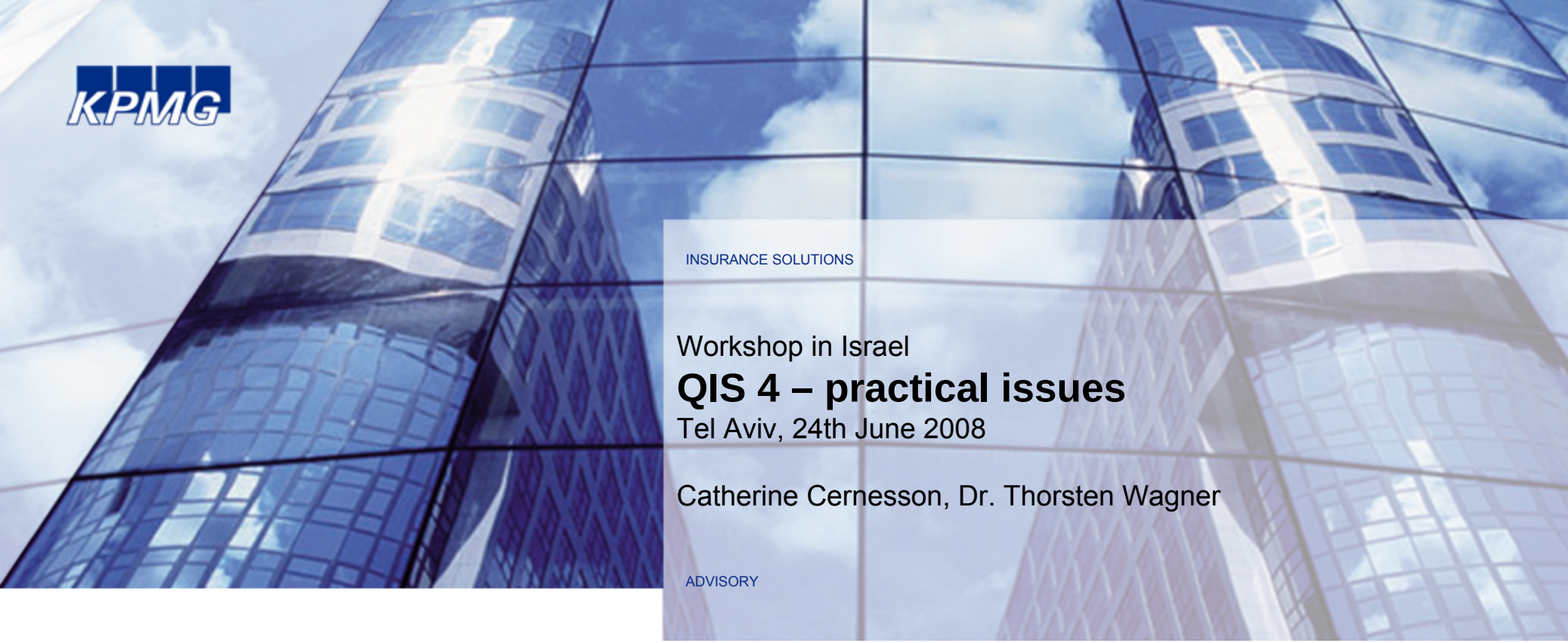

INSURANCE SOLUTIONS

Workshop in Israel

QIS 4 – practical issues

Tel Aviv, 24th June 2008

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ADVISORY

Agenda

- *Proportionality principle*

- *Simplifications*
  - *example 1: interest rate risk (sub-risk of market risk)*
  - *example 2: mortality risk (sub-risk of life underwriting risk)*

- *Proxies*
  - *non-life*
  - *life*
  - *risk margin*
  - *requirements*

Proportionality Principle Application

- The proportionality principle should be applied in a coherent way across the three pillars

- Proportionality works two-ways: it justifies simpler and less burdensome requirements for low risk profile portfolios, but also raises the expectation that undertakings apply appropriately sophisticated methods and techniques for more complex risk portfolios.

- Proportionality requirement is linked to the **nature, scale and complexity** of the risks.
- The combination of all three attributes is relevant.

- The size of an undertaking on its own is not “per se” a relevant risk-based criterion.

- To use **simplifications** a participant is **not** required to demonstrate with a calculation that difference between a more accurate method and the simplification is immaterial.
- However, the participant has to give **reasonable assurance.**

QIS 4 standard model: methodology
Simplifications: criteria for using it

Participants may use the simplified methods if criteria are satisfied or are likely to be met.

