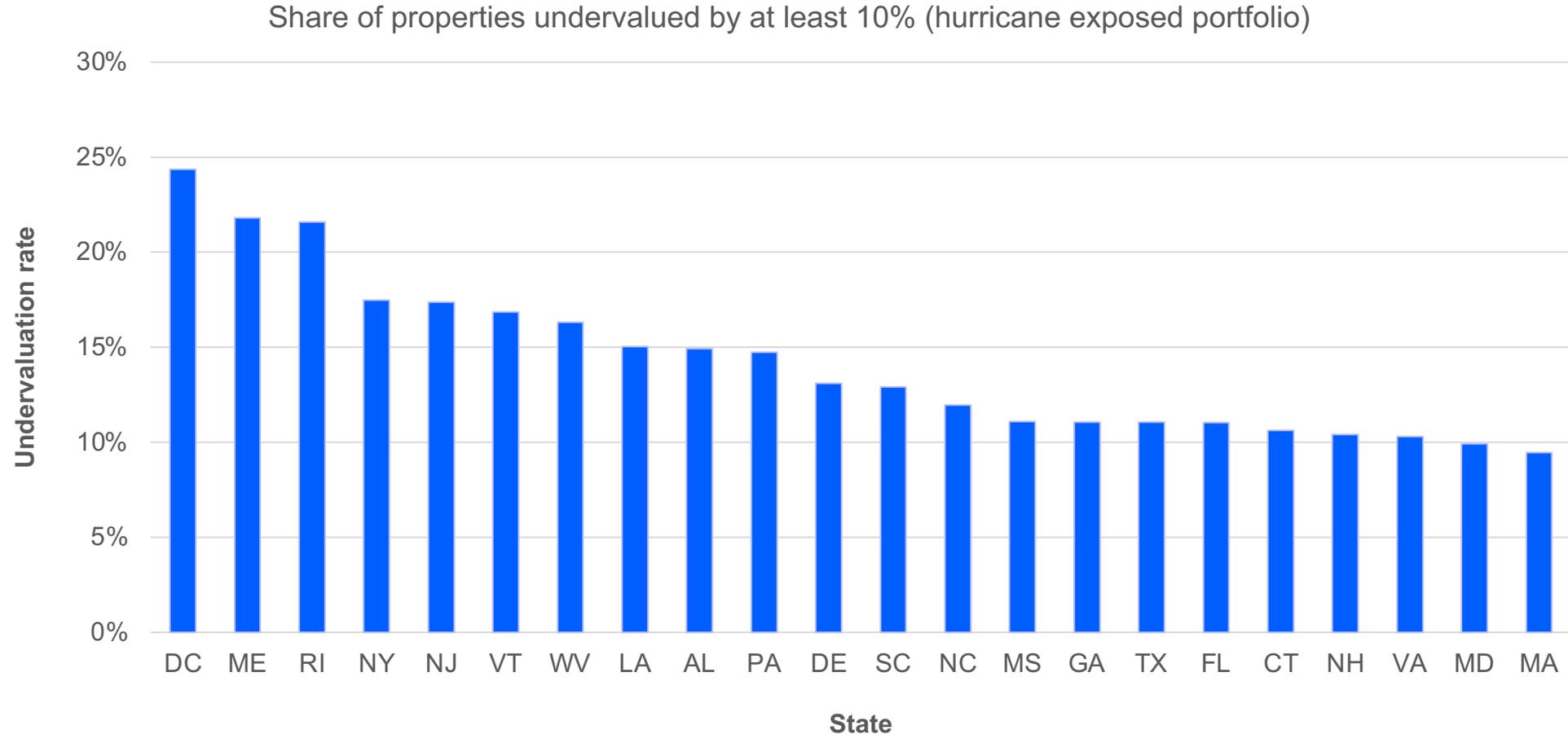
Modeled loss

Secondary modifiers in catastrophe models

Secondary modifiers improve modeled loss accuracy
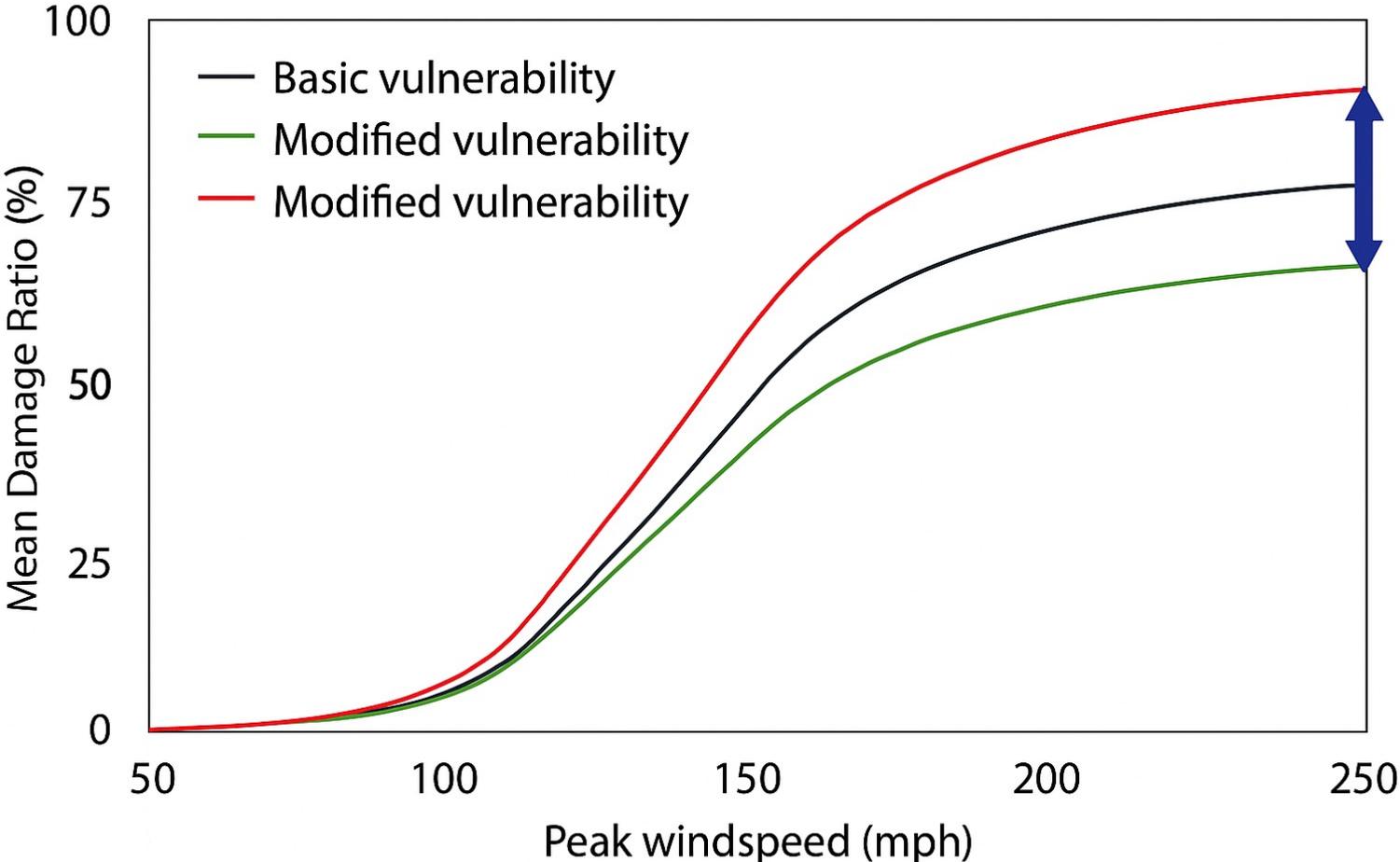
Catastrophe models: Univariate impact

Individual inputs drive moderate shifts in modeled loss

SCS AAL Change
Factoring **Living Area**

% of properties (y-axis)

% change in AAL (x-axis)

