The Grizzled Actuary

A discussion paper

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The Grizzled Actuary: The tale of Lucy Austral-O'Pithecus as she explores the value of experience and wisdom in reserving.

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Abstract

We need better ways to develop and communicate best practice reserving and reserve reporting -given ever growing stakeholder requirements, professional standards, method innovations, data sophistication, and risk requirements that push us deeper into the wicked problem space. The storytelling format is in answer to the inherent difficulty of scripting how reserving work should be done. Instead of adding to the endless rules and entreaties about how things should be done, this actuarial page turner explores the somewhat *hidden* elements of good reserving practice such as: optimizing the value of experience; agency risk; the role of conversations; the importance of governance and controls; hypothesis and problem solving structures; understanding what "black box" really means, and reserve scenario analysis that should enhance our ability to produce "A Good Actuarial Report". The storytelling process itself gives us some insight on how to extend best practice

Keywords

Reserving, reporting, wicked, problem solving, storytelling, wisdom, experience, Lucy

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Introduction

The character of "The grizzled actuary" was conceived in the 2013 GIROC working party by Richard Kelsey as we considered how to advise actuaries on what constitutes a "Good Actuarial (reserving) Report". But we quickly realized anything written down would be automatically obsolete as reports and reserving are contexts driven and these are too numerous and ever-changing for a template approach. The contexts range from how one interprets "a" data point to "ze" commissioner's purpose -with the actuary and many systems and other stakeholders in between. Rather than accept defeat I suggested we think about conveying the experience and wisdom aspects of reserving and reporting through storytelling (we had been bantering about the power of metaphor as a conceptual tool and storytelling's growing use in business and dialogue circles for explaining complex situations). James Orr provided an excellent list of themes to cover and the grizzled actuary was born. The characters and events in this story are purely fictional and any views are not official views of my employer; and while I had the pen, this story has benefited greatly from the background of our free ranging working party conversations. We hope you will enjoy and even consider adding to the tales of the wisest most grizzled and first modern actuary: Lucy Austral-O'Pithecus.

The tale of our hero, the grizzled actuary, continues.
John and I had been discussing what role experience and wisdom had in reserving and he had this story to share:

“When I was selecting my decay factors, I had a pretty consistent set of data and a good range of different fit statistics. The trouble was I did not know which made the most sense. I could choose the best fit, but the volume could have been higher and the best fit answer was a lot different from what the last study had found. Also, did I really know what the tail should be?

While I was thinking of this I bumped into my former boss the famous Lucy Austral-O’Pithecus who happened to be visiting the office. I knew she had much more important things to do, but summoned up the courage to ask for her input. She was welcoming and said she thought it important to share ideas freely. You never knew what sort of harvest that might bring. She had reviewed similar business before, so she was willing to help, but she said she would leave the decisions to me saying that while she may have overall more experience, she could not readily make up for my granular understanding of the data and its current context.

She looked through the spread sheets and selections with me said she could not see anything dead obvious and made ready to leave, paused, and then suggested a structured spot checking process to see if any of the relationships between my initial selections and the historic data looked out of whack. She said it might not show anything, but it would help her get her head into the analysis better. She had me put the raw loss triangles on an incremental basis alongside the development statistics, plus had me print out the year on year and cumulative rate change and volume change statistics. She said it was important to not lose sight of the original loss data. While statistics can help uncover subtleties, they can also hide them. She was looking particularly for confirmation of stability against nominal and on-level premium changes saying turning points often distort analyses. For her, this was part of a core checking process she did consistently on all reserve reviews to maximize the benefit and efficient use of her experience and minimize operational risk. We each noticed a few skewed points but no patterns, so in the end we left the selections alone.

She helped a lot. It was not so much about being able to walk in and stand in someone else’s shoes and do it better, but to follow a process and challenge it a bit and ask good questions based on past problems she had seen, and listen to me. She encouraged me to stick with my new answer, but show a scenario that was closer to the prior selection and explain in my report the workaround tactic needed to get there. I told her I liked her trick during a time of change of leaving a back door open with an alternate scenario that had a reasonable chance of being true. She said experience helps her get the priorities right and, with so many relationships to keep balanced and things to be checked, it takes time to reach a stage where it can be done efficiently and even she is still learning.

