

## IAA Draft Educational Monograph: Risk Adjustments for Financial Reporting

Comments Prepared by the Financial Reporting and Analysis Committee of the Casualty Actuarial Society

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*The comments below were prepared by an individual committee of the Casualty Actuarial Society, the Financial Reporting and Analysis Committee.*

The exposure draft is excellent. We really enjoyed reading it and have a few comments as follows:

Page 5: "Risk and uncertainty are used interchangeably in this monograph. In chapter 6.6, there is a discussion of the difference in how these terms might be used in some cases."

Comment:

Section 1.1 is introductory material but immediately references section 6.6, which is the conclusion of the monograph, for a definition of risk. Does the author mean Section 2.2 instead?

Including a brief definition of risk in the introductory material could be important, depending on the reader. Our impression from reading this section is that risk is defined only as adverse deviation but, in fact, the definition is more complex and subtle. One short paragraph in the introduction could include CERA definitions of risk.

The difference between expected and unexpected loss in insurance risk could be briefly defined. The ERM study material draws a very clear distinction between expected and unexpected loss. Expected loss is not considered to be part of the risk component. Risk is considered to be unexpected loss. Various types of risk could be mentioned, e.g. that insurance risk differs from market risk and operational risk, and that insurance risk has two components, namely pricing and reserving risk. One sentence could be included to distinguish between process risk, parameter risk, and model risk as components of insurance risk. The difference between policy liabilities and claims liabilities could be included since Section 1.1.2 addresses the needs of users of insurance financial statements.

Page 6: "This evolution in financial reporting practices permeates the whole of the IASB's work to codify a framework for IFRS where the concept of prudence is abandoned in favour of neutrality."

Comment: The word "neutrality" could be replaced by a risk/reward statement. We don't recall the word "neutrality" in reading Solvency II and ERM material. We do recall frequent mention of risk vs. reward.

Page 7:

Comment: Replace "(2) fulfilling a liability of 100" with "(2) fulfilling a fixed liability of 100".

Page 8:

Comment: Modify the sentence "a) risks with a wide probability distribution will result in higher risk adjustments than those risks with a narrower distribution;". Mathematically, a probability distribution is not wide or narrow. It's the confidence interval around the distribution that is wide or narrow.

Comment: Consider adding the phrase "diversification effect" to the sentence: "Risks arising from a portfolio of insurance contracts that an entity holds could be negatively correlated with each other, thus offering a reason for the entity to add a smaller amount to the present value of fulfilment cash flows in order to make it indifferent to the cash flows without uncertainty." The CERA ERM material makes frequent mention of a diversification effect.

Page 14 (2.1.1): "The main difficulties arise from the lack of frequent buy/sell transactions for similar insurance liabilities or insurance assets"

Comment: Might consider stating that for many insurance liabilities, the lack of a similar liability, regardless of whether it is traded, is the main difficulty.

Page 15: "as well as a measure of the economic value of options and guarantees embedded in insurance contracts."

Comment: Could one or two sentences be added to clarify how the reporting of options and guarantees is done with respect to fulfillment value as opposed to traditional reporting?

Page 16 Comment: We're not sure what is meant by the phrase: "The level of risk and probability analyses". Risk does have a quantifiable level but an analysis does not.

Page 16 (2.1.3): "similarly, the investment cash flows from the invested assets supporting the insurance liabilities would not be fulfilment cash flows unless the investment cash flows were directly linked as specific obligations to the policyholder per the insurance contract".

Comment: Might consider ending with "...per the insurance contract or regulatory requirements."

Page 17: “This block is needed to reflect the preference in the value of cash flows for the time value of money that occurs further in the future as having a lower value at the present time, i.e., the present value.”

Comment: Possibly include a statement on how duration is also affected by time to settlement since duration is mentioned a few paragraphs down, on the same page.

Page 18 Comment: Replace the first instance of “CSM” with “CSM, Contractual Service Margin,”.

