A Modern Architecture for Residential Property Insurance Ratemaking

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CAS Annual Meeting

Baltimore, MD November 15, 2005

Session Overview

- Background and Motivations
- Structure of Study and Paper
  - Major features highlighted
- What's Changed Since 2003?

Background

- Paper drafted in summer of 2003, submitted in fall of 2003 and accepted in winter of 2005
  - Based on research underlying an actual rate filing overhauling a Florida Homeowners program
- The paper was made much stronger with the help of colleagues at Florida Farm Bureau and CAS Committee reviewers

Educational Motivations for Writing

- Synthesize fragmented literature on residential property (primary) insurance ratemaking
- Offer an A-to-Z exposition of making homeowners rates lacking in literature
- Advance research on several homeowners ratemaking issues
  - *By-peril premiums* and effect on class rates and miscellaneous premiums
  - *Modeled catastrophe provisions* – overall development and allocations to territory and class
  - Integration of *new class plans for windstorm perils*

Practical Motivations

- Spotlight the effect of obsolete rating plans on profitability of property lines
- Encourage a comprehensive, rather than piecemeal, response to public policy mandates – seize the day
- Instill by-peril thinking into insurer systems and statistics to counter emerging causes of loss
- Get more out of industry investment in catastrophe models

Structure of Paper

- Background and Motivations discussion
- Overall rate level changes
- Territory and base class definitions
- Territory and class rating factors
- Coverage factors (amount of insurance, deductible, limit)
- Handling miscellaneous premiums keyed to base rates
- Implementation issues

Overall Rate Level Changes

- Theory of fair premium discussion
- Development of experience ratio and expense ratios
  - *Consideration of cat and non-cat overlap*
- *Cost of capital* (or reinsurance) provision – options
  - Pure ceded premium pass-through
  - Ground-up development of risk load
  - Blended method tied to market costs vs. model indications
- Rate structure for fair premium (base rate, modifiers, fees)
- *Breakdown of perils* for by-peril base premiums
  - e.g. Fire, Hurricane, Other Wind, Liability, AOP

Important Definitions

- Territory definitions by peril
  - Should be *distinct and based on gradients*
  - Consider other practicalities (political and physical lines) though they may conflict with gradients
  - *Intersection* of all peril definitions may serve as single combined map
- Base structure definitions
  - Important for modeling as well as ratemaking, especially with *new* windstorm class plan

Territory Rating Factors - Modeled

- Overall average cost – allocate on modeled average costs by territory (additive)
- Remainder (non-loss portion) of capital costs – allocate on a *risk metric* derived from model
  - Standard deviation of annual losses
  - Average of worst-case scenarios (TVaR)
  - A single worst-case scenario (PML)
- Balance allocated costs back to overall load
  - Choice of empirical vs. hypothetical model input dataset makes a difference in weights used

Class (Mitigation) Factors - Modeled

- Public and private engineering studies have found several *key features* affect windstorm costs:
  - Roof shape (hip, gable, flat)
  - Roof covering (shingle, super-shingle, tile, metal)
  - Secondary water resistance of roof (yes/no)
  - Roof to wall connection (nails, clips, straps)
  - Roof deck attachment method (nail size/spacing)
  - Opening protection (shutters, plywood)
    - Which openings are protected (windows, doors, garage door)
- So what is a "base class" house again?
- Interaction among features *highly non-linear*
- Interaction of features as a whole *with surrounding terrain*

Class Factors – Unresolved Issues

- Should base rate formula assume *mitigation affects non-loss* as well as loss costs?
  - In other words, do features reduce variation of losses or just average loss?
- Should we apply class factors to *non-hurricane wind perils*?
  - Engineering studies all done on hurricanes
- Should class factors vary by *policy form*?
  - Engineering studies all done on houses, not condos or apartments
- Should class factors be modified for *commercial* structures?
- How should *empirical experience data* be assimilated into class plan? Will models take care of it?
  - Uhhh, we have a lot of recent experience…

Coverage Factors

- In 2003, there was NO benchmark information on curves/scales by peril for
  - Amount of insurance (key factor)
  - Deductible
- Key factors for *non-modeled* individual perils developed from experience data by peril with some logic and trickery
- Key factors for *modeled perils assumed linear* (the implicit assumption of catastrophe models)
- Deductible factors for modeled perils derived from models for *percentage* deductibles
  - Flat dollar deductibles based on modification of percentage deductible loss elimination ratios for distribution of amount of insurance
- Deductible factors for non-modeled perils set in traditional fashion and tested for consistency across amount of insurance ranges

Miscellaneous Charges/Credits

- Most credits to indivisible base premium may be *targeted* to specific peril groups and the percentages *adjusted* to be revenue-neutral or sensible
  - Wind exclusion credit (100% to wind base)
  - Seasonal occupancy (non-wind perils)
  - Alarms (non-wind/liability)
  - Age of home (non-wind/liability)
  - Replacement cost coverage (non-liability)
- May be afterthought to actuary, but a major part of the *implementation* in IT and policy administration

Implementation Issues

- Measuring overall premium level *impacts*
  - Must be done *by policy* as no resemblance in current and proposed rate structures
- *Competitive* analysis
  - Must also be done at policy level
  - Consider direct and *indirect* (retention, competitor reaction) effects
  - Beware unweighted "county averages" with new territories and class plans
- *Transition plans* for current portfolio
  - Algorithm to cap renewal premium swings mandatory given sales force and regulatory concerns
  - Major effort for IT implementation – maybe more than rates!

What's Changed Since 2003?

- Big industry players have embraced concept of by-peril rating
  - Advancements in policy-level rate modeling (e.g. GLM) have led to motivations outside cat perils
- Florida insurers have had two years to implement windstorm class plans
  - Application overhauls – improved data quality?
- 2004 and 2005 have provided lots of empirical hurricane experience
  - Are the credits appropriate?
  - Emphasis on data quality in models – GIGO
- What's the next emerging cause of loss? Jim Hood?

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