Lucy suggested that I follow-up by finding what policies or claims were involved in the tail and checking in with the appropriate underwriters and claims managers for any insights. I told her I had a tight deadline, so I would be hard pressed to do much additional work, but I was curious about how she thought I should proceed at least for next time, and could she suggest specific questions I should ask to get to the bottom of things?

She said I *could* ask specific questions, but thought it might be best to start with a general conversation with each stakeholder over what *they* think I should be aware of. This would likely give me ideas for appropriate specific question once I have heard their viewpoint, but I could not know all of them in advance. I should bring along exhibits from my own draft study and if possible copies of related reports that they are used to working with to reduce the risk that my actuarial exhibits and related commentary baffle them.

Lucy confessed: “Kind of like when you showed me your exhibits first off and I hesitated. It did not really sink in and I was tempted to just agree with you. People sometimes need to see things in a way they are used to alongside the view you are used to. As long as they come from a consistent source, it should remove confusion. You might even see something you missed when you look at things from their point of view.

Think of the interview as a multi-stage feedback loop: general discussion then specific then theorizing, then back to even more detailed information once the questions have deepened. Seek more detail on the less straightforward areas, and do only gentle probing on the more stable ones. The key is listening then reflecting back any actuarial judgment or data that either helps explain or confuses things. This way you learn from each other. Don't focus too much on points of agreement and instead on areas of difficulty. Discuss examples of the problem first, then consider a few basic related facts focused questions (like who, what, when, and where). After this initial scanning[i] it may be clear what a good articulation of the problem is and you may start having credible theories of how or why the problem is occurring as opposed to unhelpful pure speculation. Not until you have a clear problem statement can you best avoid false starts, but deep dive with confidence."

I said: "But what about your practice of suggesting alternate scenarios. How did that come about?"
Lucy Said: "It came from the time I ignored an anomalous point and did not ask for advice because I was under time and "keep it stable" pressure and did not want to make a fuss. While my work passed external actuarial audit, it took a lot of "reasonable range" and "I know my book best" discussions to get there. The following year it became clear, that the alternate view was the more correct and reserves needed to be strengthened. Under pressure to rebuild confidence with auditors and management I brought in an actuarial risk analyst, my now husband Archie O'Pithecus to help improve processes. In addition to advice on methods and process Archie spoke of agency risk and overconfidence as key things to watch out for. "Agency risk is the risk that one party appointed to act on behalf of another will, instead, acts on its own behalf"[ii] and "can arise from simple ignorance of law and best practices, unwillingness to adopt best practices, or through willful negligence and corrupt practices"[iii]. This can easily tip into fraud if there is a personal financial benefit involved.

Archie said I need to keep up on emerging practices. Also I should be sensitive to my own potential for financial gain or loss where selections are not straightforward to help mitigate the risk of committing fraud. I was a bit confused about how to do this and he suggested I pre-set two types of thresholds: one with respect to what a material uncertainty could be in one of my selections (e.g., how much room for judgment in an actuarial decision is unusually large); and in a similar vein, what I should consider to be a material gain to my own circumstances. This way, I have a ready defensible way of testing on the fly if I am getting into a grey area. Standards set in the heat of the moment may be less trustworthy. He said if current decisions possibly impact a threshold, my work should get extra peer review. His other advice was to rely a lot on transparency, e.g., making it easy for others to see what I did and why I thought it reasonable or necessary, especially when I have less certainty. It was here that he brought in the idea of scenarios for communicating material uncertainties. They highlight for others in a more intuitive way what information and choices I am concerned about and how they may impact results. They are also an invitation for others to have input (they may have their own theories, now that they see practical examples) and help them avoid overconfidence in my actuarial opinion. It may also lead to their interest in investing in better data, technology or more personnel if the uncertainty is outside their appetite.

