GENERAL INSURANCE PRICING: CONTRIBUTING TO THE SUCCESS OF BUSINESS

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Aditya Khanna, FCAS

AGENDA

- INTRODUCTION
- MOTOR INSURANCE
- LARGE COMMERCIAL INSURANCE
- CONCLUDING REMARKS

INTRODUCTION

CATEGORIZATION OF INSURANCE RISK

TECHNICAL PRICING

RISK/CUSTOMER SELECTION

CATEGORIZATION OF INSURANCE RISK

Individuals (Personal Motor)	Small businesses (Commercial Fleet)	Large Corporates (Liability)

DECREASING Data Availability

INCREASING Product Customization

INCREASING Case Underwriting

INCREASING Coverage Complexity

Differences in these attributes lead to different actuarial pricing techniques

We will look at the two ends of the spectrum. Small business pricing borrows from both these ends

TECHNICAL PRICING – WHAT & WHY

- Theoretical premium - covers the expected claims and expenses and provides for a return commensurate with the risk of an insured
- In most environments though, it is hard or even impossible to charge a technical price due to the complex market forces and regulations
- Insurance is an underwriting business - understanding and selection of risks (insureds) is the key differentiator
- Technical models can help underwriters better understand the features that drive the risk of the insured. Underwriters in turn provide insights on modeling to quantify better
- Technical pricing differentiates the insureds based on risk and assist in selecting the most favorable
- Technical Pricing provides a statistically sound benchmark to understand premium adequacy

RISK/CUSTOMER SELECTION

- Good / Bad Customer – widely used but vaguely defined
- Any policyholder that pays adequate premium could be a good customer even if they can suffer huge claims
- Insureds differ in their claims potential. Actuaries use technical models to estimate future claims potential and calculate an adequate premium
- Underestimating the claims, especially when the competitor does it accurately, means you offer a lower price than what should be charged
- You will attract all such customers who are happy paying less than what they should. These are essentially bad customers!
- Similarly, overestimating will make customers migrate to competitors. Competition gets good customers who pay adequate premium!
- Anti- selection – you are being selected against.

MOTOR INSURANCE

TRANSFORMATION JOURNEY

PRICING CYCLE

TRANSFORMATION JOURNEY

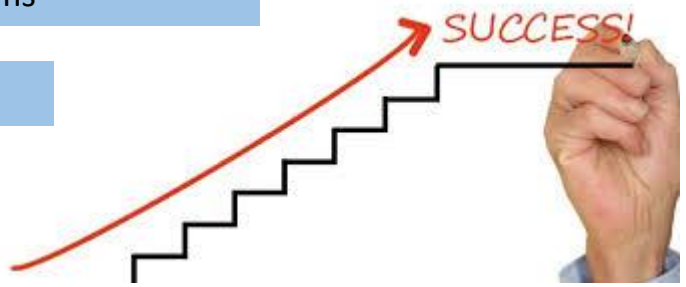
Acceptance | Price Optimization | Sophisticated Technical models| Flexible platforms

Price Optimization | Sophisticated Technical models| Flexible platforms

Sophisticated Technical models | Flexible platforms

Simple Technical models | Rigid Platforms

No Technical model | Less data availability



- Iterative process to bring discipline into pricing and underwriting progressively
- A collaborative effort of multiple functions
- Managements, Underwriters, Regulators, Actuaries and IT need to embrace change
- Requires and facilitates active communication in all directions

PRICING CYCLE - WHAT & WHO?

DATA	MODEL	IMPACT	STREET PRICING	IMPLEMENT
Data Extraction, Preparation	Developing technical models	Assess the impact of technical rates on the portfolio	Adjust technical rates to make them "market ready"	Implement the rates on various systems and platforms to make them available to the market
IT Actuary	Actuary Underwriter Finance Claims	Actuary Underwriter Sales	Actuary Underwriter Sales	IT

- Actuarial training provides the technical and business knowledge that actuaries can leverage to work closely with all stakeholders and add real value
- Partnership with IT is often underrated

DATA

- Usually the most time consuming part of the process. Challenges, for e.g.
  - ❑ Matching claims and policy data with different systems
  - ❑ Data not recorded appropriately – missing values, erroneous values
  - ❑ Duplicate records

- Actuary needs to work closely with IT to understand historical data capture that might dictate how the data is used for modeling

- Actuary must advise on useful data fields that are not being captured – make an importance list to assist the management decision to upgrade data capabilities.

