Cover Note

Second Supplement to AGN 3

The Second Supplement to Actuarial Guidance Note 3 ("Supplement") provides additional guidance to Appointed Actuaries in the determination of the valuation interest rate under Section 8(1) of the Insurance Companies' (Determination of Long Term Liabilities) Regulations. It was drafted by the ASHK Reserve Working Group and was approved by the ASHK Council on 17 November 2014 with immediate effect.

In developing the Supplement, at the request of the Insurance Authority, the Reserve Working Group obtained a formal legal opinion. The Insurance Authority also conducted an impact assessment on long term insurers as at yearend 2013. The Supplement was exposed to the ASHK membership for comment on 22 September 2014 with a comment deadline of 22 October 2014.

Members of the Reserve Working Group are listed below:

Lucy Chou	Douglas Lecocq
Danny Chow	Tak Lee
Peter Duran (Chairman)	Patrick Li
Sai-Cheong Foong	Michael Lockerman
Stanley Ko	Jeremy Porter
Ted Kwong	Michael Ross
Dicky Lam	Whitman Wu
Stanley Lau	Jonathan Zhao

ACTUARIAL GUIDANCE NOTE

SECOND SUPPLEMENT TO AGN 3 - ADDITIONAL GUIDANCE FOR APPOINTED ACTUARIES – ADDITIONAL GUIDANCE FOR DETERMINATION OF THE VALUATION INTEREST RATE

This document is the second supplementary Actuarial Guidance Note to Actuarial Guidance Note 3 for Hong Kong Appointed Actuaries issued by the Actuarial Society of Hong Kong. It supplements Actuarial Guidance Note 3 (second issue) issued by the Actuarial Society of Hong Kong in June 2002 and the Supplement to that guidance that was effective 1 January 2013 ("First Supplement"). The effective date of this Second Supplement is 17 November 2014.

Application: Appointed Actuaries in Insurance Companies
**   Sections 8 of Chapter 41E of the Insurance Companies Ordinance**

1. Introduction

1.1 . Section 8(1) of the Insurance Companies' (Determination of Long Term Liabilities) Regulations (the "Ordinance") states:

"The rates of interest to be used in calculating the present value of future payments by or to an insurer shall be no greater than the rates of interest determined from a prudent assessment of the yields on existing assets attributed to the long term business and, to the extent appropriate, the yields which it is expected will be obtained on sums to be invested in the future."

1.2. However, no guidance is given on how the "rate(s) of interest to be used in calculating the present value of future payments" (the valuation interest rate or "VIR") is to be determined from the "yield on existing assets" ("Portfolio Rate") and the yield expected on "sums to be invested in the future" ("Reinvestment Rate"). Item number 5 of the Appendix to the First Supplement stipulates that the method to combine the rates should consider:

    a) the duration of existing liabilities and assets; and

    b) the future cash flows of liabilities and assets.

1.3. The purpose of this Second Supplement is to provide additional guidance on how the Portfolio Rate and the Reinvestment Rate might be combined.

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The Actuarial Society of Hong Kong (ASHK) accepts no responsibility for the application of the guidance contained herein in any particular instance. The actuary should use his or her professional judgment in applying this guidance. The ASHK recommends that users of this Actuarial Guidance Note (AGN) exercise their own skill and due care with respect to the use of, or reliance on, this AGN, or seek professional advice if appropriate.

Guidance

2.1. Sums to be invested in the future on behalf of the long term liabilities include both asset cash flows and liability cash flows, as well as any additional amounts (positive or negative) to make the total supporting assets equal to the liabilities. Asset cash flows include interest and dividends, repayments of principal and the like. Liability cash flows include estimates of policy-related cash flows (premiums less benefits). The reserves themselves are of course based on prudent assumptions with regard to rates of mortality and morbidity and, generally, no voluntary policy discontinuance (i.e. lapses) as required by the Ordinance. Nonetheless, the actuary may find it appropriate to use prudent best estimate assumptions including lapses, when projecting the cash flows used to determine the VIR. For example, prudent best estimate assumptions may better align with the insurer's approach to managing asset and liability mismatch risk.

2.2. Under the Ordinance, when the Reinvestment Rate is greater than the Portfolio Rate, the Portfolio Rate must be used as the basis for determination of the VIR. In this case no blending is permitted and therefore no assumptions are required to determine amounts to be invested in the future.