x-axis categories: -50 to -100%, -20 to -50%, -10 to -20%, -10 to 10%, +10 to +20%, +20 to +50%, +50 to +100%
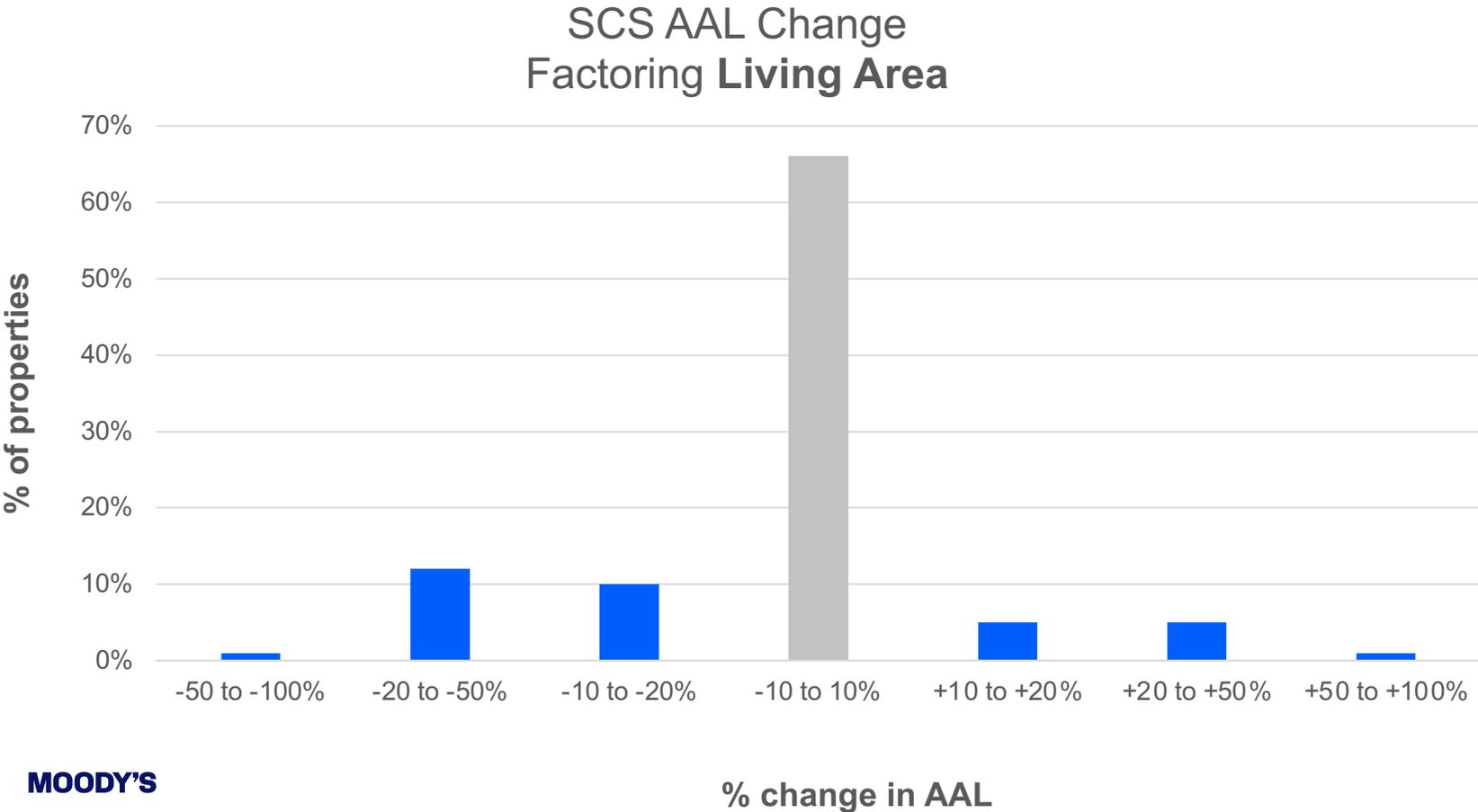
-6%

AAL change in SCS portfolio when fixing valuations w/ living area

Catastrophe models: Univariate impact

Individual inputs drive moderate shifts in modeled loss