DATA

Policy System

Claims System

External Data

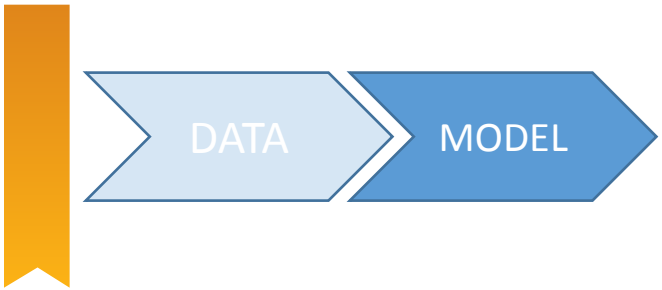
Driver features:
Age
Occupation
Years License
.....
.....

Vehicle features:
Age
Make/Model
Body type
.....
.....

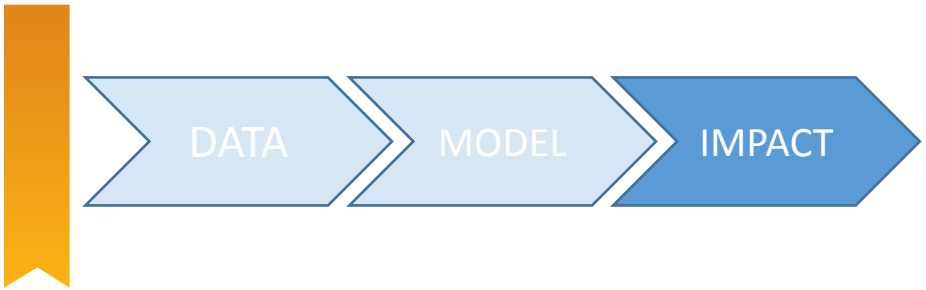
Driving features:
NCB years
Claims in 'X' years
Convictions
.....
.....

External:
Income index
Education index
Location
.....
.....

Good balance of credible factors from each category



- Generalized Linear Models (GLMs) are a industry standard
- Scientific way to derive technical premiums
- Intuitive - segments the data and determines what drives the losses
- Multiplicative structure that most markets use
- Models should be validated periodically to ensure they remain predictive
- Machine Learning Techniques are becoming popular in developed markets



- Impact Analysis is a communication tool for the actuary to reach out to wider audience
- Assesses the ***impact*** of the technical premiums on the portfolio
- Usually in a less mature or tariffed market, a lot of cross-subsidies exist
- Switching directly to technical rates is not ideal as it can potentially:
  - ❑ reshape the portfolio drastically
  - ❑ result in material loss of business
  - ❑ damage business relationships
  - ❑ not comply with regulatory requirements
- Insurers need to take a moderated approach to deal with these issues
- Impact Analysis provides the basis to kick start the dialogue for a transitional framework acceptable to all stakeholders

DATA → MODEL → IMPACT → **STREET PRICING**

- Markets are unable to handle drastic step changes
- Street pricing would typically set rules to move in the direction of technical price by taking small steps

