

Building an Individual Claim Life Cycle Model

CLRS Workshop 2: New Techniques in Reserving
September 5, 2012
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Why do it?

- Use more of the information contained in your data
- Improve predictive accuracy
- Quicker recognition of changing environment
- Better reserve allocations
- Layering of losses
- Improved operational or strategic business decisions



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Challenges

- Same as with P&C reserving in general
 - Loss development occurs over time, mature periods are old
 - Immature claims contain information
- Many facets of loss development
- Helpful to concentrate on a single time-step (e.g. beginning of quarter to end of quarter)



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A Fairly Simple Example

- Loss development on reported claims
- Ignore for now questions of emergence
- Also ignore re-opened claims, salvage and subrogation.
- Individual claim detail for 20 calendar quarters
- Only need data on claims that were open at the beginning of each quarter

Data

Financial Data

Beginning Case Reserve
Ending Case Reserve
Payment in Period

Exposure Characteristics

Type
Product
ZIP Code

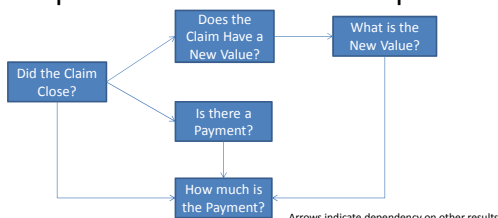
Timing Data

Accident Quarter
Report Quarter
Valuation Quarter

Claim Characteristics

Loss Cause
Loss Cause - Detail

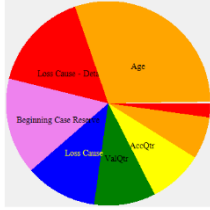
Claim activity from the beginning of the quarter to the end of the quarter



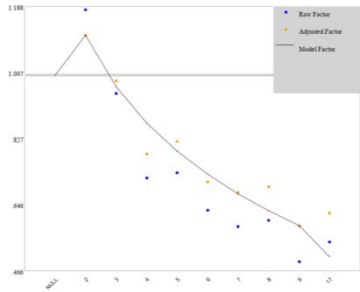
A number of available claim or exposure characteristics may have predictive value for any of these questions.

Probability of a Claim Closing

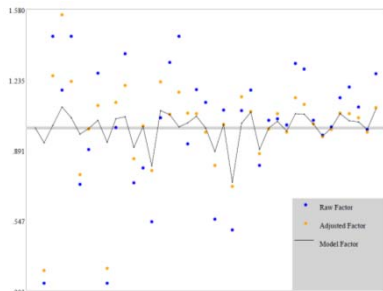
- Base probability of 71%
- Modification of this probability by various claim characteristic values that were found to have predictive value



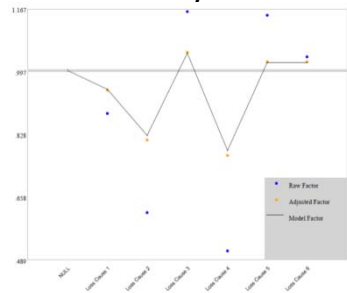
Close Probability – Claim Age



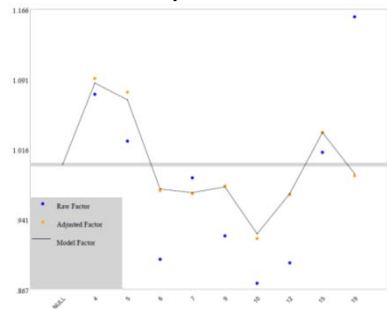
Close Probability – Loss Cause (detailed)