Hurricane AAL Change
Factoring **Living Area**

% of properties

90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

-50 to -100% -20 to -50% -10 to -20% -10 to 10% +10 to +20% +20 to +50% +50 to +100%
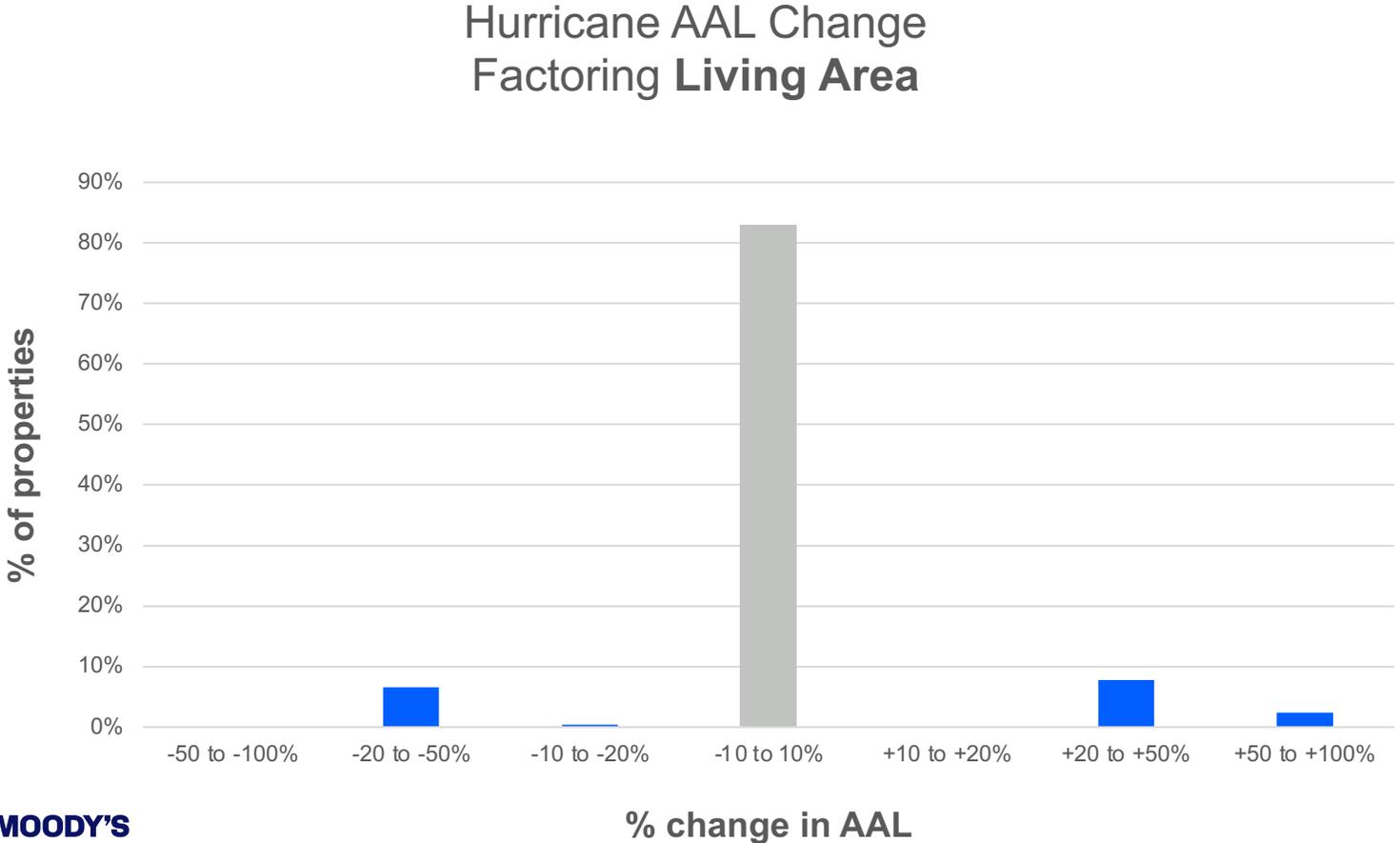
% change in AAL