Page 18 Question: This sentence confuses us: “Thus, the mean of those cash inflow is effectively reduced by a positive increment to the risk adjustment.” Would “implicitly” be a better word than “effectively”? The mean is an unbiased estimate of expected value. Why would the mean be either reduced or increased by the risk adjustment, which is an estimate of unexpected loss? Are we correctly understanding that individual risk adjustment values may be negative as long as the total risk adjustment is positive and that the means are independent of the risk adjustments?

Page 20 Comment: It may be useful to the reader to replace “the natural random variations” with “the stochastic or natural random variations”. Stochastic is the term often used to describe process risk.

Page 21 (2.2.1): “Frequency risk – This refers to uncertainty in the number of claims that will produce the cash outflows. It relates to what are typically called IBNR claims, which...”.

Comment: Not sure what the reference to IBNR here is supposed to point to – depending on the timing of the risk being evaluated, the claims may all be IBNR or there may be no IBNR claims, but frequency risk remains.

Secondly, the listing of risks seems odd to us, where legal environment risks and unknown risks are of course reasonable inclusions on the list but would manifest themselves as either additional claims (and therefore would be frequency risks) or larger claims (severity). In essence, the third and fourth items (and, really any possible other items) are a subset of the first two items. No recommended change here, just something for authors to consider.

Page 22 (2.2.1): “However, exceptions do exist, such as certain contracts offered in Germany and Japan”

Comment: It’s not clear to us what this is an exception to – we assume it’s an exception to the classification into long/short duration? Is it a hybrid policy of some type, covering both long- and short-duration liabilities? Could be a little more clear here.

Page 22 (2.2.1): “Because of the high perceived value and cost of healthcare services, governments often exert considerable influence on the regulation of health insurance”.

Comment: First, the wording seems clunky, even if accurate: We’re not sure it’s correct to claim that government is exerting influence on the regulation – this sounds like a very indirect way to state that government is regulating health insurance.

Second, we were somewhat bothered by whether we agreed with the reason given (because of the high perceived value) – We were thinking of value in a financial/economic context and disagreed with it (many health insurance decisions are highly regulated despite having less significant financial costs). But our reason was because of the high impact of the results of health decisions on how we live our lives, which falls well within a broader meaning of “value”. Moreover, is there actually any need to specify why government exerts considerable influence? Could remove the first clause completely. Not sure if there’s a need for a change here, but something to consider.

Page 25 Comment: Would it be helpful to explicitly mention scenario analysis and sensitivity testing in the second paragraph for “Risk assessment”? These two terms are often mentioned in the CERA material.

Page 25/26 (2.2.3): “...future mortality improvement, and discontinuities in mortality experience due either to favourable effects, such as a medical breakthrough, or unfavourable effects, such as pandemics or climate change.”

Comment: Calling these favourable and unfavourable would imply that we are discussing life insurance, but that wasn’t specified; of course the reverse would be true for annuities.

Page 28 (2.2.3): “This concept of compensation for bearing risk is not a specifically calculated valuation measure...”

Comment: Not sure what distinction is being made here, but seems like the point of subsequent sections will be to calculate this amount, so we’re not sure it makes sense to state that it is not “specifically” calculated.

Page 32: “Note that in the replication approach the entity does not need to actually hold these financial assets. The insurer’s actual asset portfolio can consist of different financial instruments. The replicating portfolio is a reference value determined for the purpose of valuation only.”

Comment: Clarification may be needed here. Is the replicating portfolio only meant for pricing purposes? That would make sense but what happens to transparency if the purpose is the measurement of solvency.

Page 33 (2.4): “Under IFRS X Insurance Contracts, the requirements are for the valuation to be current. That is, at the time of the reporting of the financial statements...”

Comment: We would not read “at the time of reporting of the financial statements” to be the same as the financial statement date (because the reporting takes place after the financial statement date). Would seem that most data would be evaluated as of the financial statement date, making the statement slightly incorrect.

Page 35: “Equal likelihood in the description above is not intended to be 50% probability, i.e., the mode of the probability distribution.”

Comment: Should say “median”?