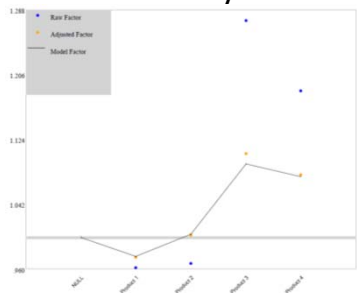
Close Probability – Loss Cause

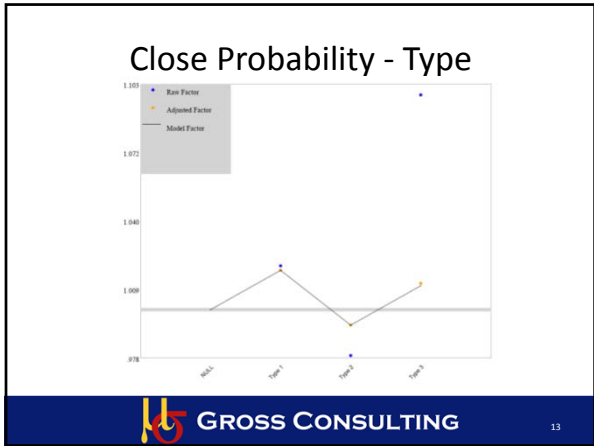


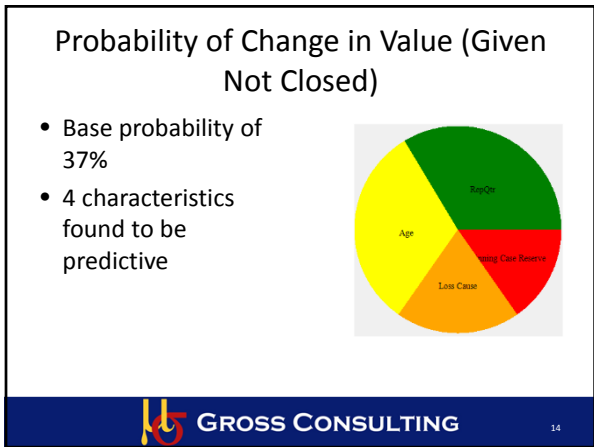
Close Probability – Accident Quarter

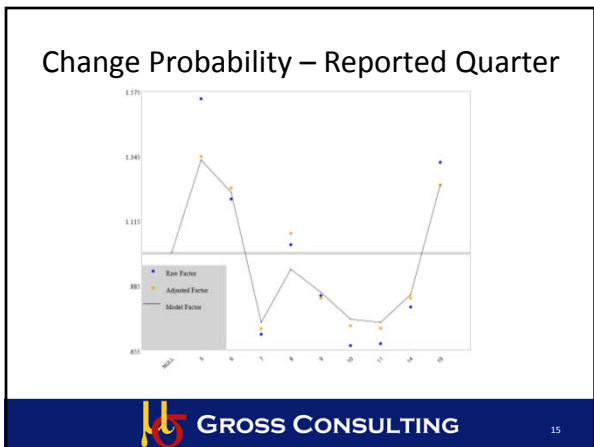


Close Probability - Product

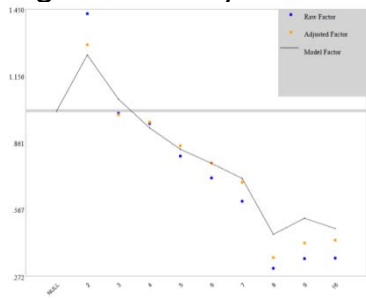




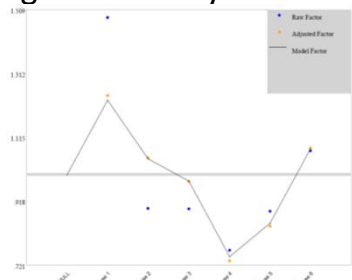




Change Probability – Claim Age

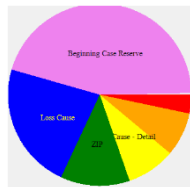


Change Probability – Loss Cause

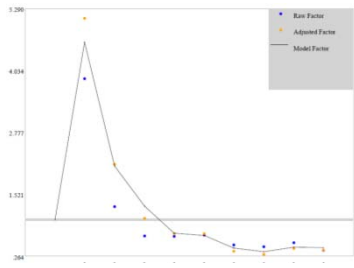


New Claim Value (Given Changed but Not Closed)

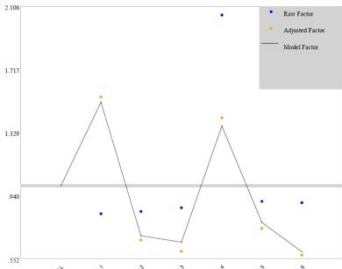
- Base factor of 1.98 to beginning case reserve
- Modification to this linear relationship, as well as five additional predictive characteristics



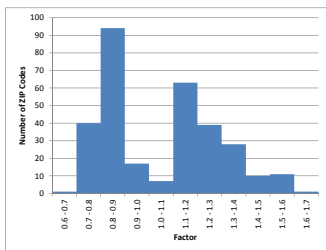
New Claim Value - Case Reserve



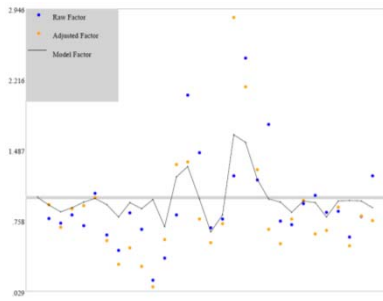
New Claim Value – Loss Cause



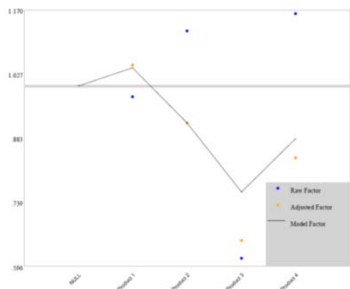
New Claim Value – ZIP Code



New Claim Value- Loss Cause (Detail)