+3%

AAL change in HU portfolio when using living area

Catastrophe models: Univariate impact

Individual inputs drive moderate shifts in modeled loss

Hurricane AAL Change
Factoring **Roof Geometry**

% of properties (y-axis: 0% to 80%)

x-axis categories: -50 to -100%, -20 to -50%, -10 to -20%, -10 to 10%, +10 to +20%, +20 to +50%, +50 to +100%
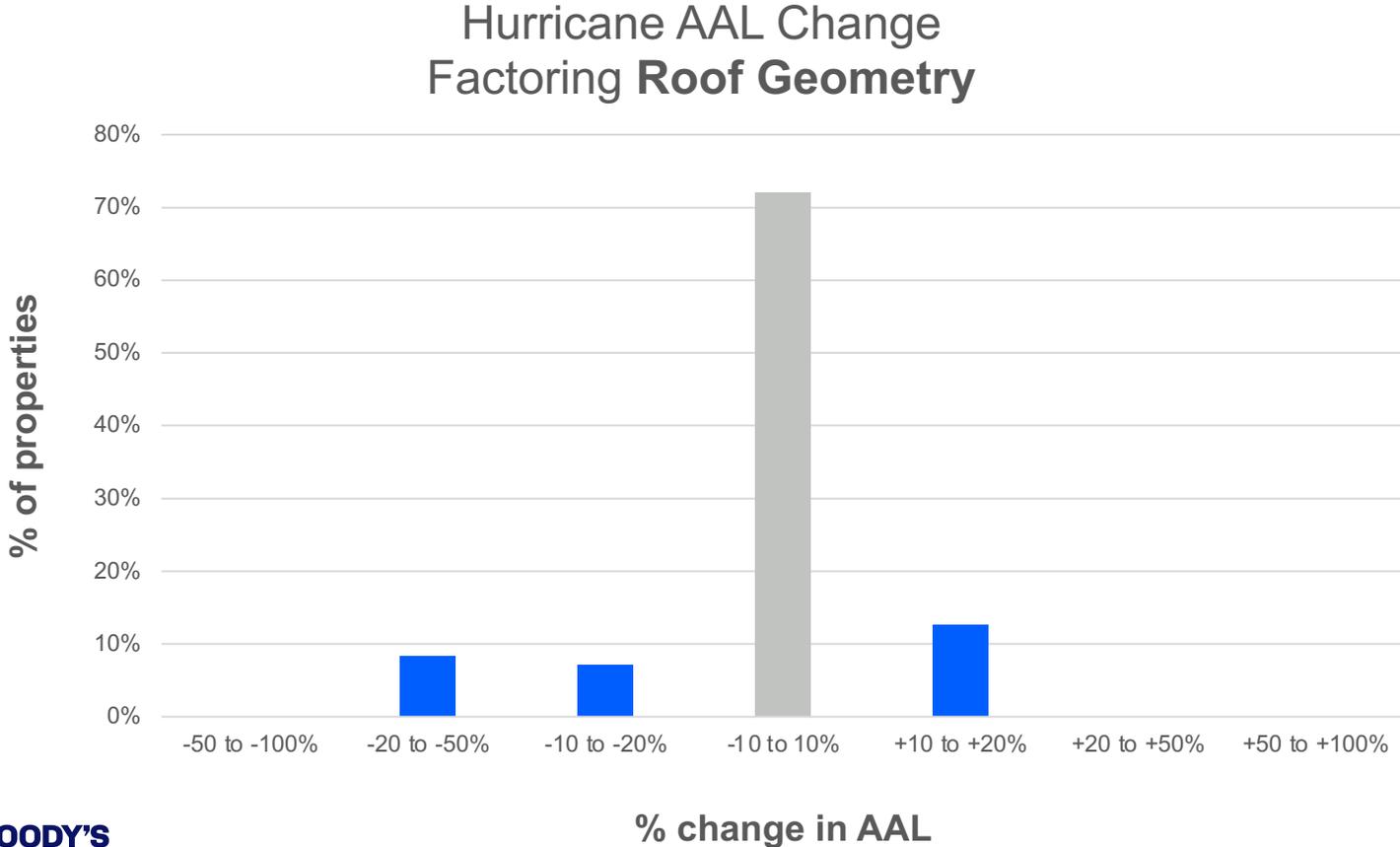
% change in AAL