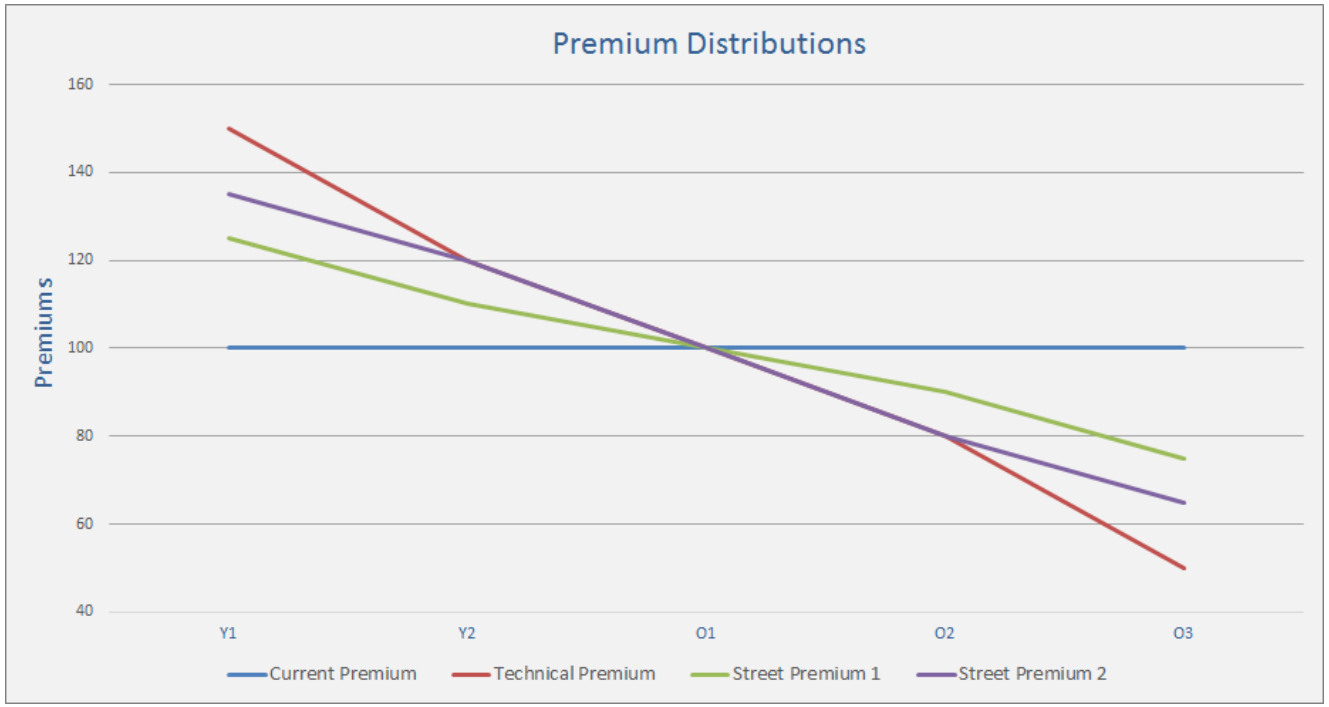
Let's take an example – inforce book of 5 motor policies

#	Driver Age	Current Premium	Technical Premium	Rate Chage %	Rate Change Band	Street Premium 1	Street Premium 2
1	Young	100	150	50%	GT 25%	125	135
2	Young	100	120	20%	10% to 25%	110	120
3	Old	100	100	0%	-10% to 10%	100	100
4	Old	100	80	-20%	-25% to -10%	90	80
5	Old	100	50	-50%	LT -25%	75	65

Rate Chage %	Street Rule
GT 25%	Cap at 25%
10% to 25%	Cap at 10%
-10% to 10%	No change
-25% to -10%	Floor at -10%
LT -25%	Floor at -25%

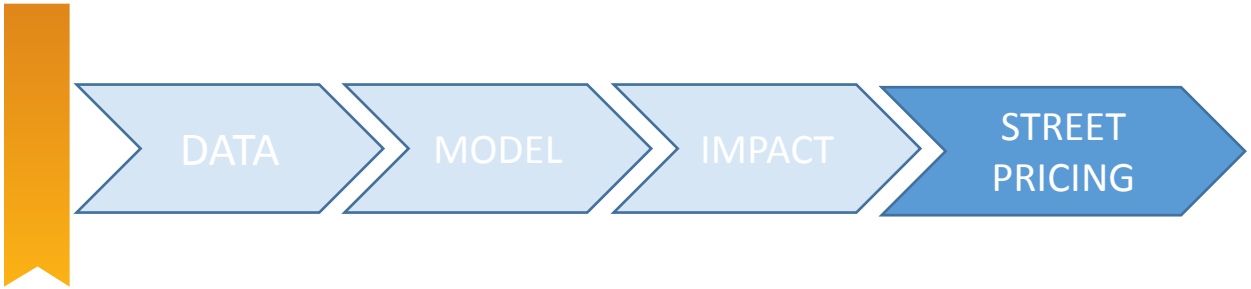
Rate Chage %	Street Rule - Old Driver	Street Price Rule - Young Driver
GT 25%	Cap at 10%	Cap at 35%
10% to 25%	Cap at 5%	Full increase
-10% to 10%	No increase	No decrease
-25% to -10%	Full decrease	Floor at -5%
LT -25%	Floor at -35%	Floor at -15%