[TS.II.A.38.] **Simplified actuarial methods and statistical techniques may be used if:**

1. the types of contracts written for each line of business or homogenous group of risk is not complex.
2. the line of business or homogenous group of risks written is simple by nature of the risk
3. any additional nature and complexity standards set out for each liability are met
4. the liability that is valued is not material in absolute terms, or relative to the overall amount of the total best estimate technical provision.
   (to be continued)

QIS 4 standard model: methodology
Simplifications: criteria for using it

=> QIS 4 guidance on materiality:

- **absolute materiality:**

Sum of all best estimates determined with simplifications ≤ 50 Mio. € (for life)

Sum of all best estimates determined with simplifications ≤ 10 Mio. € (for non-life)

OR

- **relative materiality:**

best estimate for each homogenous risk group of risks determined with simplific.
≤10% of the total gross best estimate

AND

sum of best estimate determ. with simplific. ≤ 30% of the total gross best estimate

If a participant (e.g. a captive (re)insurer) does not meet the threshold indicated, but nevertheless thinks it should be allowed to apply a simplified approach because of the specificities of its situation, it can do so provided that it 1) explains the reasons for this and 2) indicates the criteria it considers relevant in its situation.

Simplification, example 1
Mkt_{int}: interest rate risk – the standard approach

Input

Δ NAV = Change in net asset value for the scenario “interest upward shock” and “interest downward shock”; i.e. change in net value of assets minus liabilities

Calculation

• Change of net asset values Δ NAV due to a pre-defined interest rate increase and decrease.
• The capital charge is the higher value of capital charge of the upward and downward shock for the calculation also regarding the risk absorbing effect of future profit sharing.

$$Mkt_{\text{int}}^{Up} = \Delta NAV\Big|_{upwardshock}$$

$$Mkt_{\text{int}}^{Down} = \Delta NAV\Big|_{downwardshock}$$

Output

Mkt $_{int}$

= capital charge for interest rate risk

nMkt $_{int}$

= capital charge for interest rate risk including the risk absorbing effect of future profit sharing

Simplification, example 1
Mkt_{int}: upward and downward shock for interest rate risk within the standard approach

The altered term structures are derived by multiplying the current interest rate curve by $(1+s_{up})$ and $(1+s_{down})$.

The upward stress $s_{up}(t)$ and the downward stress $s_{down}(t)$ for individual maturities are as follows:

Maturity t (years)	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Relative change $s_{up}(t)$	0.94	0.77	0.69	0.62	0.56	0.52	0.49	0.46	0.44	0.42
Relative change $s_{down}(t)$	-0.51	-0.47	-0.44	-0.42	-0.40	-0.38	-0.37	-0.35	-0.34	-0.34

Maturity t (years)	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20+*
Relative change $s_{up}(t)$	0.42	0.42	0.42	0.42	0.42	0.41	0.40	0.39	0.38	0.37
Relative change $s_{down}(t)$	-0.34	-0.34	-0.34	-0.34	-0.34	-0.33	-0.33	-0.32	-0.31	-0.31

Simplification, example 1
Mkt_{int}: interest rate risk – the simplified approach

Premise

Simplification may be only used for:

- assets
- non-life technical provisions
- other liabilities

but not for life technical provisions!

Calculation

- Shock times relevant modified duration times value

$$\Delta Value \quad =$$

Value x shock x int_rate(mod. Duration) x mod. Duration)

Downward Shock: - 40%
Upward Shock: + 55%

Output

Mkt_{int}

= capital charge for interest rate risk

Simplifications, example 2
$Life_{mort}$: mortality risk – the standard approach

Input

No specific input data is required for this module

Calculation

i = denotes each policy where the payment of benefits (either lump sum or multiple payments) is contingent on mortality risk
ΔNAV = the change in the net value of assets minus liabilities
mortshock = a (permanent) 10% increase in mortality rates for each age

The capital charge for mortality risk is defined as the result of:

$$\text{Life}_{\text{mort}} = \sum_{i} \left(\Delta\text{NAV} \,\middle|\, \text{mortshock} \right)$$

Output

Life $_{mort}$

= Capital charge for mortality risk

nLife $_{mort}$

= Capital charge for mortality risk including the risk absorbing effect of future profit sharing

Simplifications, example 2
$Life_{mort}$: mortality risk – the standard approach

Premises

- General criteria are followed
- There is no significant change in the capital at risk over the policy term.