-2%

AAL change in HU portfolio when using roof geometry

Catastrophe models: Univariate impact

Individual inputs drive moderate shifts in modeled loss

Hurricane AAL Change
Factoring **Roof Age + Condition**

% of properties (y-axis, 0% to 70%)

Bars by % change in AAL:
- -50 to -100%: 0%
- -20 to -50%: ~22%
- -10 to -20%: ~6%
- -10 to 10%: ~59% (gray)
- +10 to +20%: ~2%
- +20 to +50%: ~9%
- +50 to +100%: 0%
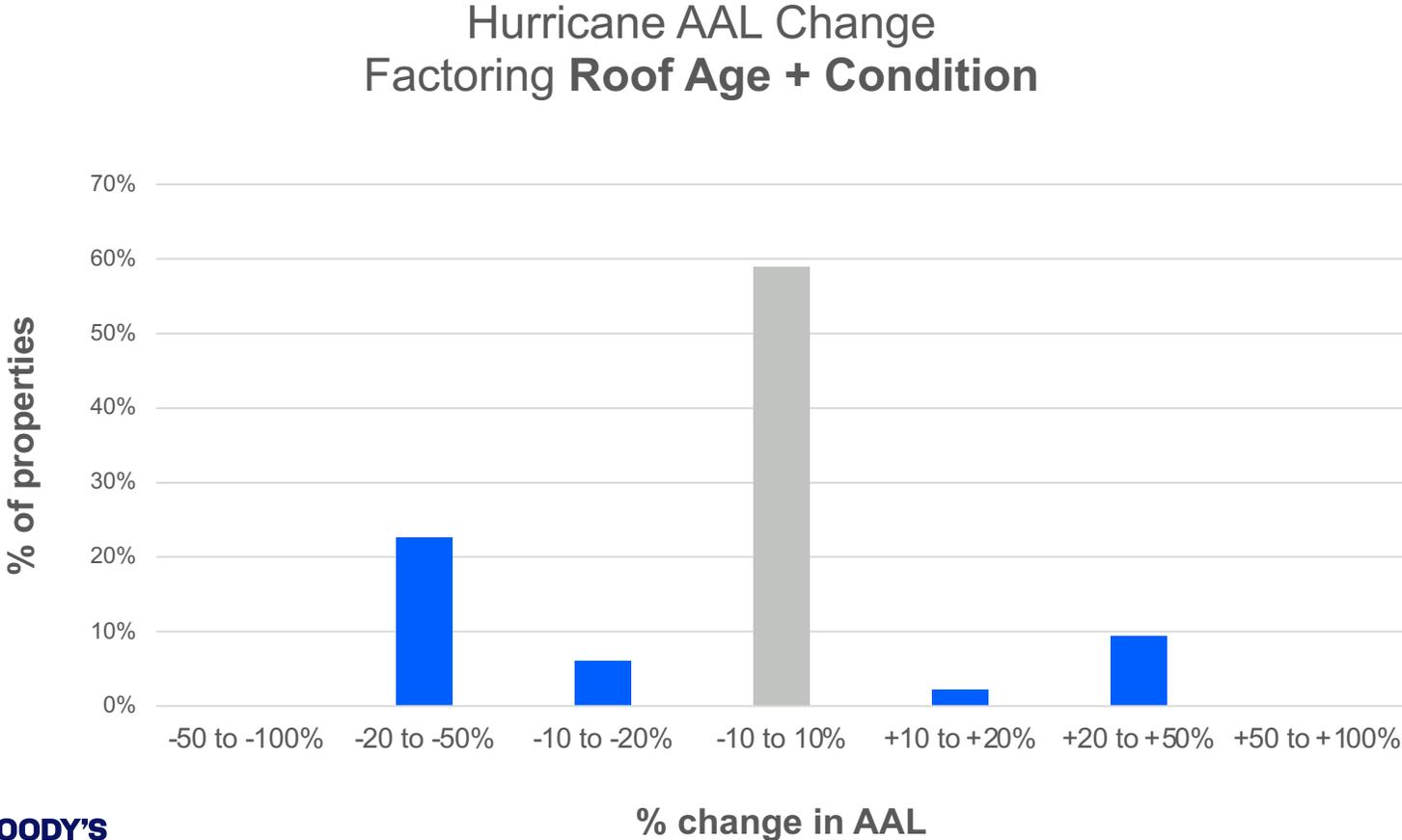
% change in AAL