DATA → MODEL → IMPACT → STREET PRICING

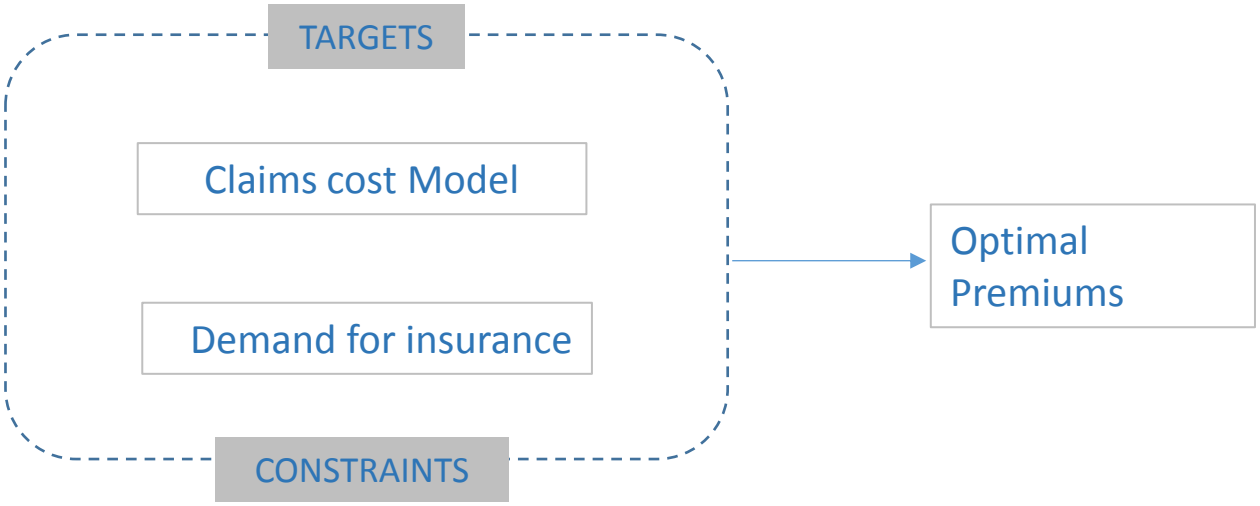


Technical premium provides the true theoretical discount to Old drivers

Street rules – provides segmentation but discount less steep than technical



- Insurers are increasingly using the Optimization techniques
- Introduces the effect of customer behavior on buying insurance
- Interplay of the claim cost from modeling and the demand from the customers
- Done appropriately, this can help the insurers achieve their profit, growth and business mix targets subject to regulatory and other constraints
- Be mindful of regulation! Some regimes may consider this unfairly discriminatory



LARGE COMMERCIAL

KEY PLAYERS

GENERAL FRAMEWORK

COMMUNICATION

KEY PLAYERS

Represents the insured
Reaches out to the UW with all the information on the requested coverage, historical claims etc.

Evaluates if the risk is acceptable to
the insurance company

Uses suitable pricing techniques to provide analysis on different coverage options

- Actuaries are required to “think” like an underwriter
- Communication with the underwriters is key - make it transparent and easy for them to understand technical price determination process so they can in turn communicate with the broker
- Insureds look to partner with insurers who understand their risk, and being able to explain all components of the premium is big way actuaries can contribute
- Actuary should carefully choose techniques that are intuitive and lend themselves well to these objectives

GENERAL FRAMEWORK OF PRICE DETERMINATION

Understand the structure to be priced and data available
Compare to historical structures