Calculation

$$Life_{mort} = 0.1 \bullet n \bullet q \bullet 1.1^{((n-1)/2)}\ Capital\_at\_Risk$$

n = modified duration of liability cash-flows
q = expected average death rate over the next year weighted by sum assured

Output

$Life_{mort}$

= Capital charge for mortality risk

$nLife_{mort}$

= ??????

- Either without taking into account the risk absorbing effect of future profit sharing
- or improving the simplification method in the sense of Solvency II

QIS 4 standard model: methodology
Proxies: What's that?

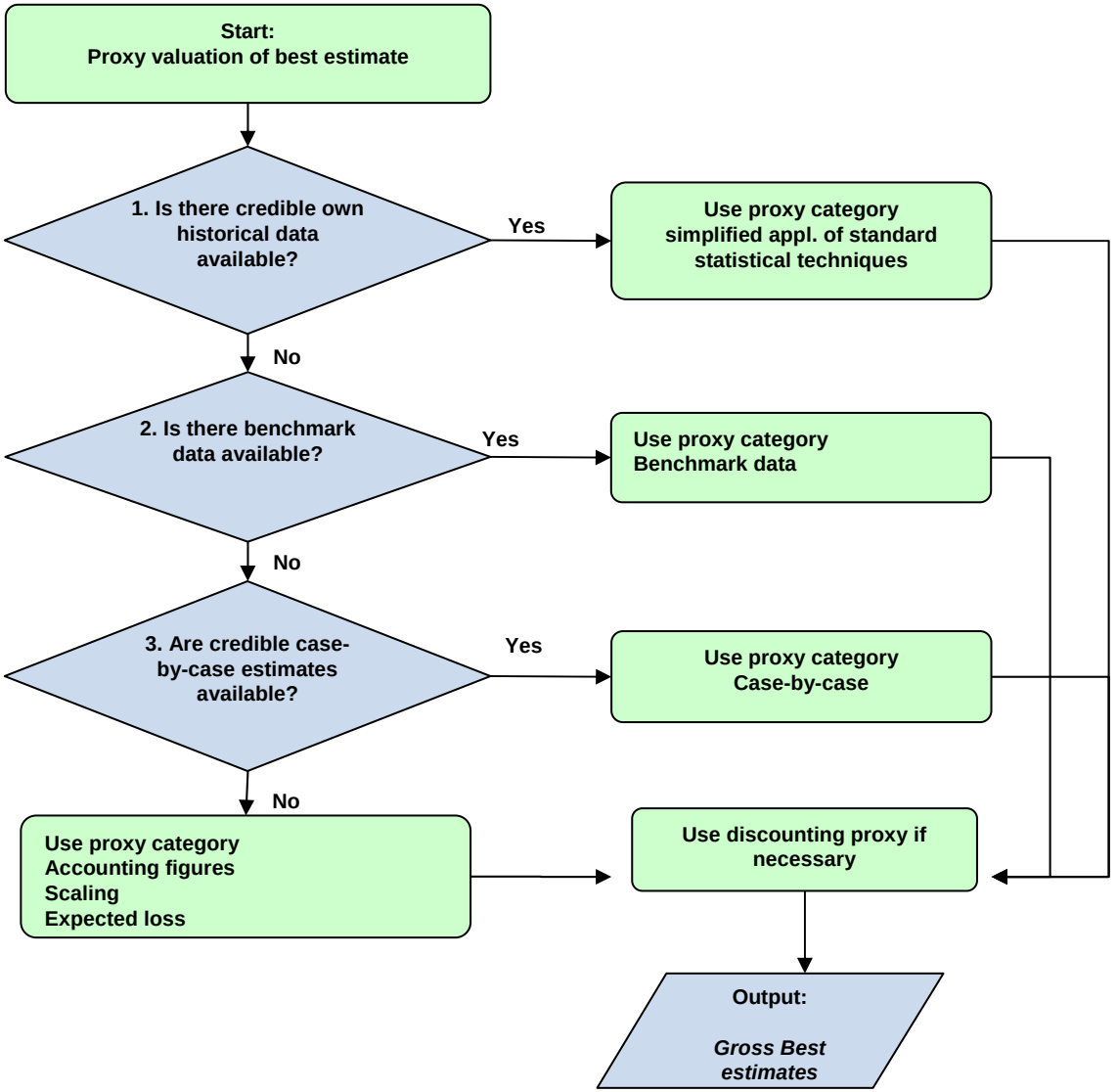
Proxy methods are needed in case of a lack of sufficiently credible own data:

- for entirely new types of insurance in the market (without historic data)
- first-time issued classes of business (for the participant)
- historic data become useless due to legislative or other significant changes
- the size of business is too small for own credible historic claim data

However, proxies have to be compatible with Solvency II and must be proportionate to the risk.