-5%

AAL change in HU portfolio when using roof age and condition

Catastrophe models: Multivariate impact

In combination, enhanced exposure data drives major location-level change

Hurricane: Average Annual Loss Change for 1M Locations
Factoring CAPE property intelligence and revaluations

% change in AAL

48%

of individual locations change AAL by more than 20%

Every portfolio will experience unique dynamics

Catastrophe models: Multivariate impact

In combination, enhanced exposure data drives major location-level change

Convective Storm: Annual Loss for 1M Locations
Factoring CAPE property intelligence and revaluations

% of properties

% Change in AAL

Categories: -50 to -100%, -20 to -50%, -10 to -20%, -10 to 10%, +10 to +20%, +20 to +50%, +50 to +100%

52%

of individual locations change AAL by more than 20%

Every portfolio will experience unique dynamics

Catastrophe models: Multivariate impact

In combination, enhanced exposure data drives major location-level change

Wildfire: Annual Loss for 1M Locations
Factoring CAPE property intelligence and revaluations

% of properties (y-axis) vs % Change in AAL (x-axis)

x-axis categories: -50 to -100%, -20 to -50%, -10 to -20%, -10 to 10%, +10 to +20%, +20 to +50%, +50 to +100%
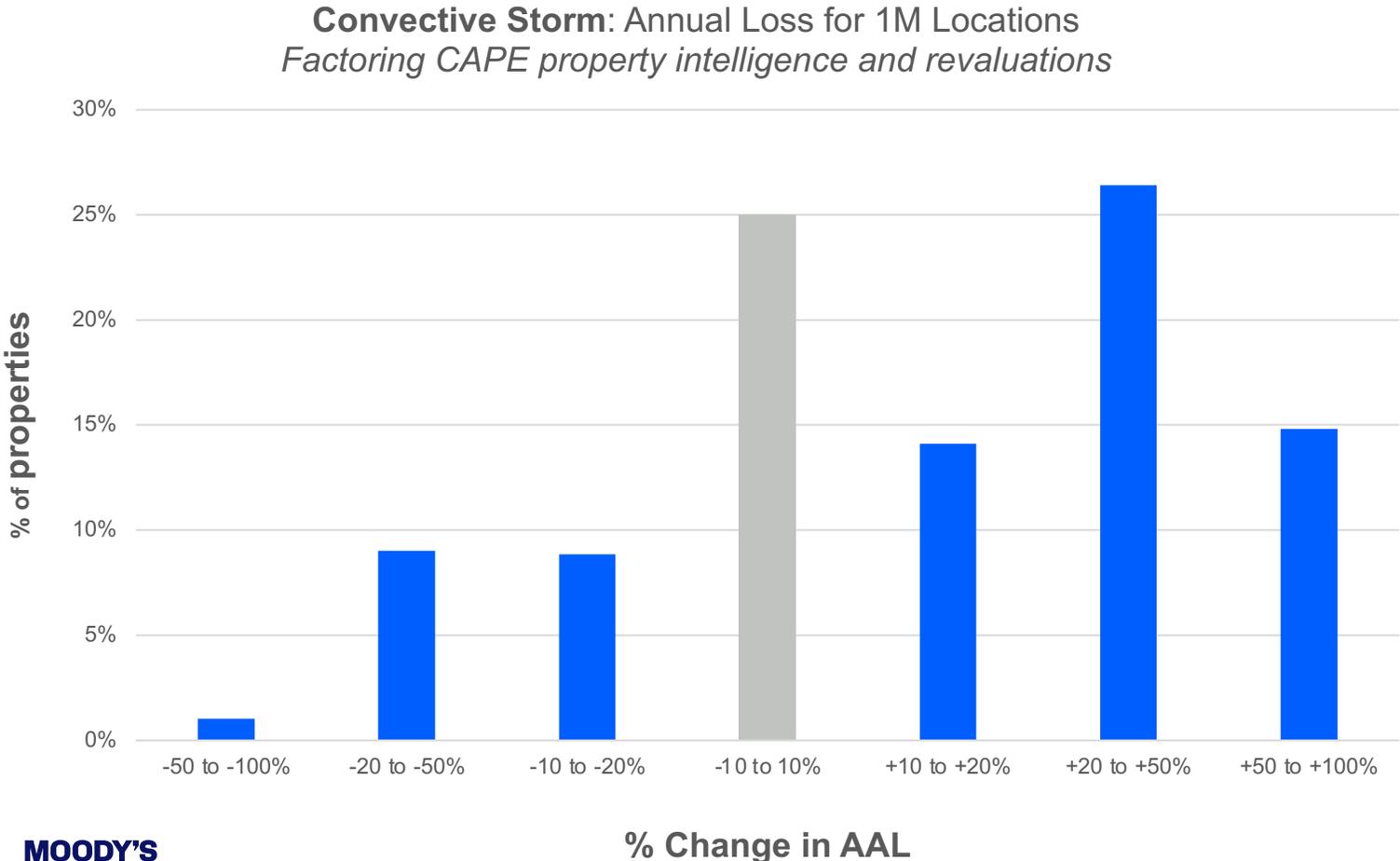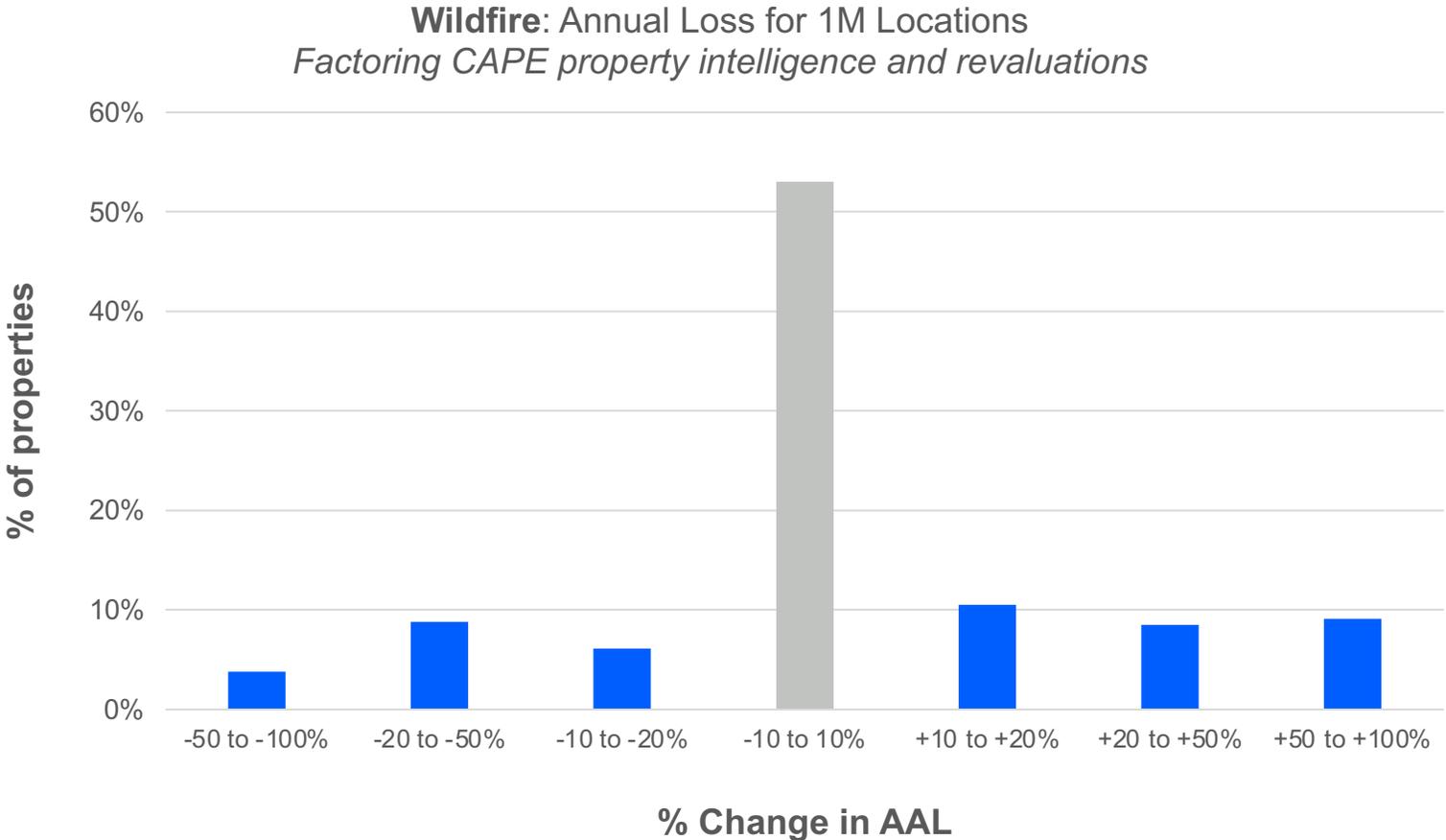
31%