Page 36 Comment: Either “an” should be replaced with “...an” in the quote from the 1998 Stein and Stein reference or “an” with “An”. There are a few more cosmetic changes which we’ve not listed here. We’re sure they will be checked before publication.

Page 41 (3.1.1): “Clearly no diversification of risks has been achieved by adopting this risk measure”.

Comment: We would consider that whether or not diversification “has been achieved” is independent of how risk is measured. We would consider wording as “Clearly no diversification of risk is demonstrated by this risk measure”.

Page 44 (3.1.2): “The security provided by capital requirements is for the protection of policyholders who expect their insurance contracts to be fulfilled, and also for the entity’s owners to protect their investment it.”

Comments:

1. The “it” at the end seems to be missing a word. “to protect their investment in the entity” perhaps?
2. We don’t think we agree with that, as it seems to imply that the owners want to supply that capital – many (most?) owners would prefer to run the company with minimal capital and hold onto their capital and accept the risk associated, if allowed by regulators to do so.
3. Might mention that it provides protection for regulators and/or guaranty funds?

Page 46 (3.1.2): “...hold capital in relation to non-replicable risk...”.

Comment: The remainder of the paragraph seems to imply that “non-replicable” is in reference to risk that “cannot be hedged”, but no definition is explicitly stated here.

Page 49 Question: We’re not understanding the term “wide probability distribution”. We think that the author means an empirical probability distribution with a wide spread of data points.

Page 49: “Such considerations are of particular concern when the probability model of the fulfilment cash flows cannot be adequately modified...”

Comment: A suggestion to replace “probability model” with “the parameters of a probability model” in this sentence. Otherwise, it’s unclear how to modify a model except by replacing it with a different model, e.g. splicing on a different tail resulting in a composite distribution. In contrast, the parameters of a distribution can be easily changed without modifying the model. Alternately, an example of how a model may be modified would be useful here.

Page 50 Question: Does the author mean a compound model or a composite model in the sentence “Creating a compound probability model...”

Page 51: “These methods include the method of moments, maximum likelihood, and the Bayesian method.”

Comment: A suggestion is to be more specific in this sentence since Bayesian methods are used for a wide variety of purposes. We think that the author means “Bayesian data analysis”. If so, then a clarification could be included such as: “In Bayesian data analysis, an initial selection of the form of a distribution function is chosen. The data is then sampled and assumptions as to the form of the distribution are modified based on the data sampled. The initial selection is called the prior distribution and the final, adjusted selection is the posterior distribution.” Alternately, a reference could be included if the Bayesian method is described in more detail elsewhere in the paper.

Page 51: “...simplified approaches such as utilizing proxy models...”

Comment: Since proxy models are less well-known than stress tests, a suggestion is to include a brief definition of a proxy model. One sentence would suffice such as: “A proxy model is a set of mathematical functions for the individual risk factors in the calibrated cash flow projection model.”

Page 52 Comment: A suggestion is to include a brief definition or example of bootstrapping such as “As an example, in order to estimate the variability of the sample mean in the original data set, sampling with replacement to generate multiple future populations may create an appropriate distribution of sample means.”

Page 53 Comment: A suggestion to replace “it may not be realistic” with “it may not be computationally realistic” and “It is therefore important to estimate the correlations between risks.” with “It is therefore important to estimate the correlations between risks with an alternative method rather than a closed-form distribution.”

Page 55: “For example, one might investigate whether statistical fitting model class A indicates incorrect commercial decisions if the data were in fact generated from a different models class B.”

Comment: The word “family” is used more often than “class” when referring to a set of probability distributions. Maybe we haven’t heard the term “model class” before because usually only a few models are considered due to time limitations or computational resources.

Page 56: “Thus, families of distributions used in practice are more likely to have four parameters: one for location, one for scale, one for tail fatness, and one for asymmetry.”

Comment: An example of a distribution for tail fatness versus asymmetry may be useful here as the two characteristics are often not distinguished in practice.

Page 56: “This property of the GEV distribution lends itself most readily to the modelling of insurance tail (high-value) losses.”