Archie asked me about risk governance and controls in my company. I said, "Do you mean for actuaries or generally?" "Well, just start with the overall framework and any areas you feel are worthy of mention." he said. I said "OK, there are level one policy's that cover general conduct and risk governance; level 2 policies that are more functional focused with, say half a dozen that apply to actuaries; and individual actuarial procedures for regular key processes. I then have procedures specific to some of my key processes. The actuarial related policies list out some do's and don'ts and people I should contact if there are thresholds met or exceptions sought. Often though, the policies and procedures are not specific enough to help me in the complex situations I face and I rely on my own judgment as to what to do." "Well, relying on your judgment is a good foundation as policies and procedures should never replace good judgment. I think of them as a checklist for the kinds of things I should be concerned with so I do not forget a step or stakeholder. When policies get super detailed, I find them less effective, since the real world is always more complicated than what can be written down, so you can go mad trying to fit everything you do into a policy that tries to consider every contingency or risk. An enhancement to policies and procedures is materiality thresholds as I alluded to before. Think about how large a breach to a specifically applicable policy or procedure might need to be for materiality, and consider that as a threshold amount to guide you towards special action or breach reporting. Thinking this through in advance will help you notice when things actually go out of kilter.

Further along these lines consider a few likely scenarios that could cause single or multiple breaches. This will help you be more alert to emerging problem situations. This is also part of developing experience and wisdom. Conflicts of interest, as I explained earlier, are particularly important to monitor. And when these are at stake the ‘so what’ factor is the test of an effective governance structure, -‘so what’ if I think there is a problem, am I empowered really to raise it and if I do, will it get appropriate attention? As a professional, you are under a higher burden of expectation, so you will need to use your ingenuity and integrity to guide you towards an appropriate outcome. There is always the profession’s advice service. I used it once and it was helpful. They helped me see things from a different perspective and even though there was something ‘wrong’, I had assurances I was not professionally bound to do something about it as it was not a professional matter, but I was reminded there might be other duties. If your direct line management is or would be non-receptive, it should always be possible to raise concerns to your risk management, compliance or internal audit departments, even if anonymously. Just keep a record. Also, the PRA and other regulatory authorities can handle anonymously raised issues. In my case, I could only raise it formally without adverse fallout within risk management processes, but since I thought PRA compliance might possibly be impacted I had an informal chat with my compliance officer as to whether something more aggressive was needed. It does not need to be your burden alone. Share the load with sensitivity, but do not neglect documentation or shirk your responsibilities. Looking at things from the perspective of an outsider and how they might expect you to act will help you avoid the trap of following a policy, but still failing those who depend on you.”

John: “Lucy, thinking about your comments on materiality and governance, I feel this reserve change deserves more scrutiny. How can I study this better?”

Lucy: “I like the fact you are paying attention to how you feel about the analysis, often something is too complex to put into clear thoughts, but an emotional response may be triggered. I always pay especially attention to negative emotions and try to identify something objective my mind associated with the worry as a starting point for more rigorous investigation. And you have to start somewhere anyway. What prompted you to feel something might be wrong?”

John: “I just had an image of explaining things to the FD, and getting a grilling about why the change has occurred. And I thought of the shame of it being something simple that he knew and I did not, like a TPA bordereaux coming in late. Also, to be honest, this could affect people’s bonuses, mine included”

Lucy: “Kia Kaha, let fear keep you strong. We could start with claims processing, but let’s check if the underwriter knows anything first. He would want to be informed early on anyway, so it may be more politic to start with him?.”

John: “OK, but I owe Nigel something and he may ask why I don’t have it…”

Lucy: “Being professional is about keeping priorities right. Is the thing you owe more important to him than this possible result?”

John: “No. OK. I will send him an email and copy in the claims manager.”

Lucy: “Wait, I think you should see him in person. Management by email rather than conversation or face to face meeting breaks down the chance for natural feedback and in this case may send the message to your underwriter that you are avoiding him. There would be nothing necessarily wrong with copying in claims, but you should consider peoples possible reactions and adjust your phrasing accordingly. I know you are very considerate, but I am really sensitive to this after my experience of certain people in the head office for whom copying in is often a really threatening or bullying exercise, either when the manager themselves has trouble with assertiveness, is afraid of confrontation or is afraid of challenge.”