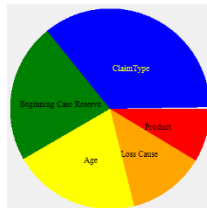


New Claim Value - Product

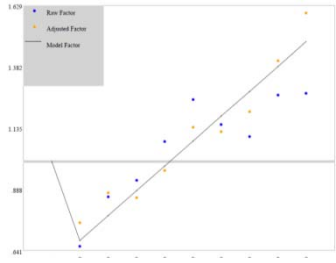


Probability of Payment

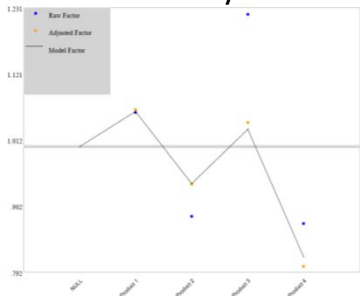
- Base probability of 51% for any given claim
- Additional predictive power for five claim characteristics



Payment Probability – Case Reserve

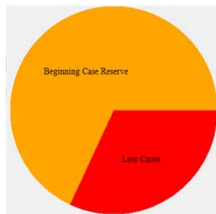


Payment Probability – Product

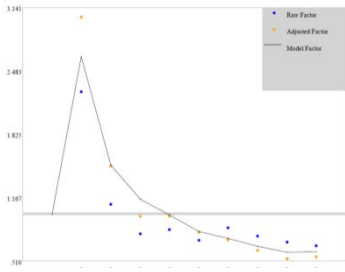


Paid on a Claim Closed (Given Payment Occurs)

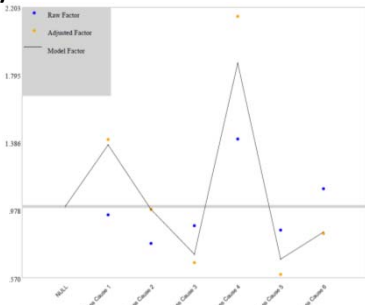
- Basic assumption of linearity with Case Reserves – base factor of 1.23
- Beyond that assumption, case reserve level and summarized cause of loss found to have predictive power



Payment Amount – Case Reserve



Payment Amount – Loss Cause



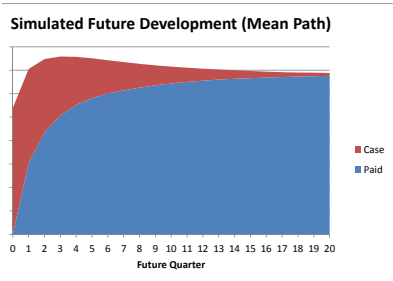
Fraction Paid on an Open Claim (Given Payment occurs)

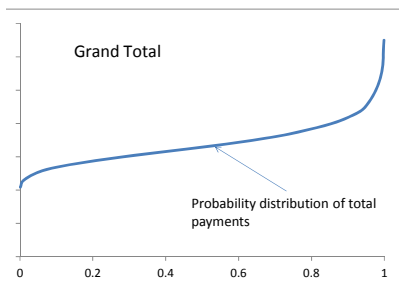
- Base factor to new value (or previous if unchanged) of 56%
- None of the variables were found to add predictive value