Comment: It would be informative to also state that the GPD is in widespread use for the modelling of operational risk in ERM.

Page 61 Comment: Cumulants are usually defined by the cumulant-generating function or by the natural logarithm of the characteristic function, which are not mentioned on this page.

Page 67: “It has been utilized in the area of corporate risk management and asset liability management, often with a focus on interest rate risk, but it can also be applied for a variety of other risks.”

Comment: One or two examples of “other risks” would be useful.

Page 67: “Policyholder behaviour risks are typically considered non-diversifiable and are path-driven.”

Comment: Does “path-driven” refer to Monte-Carlo simulation? Does the author mean that policyholder behaviour is not adequately modelled by a closed form statistical distribution, and that policyholder decisions are based upon individual risk factors such as responses to life events and environment or to the financial markets?

Page 67: “the account value has dropped”

Comment: Should the term be “current account value”? We think the reference here is to a hypothetical account in the financial markets. Otherwise the guaranteed benefit base in the variable annuity account would not be in-the-money.

Page 71: “However, they do not allow permit variance-covariance manipulations as would be possible with linear correlation assumptions.”

Comment: Did the author mean to include both of the words “allow” and “permit” or only one of them?

Page 71: “The relationship with Kendall’s tau also holds true for other elliptical distributions.”

Comment: A suggestion to include a brief definition such as “An elliptical distribution is one that generalize the multivariate normal distribution.” It would also be helpful to the reader to include an example of other elliptical distributions such as the multivariate t-distribution.

Page 71: “Copulas allow one to deal with the dependence among random variables separately from their marginal distributions.”

Comment: It might be helpful to the reader to elaborate here before the detailed mathematical description begins on the next page. “The estimation of the multivariate distribution is decoupled into estimation of the marginal distributions, which is more robust, and estimation of the dependence relationship, which may have scarce data. This decoupling is achieved with a copula function.”

Page 73 Comment: A suggestion to include an example. “In the non-elliptical world, the intuition about correlation breaks down.” could be replaced with “In the non-elliptical world such as Generalized Extreme Value distributions, the intuition about correlation breaks down.”

Page 75 Comment: Would it be correct to replace “Iman and Conover put forth a simple method using rank correlation.” with “Iman and Conover put forth a simple method using rank correlation to achieve a desired dependence structure.”? The purpose of this alternate method would be clearer.

Page 77 (5.1): “In practice, for financial reporting purpose it is necessary”

Comment: Should be “purposes”?

Page 79 (5.3.1): “Should the amount of losses be used? Or would loss ratio be a better option than the amount of losses?”

Comment: Not obvious to us why it would matter which you choose to model, perhaps an example would be helpful here?

Pages 80-81: “Therefore, ESGs can be used to discount insurance contract fulfilment cash flows (i.e., insurance liabilities) under alternative economic scenarios. In this case, under each scenario the generated market returns used to model fulfilment cash flows are correlated with the rates used to discount the fulfilment cash flows.”

Question: A clarification may be needed here. The first sentence means that the insurance contract fulfilment cash flows are discounted with market rates in the ESG. In other words, the discount rates are the market rates? The second sentence implies that the discount rates are not the market rates but are correlated with the market discount rates. Does the author mean that “ESGs can be used to modify the discount rate for insurance contract fulfilment cash flows”?

Page 84: “In this example, the sum of the 95% confidence level risk adjustment for line X and the 90% confidence level risk adjustment for line Y would correspond to the 97% confidence level for the company that has the two lines combined.”

Comment: Was the 97% calculated by simulation or with a closed-form solution? This example states that an appropriate level of confidence level for the total company was not chosen. Does that rule out a simulation? Otherwise, it would be useful to show a mathematical formula for a closed form solution in the case where the risk adjustment for each line of business is set with differing confidence levels. In fact, it could be useful to the average reader to show the mathematical formula (in the first half of page 83) in addition to the calculation for the case where confidence levels by LOB are the same.