John: “Gotcha. Something like that happened to me earlier this year and these two guys are prone to blaming each other, so I can see that that any approach may stir up resentment and affect their objectivity. Also, I am feeling a bit afraid of Nigel right now…. I guess it is time to man up and go see him.”

John: “Hi Nigel. This is Lucy Austral-O’Pithecus who works in head office. I am finding some spikes in your data and she is helping me fit things together.”

Nigel: “I know Lucy from my Bloodstock underwriting days. We used to call her the grizzly wizard on account of her name and the shock of grey in her hair and her constant preaching of doom and gloom."

Lucy (Laughing): "Yeah, Mrs. Austral-O'Gare and I was a relentless perfectionist back then, always finding fault in everything, although my first husband Ian O'Gare really was an Ogre who did not even like cats and I had to dump him."

Nigel: "John, How can I help? I am just working on that budget you were going to give me input on last week."

John: "Sorry, something came up that may have an impact and I wanted to do more work before I saw you."

Nigel: "Next time, tell me you will be late."

John: "Fair point, but let me explain. I had seen some uncertainty in your numbers last year and it seems to have declared itself into a trend this year that increases your accountants' loss ratio by 5 points."

Nigel: "But that is the segment we are gearing up to grow because it has been outperforming the others. You never told me this might happen in your preliminary study and now you're late with the final and making it even harder to react. We just missed target Risk Adjusted Profitability last year and my team has put in a lot of effort rebalancing the portfolio to get their bonuses back. You owe us the benefit of the doubt, now that you are so late."

Lucy: "Let's not overreact. We are talking to you find out what we may have missed. John, can you talk Nigel through what you are seeing? But before that: Nigel, can you tell us what has been going on in this segment?"

Nigel: "Well, this must be the effect of some processing change and not a real up tick. Probably because of a new company initiative. There are lots of them right now."

Lucy: "Well, that is a possible explanation; do you have any facts about this?"

Nigel: "No, I was just guessing."

John: "Well, let's first identify things we know and other stakeholders who should be consulted. What have you actually noticed and who else might possess helpful facts?"

Nigel: "Nothing comes to mind. Have you talked to claims processing?"

John: "Not yet. We wanted to start with you. Who else might have an idea?"

Nigel: "Let me think about it. Can you show me what you are seeing?

Nigel (Long looking at exhibits): "So, what you are saying is that after around 3 years of development, the reserves seemed to hold to ultimate, except there was a late increase in the 2008 accident year last year due to a large loss and now a few more years have modest increases? The 2008 claim must have been the matter of Kantell, White and Wong. Their partner Wei Wong was accused of missing a large scale problem with fraudulent CDO bond accounts. The size of the award surprised us, but it is closed. I have not heard anything about the other years. The dollars are not very large so is it really worth changing my loss pick? You should try Charlie in claims. They may have finished their annual audit so there could be some useful insights."

John: "Is there anything changing with respect to your insured's or your contracts?"

Nigel: "Not really. We sell to mainly to third tier accounting firms who are not doing complex work. The contracts are pretty standard and have not changed much. It was nice seeing you both.

Lucy: "Same too. Thanks."

Nigel: “Something bothered me about what the underwriter said. What’s a third tier accountant and why would they be auditing CDO firms? Also, we need to get some advice on their wordings.”

We went off and had discussions with claims and the policy wordings department. We also looked at the law firm and overall professional results to see if there were any parallels. There were no clear answers, but we found mostly things to worry about and nothing that implied we were being conservative. So I followed Lucy’s advice and stuck with my numbers. I listed out some of the key supporting pros and the less plentiful cons and provided a scenario where last year’s large loss was excluded on account of the financial crisis tie-in. I had already tempered this in the Bornhuetter loss ratio, but not tempered the tail factors as well.

A few months later Lucy was back in the office and asked how I was doing.

John: “Fine. Thanks again for your help this spring. As a result they scaled back the accountant’s expansion, partly due to the higher numbers, but also home office had been worried about boutique accounting firms and decided to assert themselves a bit more. I hear you are writing a paper on reserving models. Do you have any new favourites?”