of individual locations change AAL by more than 20%

*Every portfolio will experience unique dynamics

MOODY'S

30

Catastrophe models: Uncertainty

At the portfolio level, enhanced exposure data greatly reduces model uncertainty
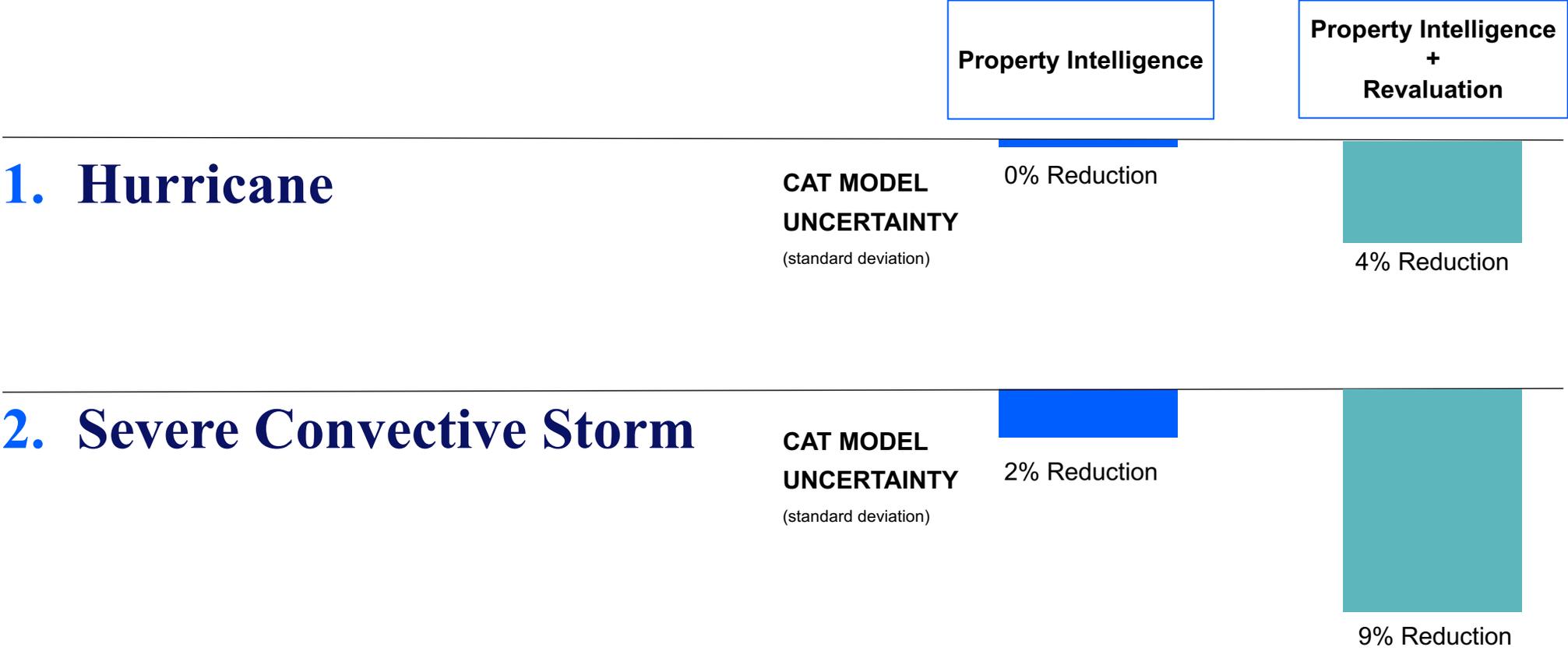
	Property Intelligence	Property Intelligence + Revaluation

1. Hurricane

CAT MODEL UNCERTAINTY

(standard deviation)

0% Reduction

4% Reduction

2. Severe Convective Storm

CAT MODEL UNCERTAINTY

(standard deviation)

2% Reduction

9% Reduction

MOODY'S

The underwriting opportunity

Translating portfolio insights into underwriting action

1. **Achieve coverage adequacy** — it's within reach...and good for everyone

2. **Reshape portfolios** away from the policies driving outsized modeled losses

3. **Improve loss segmentation** beyond catastrophes

MOODY'S

Pursuit of truth

The next competitive frontier starts with **better data**

MOODY'S