Page 84 (5.5): Entire bullet 2 conflates two ideas that should be distinct in our opinion. “What would be an appropriate level of confidence level for line X and Y combined” – first, perhaps simplify to “What would be an appropriate confidence level for line X and Y combined?”.

But more importantly, the Monograph seems to imply that the question of what confidence level is appropriate for the combined company arises because two different levels were chosen for the two different lines. Even if you used the same confidence level (perhaps 95%) for the two different lines, you still must answer the question of what is the appropriate confidence level for the combined company – it may not be the same as the confidence level used for the two lines (perhaps it’s only 90%, or perhaps it’s 99%)

Page 88: “Another more apparent and intuitive example of mitigation is the participating feature of life insurance products. When compared to a comparable non-participating life insurance policy, the policy that offers a participating feature should generate a smaller risk adjustment than the policy without the feature.”

Comment: Unfortunately, it isn’t clear to us or intuitive why the payment of dividends would generate a smaller risk adjustment.

- Our limited understanding of participating life is that it should result in a somewhat “tighter” distribution of ultimate results – if results are poor, then no dividend; but good results mean the company dividends back to policyholders and ends up closer to the mean/expected than if it were non-participating. Overall, this means that the distribution of ultimate results should be “tighter” than for non-participating, that is, lower variance or more results closer to the mean.
- However, does the “comparable” non-participating life insurance policy come with the same premiums, or with different premiums, reflecting the expected cost of that dividend?
- If assuming the same premium, and there’s no dividend when performance is “poor”, then looking at the 90<sup>th</sup> percentile (for example) would result in the same answer for participating as for non-participating, and therefore we disagree with the Monograph, we think – because the results where the dividend matters are never in the tail of the distribution, where things like CTE and other measures are determined.
- If assuming that the “comparable” policy is more expensive because it prices for the expected value of the dividend, then we think the Monograph is correct – insurer collects more premium and it only costs them when the results are poor, so looking at the 90<sup>th</sup> percentile is a different answer for participating versus non-participating (with the result better for the insurer that sells participating, thereby supporting the statement in the Monograph).
- Overall would be good to clarify with more specific wording or an example.

Page 98: “As a consequence, the final results will depend strongly on the robustness of the framework defined by and processed followed by the company.”

Comment: Does the author mean “processed” or “processes”?

Page 99 Comment: Replace “one approach is designate” with “one approach is to designate”.

Page 100: “Bayesian techniques to assess an empirical distribution of the liabilities”

Comment: A suggestion to be more specific. We think that the author means “Bayesian data analysis techniques” since an empirical distribution is involved.

Page 107 (8.2): “...losses that have been settled, new claims that have made...”

Comment: Perhaps should be “new claims that have emerged...”?

Page 110 (8.4): “Reacting too quickly to recent experience...”

Comment: this sentence seems to caution against being over-responsive to recent data. Would consider whether a similar caution against being under-responsive is also warranted, as being overly biased in either direction is problematic.

Page 114: "it becomes necessary to model out the liability distribution to determine an equivalent confidence level."

Comment: Does the author mean that a closed form solution for the empirical liability distribution becomes necessary?

Page 115: "based on a top-down view"

Comment: Would it be useful to mention ERM here? Possibly substitute the phrase "based on a top-down ERM view"? The first three bullet points are very similar to CERA material and not every Actuary reading the Deloitte paper will be familiar with the CERA material.

Page 115: "An attribution analysis is a quantitative tool often used in the financial field to analyse the change in certain financial metrics, such as portfolio performance."

Comment: Since the financial field is mentioned in the above definition of attribution analysis, it would be useful to include a brief description that every investor recognizes, namely that of comparing the performance of a portfolio or an asset class to a relative benchmark.

Page 115: "and calculate an attribution amount for each driver to evaluate the impact on the risk adjustment. The key drivers included in this quantitative analysis could include change in the view of risks, in business mix (i.e., change in diversification), in risk adjustment techniques, and in each of the key assumptions for each line, such as in-force demographic."

Comment: It sounds like a great idea. Describing benchmarks for the risk drivers given as examples would not only make the reading more interesting but also highlight the innovation of this new method.