Lucy: “I still use the basic link ratio approaches, but also growingly use a statistical reserving package and even some hybrid approaches if the different models have complementary strengths.”

John: “I am intrigued. What do you mean by this?”

Lucy: “It is interesting. In simple cases where the numbers behave, link ratio and statistical reserving methods give similar answers, but in real life, straightforward is uncommon. It comes down to one’s experience, I have used link ratios my whole life and I can make adjustments on the fly or do some things intuitively, like forcing link ratios to be monotonically decreasing, or adjusting factors for large losses or smoothing out temporary reserve takedowns in the data, and I can play back between paid and incurred methods in subtle ways. The problem is it can be difficult to explain or document and in hindsight reviews my smoothing and melding sometimes looks less inspired than it felt at the time. Statistical methods, however explicitly consider more dimensions of relationships and all at the same time. I find it harder to intuitively follow the results, putting more trust in the significant tests doing their job. Rather than selecting with subtlety, I find myself occasionally bossing the model around when I have convictions about, say, a particular alpha decay rate (a loss development concept) or a trend, but all of a sudden they are easier to explain and document. The proof is in the pudding, and so far my statistical reserving models have held up fairly well, and my intuitive grasp of the method is growing, but I still have fear of model failure, so I look at both methods. I am even starting to play around with individual claim simulations to help with severity shock losses. From the perspective of each other, each look very black box: link ratio family methods -since they rely on hidden assumptions that usually have not been tested or may even be statistically false; statistical reserving -since many more variables are introduced and relationships created that can get a bit abstract and the calculations are complex, perhaps relying on even more hidden assumptions; and of course individual claim simulation has its own set of perils – literally.

In deciding what is appropriate, there is a steer-ability element that one needs to consider. Do you want something like a shopping cart with fixed back wheels that can be steered with one fist in most cases and leaves a nice easy to follow path for those monitoring you, but at a cost of not manoeuvring well sideways when an obstacle is met or around tight corners?; or an independent wheels shopping trolley that can move in any direction at a moment’s notice, but needs a two hands complex steering strategy dealing with momentum, three dimensional moving obstacles and more complicated optimization? And then there are loss distributions: claims follow a time dependent random process around mixed baskets of claim types -with varying frequency and severity components and occasional process shocks. Link ratios and standard statistical reserving packages do not work at the level of this sort of granularity, but sometimes the severity aspect of reserving is dominant, so if you are not modeling frequency and severity directly with loss distributions, other methods may seem black box. So for me “black box” is as much about letting a tool make selections for you without understanding or checking, as it is about not understanding your data or underlying processes well enough to know what tool is most appropriate. Also, there is risk to think about: the strategic risk that an inappropriate model or package is used; the operational risk that the model is not used well or that mistakes are made; the tie in risk that results are compatible with use for capital modeling or pricing purposes (excessive conservatism can hurt here); and finally risk communication so that people correctly understand the types and levels of all types of risks that your analysis entails.

John: “You only said a little about hidden assumptions. Can you give me some more detail?

Lucy: Let me give some examples, but the full list is longer.

Most methods generally assume there is no bias in comparing accident years with different underlying volume and that segmentation into reserving segments takes care of all business mix changes. Also, methods generally assume that past losses have predictive power over the future, for instance with respect to mix of claim types and sizes. These in turn are affected by policy wording or social or behaviour changes. Finally, unexamined data quality (both current and historic) can be a hidden assumption.

For link ratio methods, it is implicitly assumed that the amount of loss in a later period has a multiplicative direct relationship to the amounts of loss in earlier periods; and that this multiplier is stable across different accident years. It also assumes that random shocks or lulls from the underlying loss distributions do not cause material distortions. It is an exposure free method (the ratios “divide out” exposure) except when in the form of Bornhuetter or frequency severity exposure based methods (usually in the form of on level premium). Normally, but with exceptions, it assumes that residuals are unbiased e.g., that calendar year, accident year and other trends are stable.