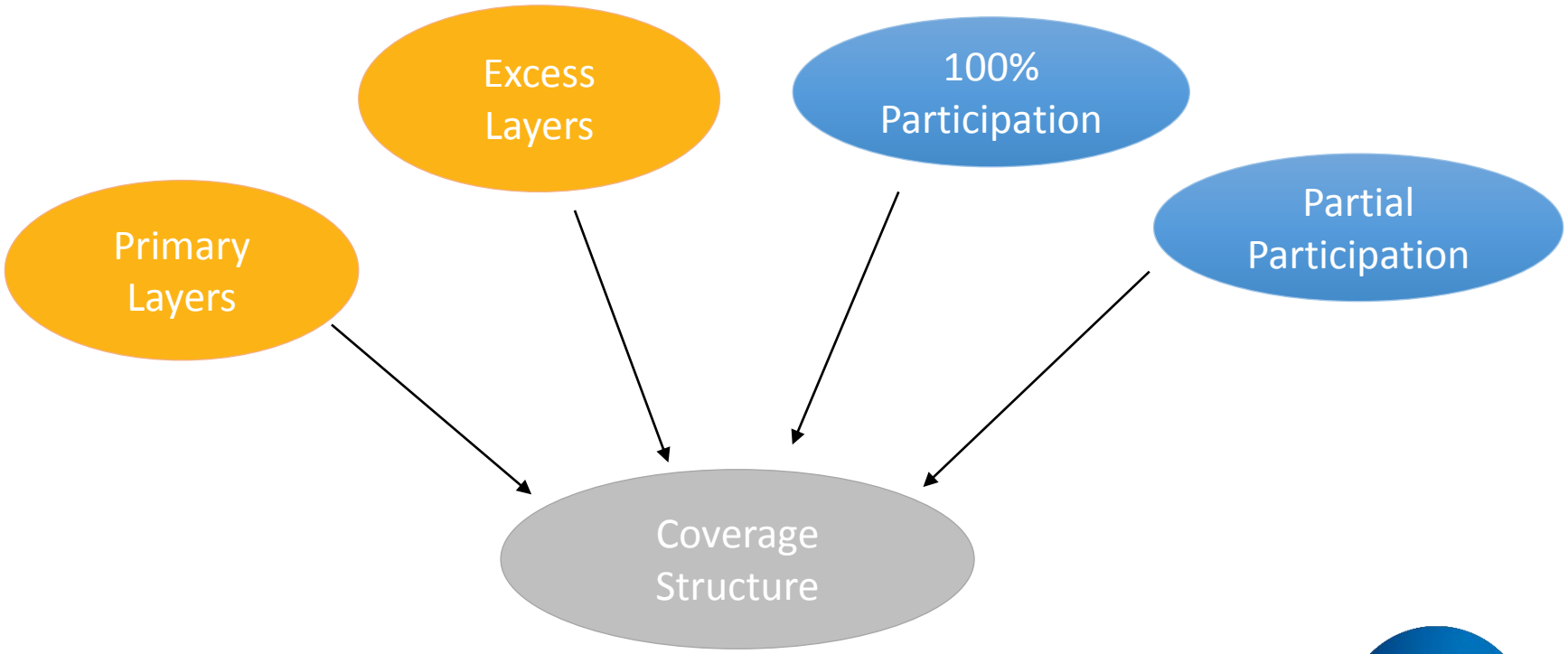
Discuss any queries with UW who in turn may go back to the broker
Less information means less informed pricing

Model the historical claims

Simulate the modelled claims

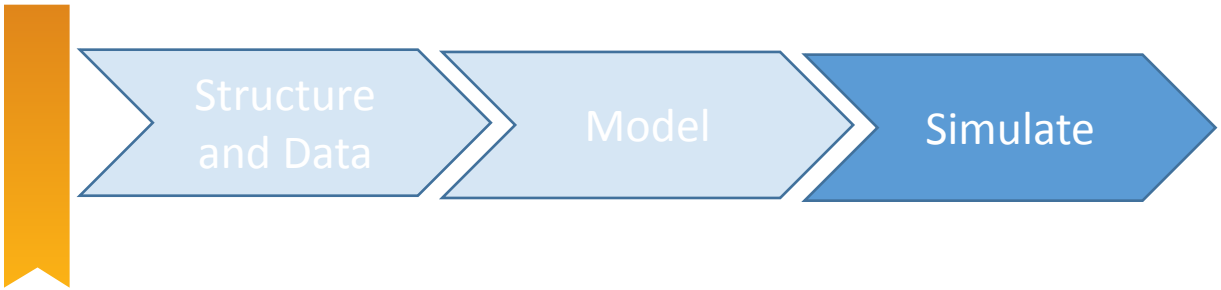
Allocate the simulated claims to different structures

Structure and Data



Structure and Data → Model

- Objective is to estimate the future claim count and claim cost characteristics
- Experience rating uses the insured's own data
- Exposure rating uses industry data
- Typically, these will be blended to build final estimates
- To price different layers, one can choose statistical distributions that can be simulated (run over and over again) to create scenarios
- Typical claim count distributions – Poisson, Negative Binomial
- Typical claim cost distributions – Pareto, Log Normal, Mixed Exponential



- Simulation results are a tool kit for the actuary to speak to the underwriters
- Each simulation represents a possibility of how the loss process can turn our
- Easy to communicate how many claims are estimated to be above a certain threshold
- Let's take an example with 5 simulations (typically, 10k-50K)
  - ✓ Expected claim count = 2.5
  - ✓ Expected severity = 3000
  - ✓ Standard deviation of severity = 4000