2.3. In contrast, when the Portfolio Rate is greater than the Reinvestment Rate prudent best estimate assumptions are required to estimate future liability cash flows. Prudence is to be assessed by means of the impact on the calculated VIR. That is, a given set of assumptions is more prudent than a second set of assumptions if it results in a lower VIR. This will normally be the case when policy cash flows are back-ended, i.e. when policy terminations are low. For example, focusing on mortality only, a lower mortality assumption will be more prudent for purposes of combining the Portfolio Rate and the Reinvestment Rate than a higher assumption. Prudence in this context is different than prudence in the context of the actual valuation where policy liabilities are set using net premium reserves with mortality assumptions that are normally higher than best estimate assumptions. **It is important for the actuary to bear in mind the context in which prudence is to be evaluated, namely it is to be judged in the context of determining the extent that reinvestment is necessary and affects the VIR.**

2.4. As noted, the actuary should strive to set "prudent best estimates" when projecting the cash flows used to determine the VIR. In practice it is seldom the case that a best estimate is known with certainty. There is almost always some degree of uncertainty due to lack of sufficient data, emerging trends that are not fully reflected in the existing data, unknown future economic and social conditions, changes in attitudes towards savings, etc. Such uncertainty should be allowed for by choosing final assumptions toward the prudent end of the range.

2.5. Appointed Actuaries are advised to refer to the actuarial literature for guidance in setting prudent best estimate assumptions. Two such sources are *Measurement of Liabilities for Insurance Contracts: Current Estimates and Risk Margins,* dated 15 April 2009 and published by the International Actuarial Association ("IAA Reference") and *Analysis of Methods for Determining Margins for Uncertainty under a Principle-Based Framework for Life Insurance and Annuity Products,* dated 31 March 2009 and published by the Society of Actuaries ("SOA Reference")[1]. Both these documents

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[1] Both are available from the respective websites

discuss the setting of best estimate assumptions and margins for uncertainty. Key guidance from these documents that Appointed Actuaries should consider is noted below, particularly as it relates to discontinuance or lapse rates.

2.6. Appendix B5.2 of the IAA Reference contains useful guidance concerning discontinuance rates. In particular, the overall approach to setting best estimate discontinuance assumptions is described as follows:

> "To the extent practical, relevant and reliable discontinuance experience is used as the starting point, to be modified appropriately if future conditions are expected to differ significantly from those in the period covered by the experience. In the absence of reliable experience data for the class of risk under consideration (e.g., new products or later durations in the policy), other comparable sources would normally be considered. These assumptions usually have to be portfolio-specific, reflecting other factors, including product and risk characteristics such as age."

2.7. Specific considerations under Appendix B5.2 are listed:

> "The following are some considerations that can affect expected discontinuance assumptions. Most of these factors are portfolio-specific, although some are applicable on an entity-specific or type of product-specific basis, with many the result of contract features, policyholder characteristics, and overall conditions that affect the market or overall industry.
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> • benefits and options provided through contract features;
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> • the way the contracts were sold and marketed (e.g., a universal life contract sold as low premium term insurance or primarily for investment purposes)
>
> • contract duration, attained age and gender;
>
> • premium frequency and payment method and mode;
>
> • premium paying status;
>
> • size of contract and current, expected future, and changes in the financial condition of the policy owner;
>
> • relative advantages of lapsation/withdrawal and persistency to the policyholder (e.g., due to insurability, loss of product specific guarantees by the policyholder, current or anticipated tax and other benefit situation)"

2.8. Section 5.5 of the SOA Reference discusses margins for uncertainty in the context of setting assumptions for policyholder behaviour. The actuary should take this guidance into account when setting prudent best estimates. It is advised that

> "The margins for uncertainties should be a function of whether companies have credible experience data. In the absence of relevant and fully credible data, the margins should be determined such that the policyholder behavior assumption is shifted toward the conservative end of the plausible range of behavior."

2.9. Section 5.5.1 of the SOA Reference goes on to discuss setting margins for lapse rates. Several approaches are discussed. One such method is "Actuarial Judgment Based on Experience Studies". Relevant guidance includes the following:

> "To the extent that companies have credible volumes of experience data, the margins on withdrawal and lapse assumptions could be determined using actuarial judgment based on experience studies for similar products. With this approach, margins for uncertainties are generally expressed as a series of multipliers to the best estimate lapse rates, surrender rates or partial withdrawal rates. The experience studies are generally performed (and margins determined) based on grouping policies by appropriate factors such as issue age, policy duration, distribution channel, tax status and premium size."

2.10. The actuary should consider the above guidance and use his or her judgment in applying the guidance given the characteristics of the business, available data and/or systems any other constraints.

2.11. Non-market assumptions other than lapse (mortality and morbidity) are used in the actual valuation to calculate the policy liabilities. Per the Ordinance, these assumptions need to be set on a prudent basis. **However, prudence in the context of actual valuation (i.e. liability calculation) is likely to be different than prudence in the context of combining the Portfolio and Reinvestment rates.** For example, higher rates of mortality used in the calculation of the policy liabilities will normally increase their value. In contrast, higher rates of mortality when used to project "sums to be invested in the future" will lead to less future projected cash flow and therefore less weight being given to such cash flows. The result will be a higher VIR. The actuary is therefore advised to use prudent best estimate mortality and morbidity assumptions when projecting sums to be invested in the future.

