Claims Analysis Study of May 24, 2011

Insurance

Institute for

Business &

Hailstorms in Dallas-Fort Worth

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History of Hail Claims Data

- Crop-Hail Insurance Actuarial Association (CHIAA)—industry-wide association formed in 1948
 - Loss data consistently and systematically collected beginning in 1940s (Roth 1949; Changnon 1972, 1999; Changnon and Changnon 1997)
 - CHIAA includes ~90% of all crop-hail insurance in the U.S. (Changnon and Changnon 1997), but only ~20% of crops insured (Changnon 1972)
 - Used by Stanley Changnon
 - Spatial and temporal aspects of economic losses (Changnon et al. 2009)
 - Proxy to estimate total economic losses



History of Hail Claims Data

Property Insurance

 No distinguishing between hail, wind, tornado, rain, lightning losses (Changnon 1972, 1977; Changnon et al. 2009)

No consistent data collection amongst companies
 = difficulty in conducting economic analyses
 (Changnon 1999)

More reliable than NWS Storm Data (Changnon et al. 2009)



May 24, 2011 DFW Claims Study

- \$876.8 million in insured property and auto losses (Texas Department of Insurance)
- Residential structures in 20 ZIP Codes from five property insurers
- Identify factors contributing to more or less damage
- Claims study comparing:
 - Roofing material performance
 - Radar-estimated hail severity vs. claim severity
 - Aging-discussed in full conference paper
 - Relative difference in roofing damage vs. walls/windows/doors/trim damage discussed in full conference paper
- More than 67,000 policies in force
- More than 6,600 claims



Selecting Study Area

- LSRs
- Field observations of damage severity (RICOWI 2012)
- Insurer-reported relative claims percentages
- Insurer-reported presence of impact-resistant roofs
- Community age
- KFWD WSR-88D MESH (Witt 1998) data



KFWD WSR-88D MESH Data



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Selected ZIP Codes



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Calculating Claim Frequency and Severity

- CF_x = claim frequency of category
 x (e.g. walls)
- NCSx = normalized average claim severity of category x
- c_x = number of claims in category
 x
- p_x = number of policies in category x
- I_{xn} = claims losses in dollars for house n in category x
- CovA_{x_n} = insured limit of primary structure n in category x



 $CF_{\chi} = \frac{c_{\chi}}{p_{\chi}}$



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Roof Damage

Claim Frequency: Roof Damage



*Very small sample sizes of non-asphalt products



Roof Damage

Normalized Claim Severity: Roof Damage



*Very small sample sizes of non-asphalt products



Spatial Distribution of Damage vs. Radar-Estimated Hail Sizes





Spatial Distribution of Damage vs. Radar-Estimated Hail Sizes





Reclassification Scheme

Original Normalized Damage Severity	Reclassified Damage Severity
0.0% - 0.15%	-4
0.16% - 0.30%	-3
0.31% - 0.50%	-2
0.51% - 1.00%	-1
1.01% - 1.50%	1
1.50% - 2.00%	2
2.01% - 3.00%	3
3.01% - 4.00% +	4

Original Radar- Estimated Hail Size	Reclassified Hail Size
0.00 in. – 0.50 in.	-4
0.51 in. – 1.00 in.	-3
1.01 in. – 1.50 in.	-2
1.51 in. – 2.00 in.	-1
2.01 in. – 2.50 in.	1
2.51 in. – 3.00 in.	2
3.01 in. – 3.50 in.	3
3.51 in. – 4.00 in. +	4

Damage Comparison





Data Limitations

- No data on roof ages
- Small sample sizes of non-asphalt materials
- Primarily brick wall materials may mean less wall damage than storms in other locations
- Very little data concerning impact-resistant roofs



Recommendations

- Increase sample size with larger spatial area, or more insurance company participation
- Claims analysis studies from hailstorms sampled by IBHS in-situ instruments (Brown et al. 2012, Giammanco and Brown 2014)
- More complete, comprehensive, and systematic property insurance data collection (Changnon 1999)



Questions?

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See conference manuscript for references