Simulations						
Simulation Output #	Number of Claims	Claim #1	Claim #2	Claim #3	Claim #4	Claim #5
A	2	1000	1500			
B	1	3000				
C	5	500	2500	5000	100	1100
D	1	15000				
E	3	600	1800	4200		

- Now that we have simulated the losses, we can allocate those to almost every structure. Let's take an example:

Structure	Layer 1	Layer 2	Layer 3
Attachment	1000	2500	5000
Limit	1500	2500	5000

- For each simulation allocate each loss to these three layers
- For a given layer, this would provide 5 possible outcomes at the end of the year

Simulations							Allocate		
Simulation Output #	Number of Claims	Claim #1	Claim #2	Claim #3	Claim #4	Claim #5	Layer 1	Layer 2	Layer 3
A	2	1000	1500				500	0	0
B	1	3000					1500	500	0
C	5	500	2500	5000	100	1100	3100	2500	0
D	1	15000					1500	2500	5000
E	3	600	1800	4200			2300	1700	0
						Avg Claims	1780	1440	1000

CONVERSATIONS WITH UNDERWRITER

Underwriter: So how many times do we blow up each layer?
Actuary: 100%, 40% and 20% of the times

Underwriter: Broker has some quotes at hand (1500, 1800, 1400) - what Profit margins do these mean?
Actuary: First one would be a loss of about 20%, Layer 2 and 3 bring 20% and 30%

Underwriter: I have spoken to the broker. Customer insists that we take some share on the first layer if we need a piece of other layers.
I am happy to pick up 30% on layer 2 and layer 3. What is the max we can absorb on layer 1 to hit the target profit of 18%?
Actuary: I think you can go up to 10%

Layer #	Claims	Offered Premium	Profit	Profit Margin	Share	Assumed Premium	Assumed Profit
1	1,780	1500	(280)	-19%	10%	150	-28
2	1,440	1800	360	20%	30%	540	108
3	1,000	1400	400	29%	30%	420	120
Totals for Insurer Share						1110	200
Profit Margin for the Insurer						18.0%	

CONCLUDING REMARKS

TRACK & MONITOR
ROLE OF INTERMEDIARIES
ROLE OF REGULATORS
SUMMARY

TRACK & MONITOR

- Crucial to keep a track of performance with continuous monitoring
- Track key performance indicators
- Create a feedback loop for the management to take timely action
- Premium Strength = Actual charged premium / Technical premium
  - ✓ Pricing discipline
- Premium (Rate) changes
  - ✓ Market cycle – strategy direction
- Conversion/Lapse rates
  - ✓ Sizing the competition
- Growing and shrinking segments
  - ✓ Any anti-selection going on
- Growing and shrinking channels
  - ✓ Possibility of a bias in how insurance is offered

ROLE OF INTERMEDIARIES

- Business mix and premium strength can depend strongly on the role of intermediaries such as brokers and agents
- On personal lines side, a portfolio or market relying heavily on intermediated business can keep the rates low
- On large corporate side, brokers are involved to a great degree on each account and interested in how the price is build – many employ actuaries
- Personal lines technical models can actually use intermediaries as a rating factor to understand the risk of the business they provide
- Commercial lines portfolio tracking can similarly point out to brokers placing profitable/loss making business
- The final price is a matter of negotiation between the underwriter and the broker
- Technical analysis provides the insights to effect a good negotiation strategy – educate the broker and provide the right incentives

ROLE OF REGULATORS

- Some products are required to be purchased by law in various countries – e.g. motor third party liability for individuals, Workers' compensation for businesses
- Regulators focus on products which influence the public at large
- Regulations can determine what insurers and intermediaries can and cannot do
- It is important for all market participants to understand the goals of regulation and work with regulators for an efficient future!

SUMMARY

- The role of the actuary goes beyond sophisticated modeling techniques
- Benefits of the modeling will not be achieved if the modeling results stop at the actuary's desk
- Actuary should be able to communicate the results effectively
- How do the results impact the portfolio – more than the analysis itself, the management wants to know what difference the analysis makes
- It is important to understand that all stakeholders come from different backgrounds - respect this while taking them through your work
- Remember – no model is perfect and will never be! It is a starting point for a constructive dialogue and an effort to make an informed decision
- Actuarial Science and Underwriting Art have to be blended for the insurance company to thrive

COLLABORATE | COMMUNICATE | COOPERATE

Casualty Actuarial Society
4350 North Fairfax Drive, Suite 250
Arlington, Virginia 22203

www.casact.org