3. Example Calculations for Blending the Rates

3.1. For example, consider a five year product issued one year before the valuation date that is supported equally by two bonds with remaining terms to maturity of 3 years and 5 years both yielding 4% (after allowance for risk as in item number 3 of the Appendix to the First Supplement). The Portfolio Rate is therefore 4%. Assuming that premiums are paid in the beginning of a year and benefits are paid in the end of a year and an initial reserve of 36,031 as well as a Reinvestment Rate[2] in years 3 and later of 3%, the following is an illustrative example of how the Portfolio Rate and the Reinvestment Rate could be blended. For simplicity, the only projected asset cash flow is the maturity of the 3 year bond.

3.2. The yearly "sums to be invested in the future" may be thought of in two way, namely as the increase in policy liability plus principal repayments from the existing asset portfolio ("Alternative 1") or as the asset cash flows plus liability cash flows plus an additional amount (positive or negative) to bring the total invested assets to the level of the policy reserve ("Alternative 2"). This is shown in the tables below:

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[2] The Reinvestment Rate is calculated using the approach outlined in the 19 December 2008 *Notice for Appointed Actuaries: Chapter 41E – Reinvestment Rate for Reserving* issued by the Actuarial Society of Hong Kong.

Derivation of Sums to be Invested in the Future
Alternative 1

Policy Duration	Years from Valuation Date	Increase in Policy Liability	Existing Asset Portfolio	Principal Repayments	"Sums to be Invested in the Future"	Investment Rate*
1	0	N/A	36,031	0	N/A	4.00%
2	1	33,134	36,031	0	33,134	3.67%
3	2	30,121	36,031	0	30,121	3.33%
4	3	26,987	18,015	18,015	45,002	3.00%
5	4	(126,272)	18,015	0	(126,272)	N/A

*Three year grading from the Portfolio Rate to the Reinvestment Rate as permitted by the Ordinance

Derivation of Sums to be Invested in the Future
Alternative 2

Policy Duration	Years from Valuation Date	Premium Collected*	Benefits*	Net Liability Cash Flow	Net Asset Cash Flow**	Additional Amount	"Sums to be Invested in the Future"
2	1	50,000	15,000	35,000	0	(1,866)	33,134
3	2	40,000	10,000	30,000	0	121	30,121
4	3	30,000	5,000	25,000	18,015	1,987	45,002
5	4	20,000	150,000	(130,000)	0	3,728	(126,272)

*Policy year 1 cash flows are premiums of 60,000 and benefits of 20,000.
**Coupon income is ignored for simplicity

Calculation details for the VIR are shown in the following table:

Years from Valuation Date	Policy Liability	5 year bond	3 year bond	New Money @t=1	New Money @t=2	New Money @t=3	Weighted Yield	Discount Rate	Earning period (in years)
	Yield	4.00%	4.00%	3.67%	3.33%	3.00%			
0	36,031	18,015	18,015				4.00%	1.0000	1.0
1	69,165	18,015	18,015	33,134			3.84%	0.9615	1.0
2	99,285	18,015	18,015	33,134	30,121		3.69%	0.9260	1.0
3	126,272	18,015		33,134	30,121	45,002	3.40%	0.8931	1.0
4	0								

3.3 The weighted average investment rate is determined in the following formula:

$$\frac{\Sigma \text{ Weighted yield} \times \text{Policy Liability} \times \text{Discount Rate} \times \text{Earning period}}{\Sigma \text{ Policy Liability} \times \text{Discount Rate} \times \text{Earning period}}$$

The result of the example is 3.650%, which would then be the implied maximum VIR. This is equivalent to a blend of 65% of the Portfolio Rate and 35% of the Reinvestment Rate.

3.4 In projecting the future policy liabilities for the purpose of determining the VIR, it would be reasonable to make an estimate of the VIR and then check that it is relatively close to the actual VIR determined. In the above example, for instance, 4% was used to determine the policy liabilities. The valuation rate is determined as 3.65%. The final VIR is to be determined by an iteration process and a second iteration using policy liabilities based on 3.650% results in a final VIR of 3.652%.

3.5 The above is a simple example and is not meant to be prescriptive. Other variations may also be used, for example, as a simplification, when the term of the liabilities is relatively short, including present value factors in the weighted average calculation may not be necessary. For example, an alternative formula might be:

$$\frac{\Sigma \text{ Weighted yield} \times \text{Policy Liability} \times \text{Earning period}}{\Sigma \text{ Policy Liability} \times \text{Earning period}}$$

In this example, the resulting maximum VIR would be 3.644%.

4. Conclusion

4.1. This Second Supplement to AGN 3 provides guidance for Appointed Actuaries in the determination of the valuation interest rate under Section 8(1) of the Ordinance. Appropriate application of the guidance contained herein requires that the Appointed Actuary apply his or her professional judgment.