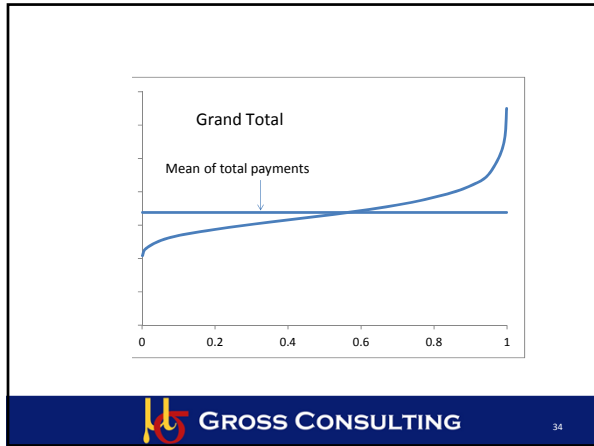
Bringing it together

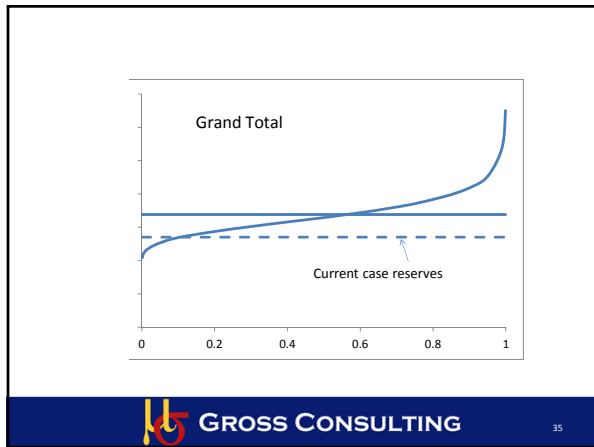
- Simulation can be used to project activity in the next quarter
- It is necessary to project not only the predictive relationships, but also the residual error term.
- Chain through quarters using information from the previous simulated quarter.
- Store results, preferably at the claim level.

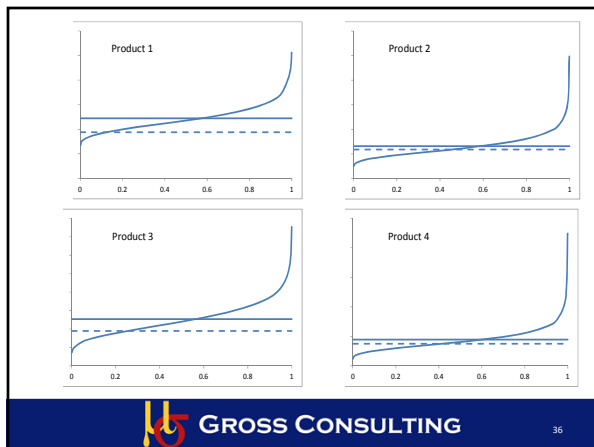


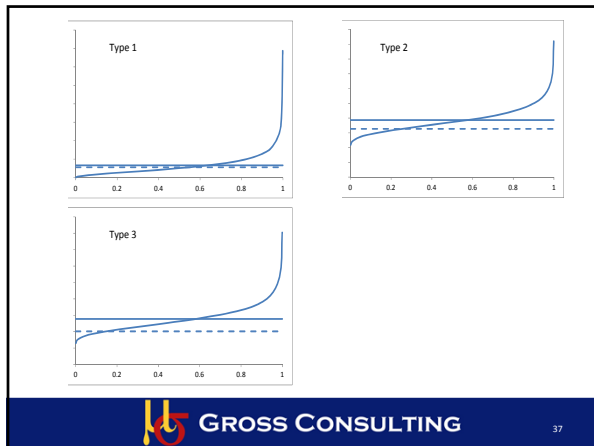


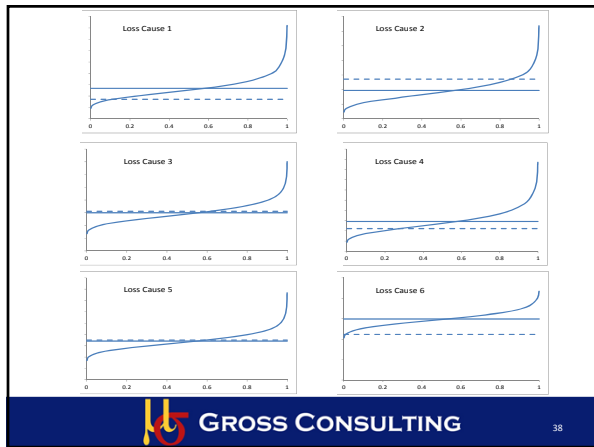












Discussion of Additional Complexity

- Relationship between Loss and ALAE
- Emergence
 - Added problem of unknown claim characteristics
 - Simulation approach driven by need for detail (ex. path is important, or only ultimate)
 - Valuable link to pricing
- Re-opened claims
- Changing claim characteristics
- Salvage & Subrogation

Uses of Methods

- Opinion of reserve and uncertainty including interim projections their uncertainty
- Investigating questions from a traditional triangle analysis
- Indicating potential problems with a triangle analysis
- More focused discussion with claim department
- More sophisticated allocation of reserves



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