On the other hand in statistical methods, random shocks or lulls from the underlying loss distributions may be better reflected, but only to the extent that they are in the data. The focus on residuals helps ensure actual accident year, calendar year and development decay trends and shocks are not overlooked, but care needs to be taken to avoid over-fitting and to ensure statistically significant relationships actually make sense. Fitting has to start and end somewhere and the results can differ depending on what order you followed in the optimization process, and what significance thresholds or extra assumptions you applied. This can make benchmarking difficult as the individual model components may not be easily comparable to simpler approaches. Also some models may have adjustments normalizing loss data relative to exposure. In this case it might be assumed that there is a strong stable exposure relationship, which is not necessarily true, for instance, in times of economic or insurance cycle turning points (but this may be picked up elsewhere in the model).

Individual claim based methods, require even more model elements. It helps to think about all the factors in the “lifecycle of the peril” and think about the trade-offs needed to get a reasonable model working to come up with a list of additional black box elements that the link ratio and statistical reserving methods barely touch the surface of.

So, John, I heard you missed your bonus target this year?”

John: Yes. The accountants thing killed us off, we were limping anyway, but now the vibe seems very energized and optimistic for next year. This is because I shared some of your wisdom and experience with the management team in the post bonus review meeting and they got how we should be listening more to each other, ambivalent partisanship is a phrase someone brought up –the idea that there can be loyalty with challenge. Certainly in our case, we needed the challenge earlier. Thanks again Lucy!

Lucy: My pleasure. I benefited as well. As a final point, you might consider generally improved governance next year. We are in the process of updating policies to ensure that for critical issues like the reserve selections, sufficiently formal and open meetings occur with the right stakeholders in the room. Mind you, Informal discussions are still vital, but where important decisions are made, there needs to be formal meeting elements like: an agenda with issues for discussion, decisions to be made, points for noting and etc. and formal recording of key discussions and decisions; but the real heart of the meeting is ensuring that there is real discussion that achieves a shared understanding of the: issues, relevant facts and/or opinions to note, implications of different options. Finally there should be clarity as to any decisions that are made, accountability for them, and required follow-up actions.[iv]

Afterword: The storytelling process itself gives us some insight on how to extend best practice: by forcing the writer to confront directly the subtleties of how things really develop and interrelate as she(he) prepares to make things understandable to another (Is this why we learn by teaching?). This leads to seeing normally hidden “intermediate links” that if expanded would help make the subject or reserving surveyable[v] Finally, might we have confidence that we can begin the survey in earnest: mapping connections rather than just lists, and general problem solving methodologies rather than just actuarial ones?

[i] The SARA problem solving model: US Bureau of Justice Assistance, July 1999, *Addressing Community Gang Problems: A Model for Problem Solving*, NCJ 156059, **4-5**, 17-30. Available online at www.ncjrs.gov

[ii] Sweeting, 2011, *Financial Enterprise Risk Management:* Cambridge University Press (also, chapter 3 has a really good discussion on stakeholders)

[iii] International Organization of Pension Supervisors, 2010, *Module 3, Identifying Risks,* ***2(A)****, 17. Available online at www.iopstoolkit.org*

[iv] Thanks to James for these last suggestions

[v] This is inspired by Wittgenstein, 2009, *Philosophical Investigations (*Translated by Anscombe, Hacker, Schultze): Wiley-Blackwell paragraphs 119, 122, 129 (and 87 on "explanations") as copied below:

PI 87) "One might say: an explanation serves to remove or to prevent a misunderstanding — one, that is, that would arise if not for the explanation, but not every misunderstanding that I can imagine.

PI 119) The results of philosophy are the discovery of some plain piece of nonsense and the bumps that the understanding has got by running up against the limits of language. They – these bumps – make us see the value of that discovery.

PI 122) A main source of our failure to understand is that we don't have an overview of the use of our words. -Our grammar is deficient in surveyability. A surveyable representation produces precisely that kind of understanding which consists in 'seeing connections'. Hence the importance of finding and inventing intermediate links.

PI 129) The aspects of things that are most important for us are hidden because of their simplicity and familiarity.

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