QIS 4 gives a range of possible proxies, divided into several categories:

QIS 4 standard model: methodology
Proxies: How to use?



Non-Life Proxies – Types

- The following table gives an overview of the proxies that may be used by participants in order to assess non life claim provisions and premium provisions for the best estimate:

Proxy \ Applied to	Claims provision	Premium provision
Market development patterns	?	
Average severity/frequency	?	
Bornhuetter-Ferguson	?	
Case by case	?	
Expected loss		?
Simplified application of standard statistical techniques	?	
Premium based		?
Claims handling costs	?	

- Additional proxies :
- Discounting proxies
- Gross-to-Net proxies

QIS 4: Non Life Proxies

Proxies – Methodologies

The QIS 4 package includes a technical tool which is intended to facilitate the “best estimate” valuation of technical provisions in non-life insurance .

- Methodology to determine proxy parameters and their values:

- use of historical aggregated market insurance data
- benchmark portfolios information
- case estimate information
- initial pricing or business plan assumptions
- use of local accounting figures (ie unearned premium reserves)

Some proxy examples: Life I

Best estimate Proxy for life insurance obligations **restricted to guaranteed benefits**:

$$BE_{guaranteed} \approx TP \bullet \frac{\exp(r_{solvency1} \bullet Dur_{\text{mod}})}{\exp(r_{risk-free} \bullet Dur_{\text{mod}})}$$

where

TP = statutory technical provisions

Dur_{mod} = modified duration of TP

$r_{risk-free}$ = risk-free interest rate

$r_{solvency1}$ = statutory interest rate applied to TP

- Application to the finest practicably possible segment of technical provision, at least according to different discount rates.
- Not possible to use if discretionary benefits are granted or to value other financial options.

Some proxy examples: Life II

Proxy for dealing with “extra benefits”, i.e. profit sharing (slightly simplified):

Step1:

Calculate a “calculatory profit fund” as the difference between

- statutory reserves and
- present value of guaranteed benefits and expenses

Step 2:

Determine a distribution ratio

- taking into account past practise as well as contractual or commercial commitments
- based on firm strategy for distributing extra benefits

Step 3:

The best estimate technical provision is equal to the sum of

- present value of guaranteed benefits and expenses (as calculated under step 1)
- product of distribution ratio (as in step 2) and of the max(0; calculatory profit fund)

Some proxy examples: Risk Margin

If participants are unable to calculate risk margins according to the standard method (or at least a simplification method), the following percentages may be applied on the best estimate amount:

Proposition for Proxies for the Risk Margin as percentage of the Best Estimate:	
Workers Compensation	14%
Health Insurance	6%
Accident & Health	12%
Motor liability	13%
Motor other	4%
MAT	10%
Fire & other	6%
3rd party Liability	14%
Credit & suretyship	9%
Legal expenses	5%
Assistance	6%
Miscellaneous	15%
Non-pro-portional reinsuran. Property	17%
Non-pro-portional reinsuran. Casualty	21%
Non-pro-portional reinsuran. MAT	19%

QIS 4: Requirements for Proxies

Additional Requirements for use of proxies

- provide additional qualitative information:

  In particular, participants are invited to comment on the appropriateness and suitability of the proposed proxy techniques, including the extent to which these techniques are consistent with the overall philosophy of Solvency II. Such information will allow for the further development of proxy techniques (including technical descriptions as well as application criteria) for the valuation of technical provisions under Solvency II.

- over-reliance on any one (non-life) proxy method would seem inappropriate:

  Considering that each may, at a point in time, produce sensible estimates, but changing circumstances may render its accuracy and validity of limited use. Therefore, to the extent this is practicable, participants should not rely on a single proxy method, thought to be appropriate, but rather consider a range of approaches before making a final decision on which method they take.