
## Agenda

- Objectives of working party
- Background to survey
- Key results of survey
- Key issue 1: allocating diversification appropriately
- Key issue 2: communication and understanding
- Conclusions and next steps

## Objectives of working party

Working party established to understand the issues the industry faces with the implementation and development of capital allocation frameworks

**We aim to:**

- Assess the advancement of the insurance industry in developing frameworks
- Understand and communicate the key issues
- Consider whether additional guidance or methods would be beneficial

**To date we have:**

- Used a survey to collate initial data, and
- Followed up with supplementary questions in certain areas.





## Background - Why are we looking at this?

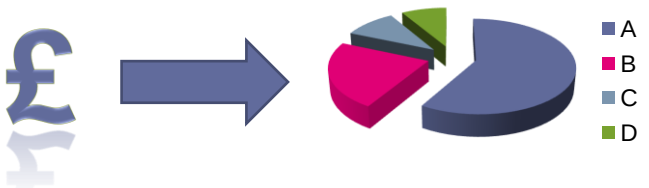
- Economic capital modelling is still in its infancy in the UK insurance industry, relative to the Banking industry
- Hence, capital allocation on an economic basis is not widely used in the UK insurance industry
- We believed that companies have common problems in implementing the uses
- While there are a number of theoretical papers that have been published on capital allocation, we wanted to start by understanding current practices and some of the practical challenges life companies are facing





## Background - What is capital allocation?

- A process of how businesses divide their financial resources and other sources of capital to different businesses, products and projects.




- Overall, it is management's goal to optimize capital allocation so that it generates as much wealth as possible for its owners.

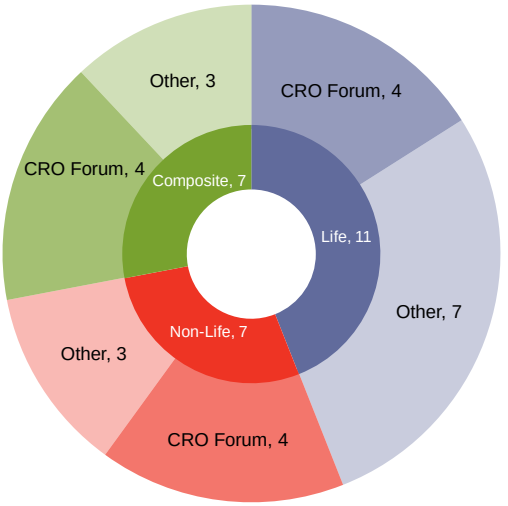
## Background - Why allocate capital?

- Maximises the benefit of using a scarce resource
- Aids decision making
- Prevents excessive risk taking in a business unit
- Increases clarity and accountability, and allows remuneration to reflect risk taking
- Allows management to understand product profitability
- Improves the quality of the conversation between management and stakeholders
- Creates competitive advantage
- Regulatory pressure (S2, TCF)





## Survey - profile of respondents



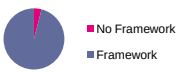

- 25 respondents
- 12 CRO Forum
- 13 Non-CRO
- 11 Life only
- 7 Non-life only
- 7 Composite





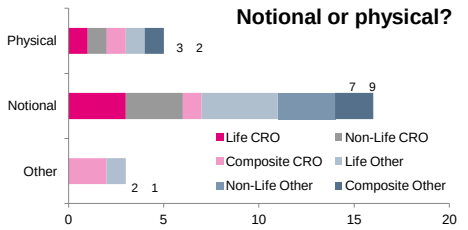
## Survey – general state of play

- Of the 25 respondents, only 1 did not have a capital allocation framework.
- Of those with a capital allocation framework, 19 were planning to develop this further in future.
- 9 of the respondents described their capital allocation as passive, reflecting historic business development
- The remaining respondents described their capital allocation as either active or proactive.
- 7 of the respondents viewed their capital allocation process as separate to their business planning process.

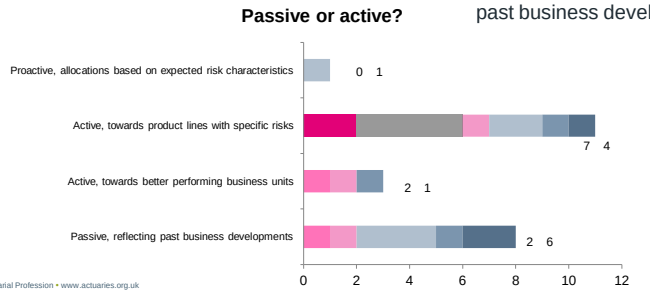





# Survey – form of allocation



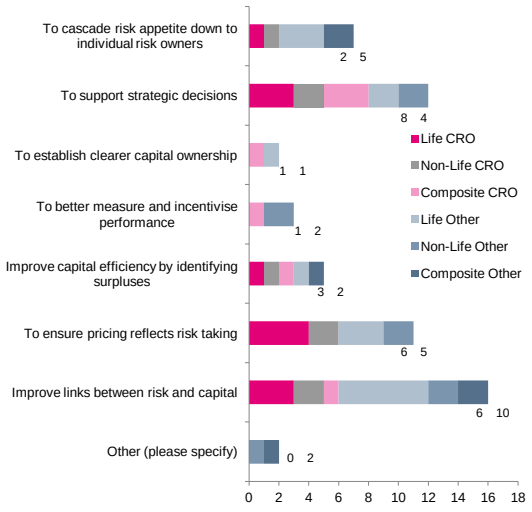

- Capital allocation is generally notional, although 5 firms are physically moving capital
- CRO firms are generally active in capital allocation – towards product lines
- Non-CRO firms typically have passive capital allocation, reflecting past business developments








# Survey – Reasons for Capital Allocation (respondents could provide up to three answers)




- Improving links between risk and capital is seen as the most important reason for capital allocation.
- Supporting strategic decisions is a key driver, particularly for CRO-forum firms.
- Pricing for risk appears to be a key driver, particularly for life companies
- Cascading risk appetite also clearly an important driver for non-life firms
- Establising clear capital ownership was not an important reason for the majority of firms.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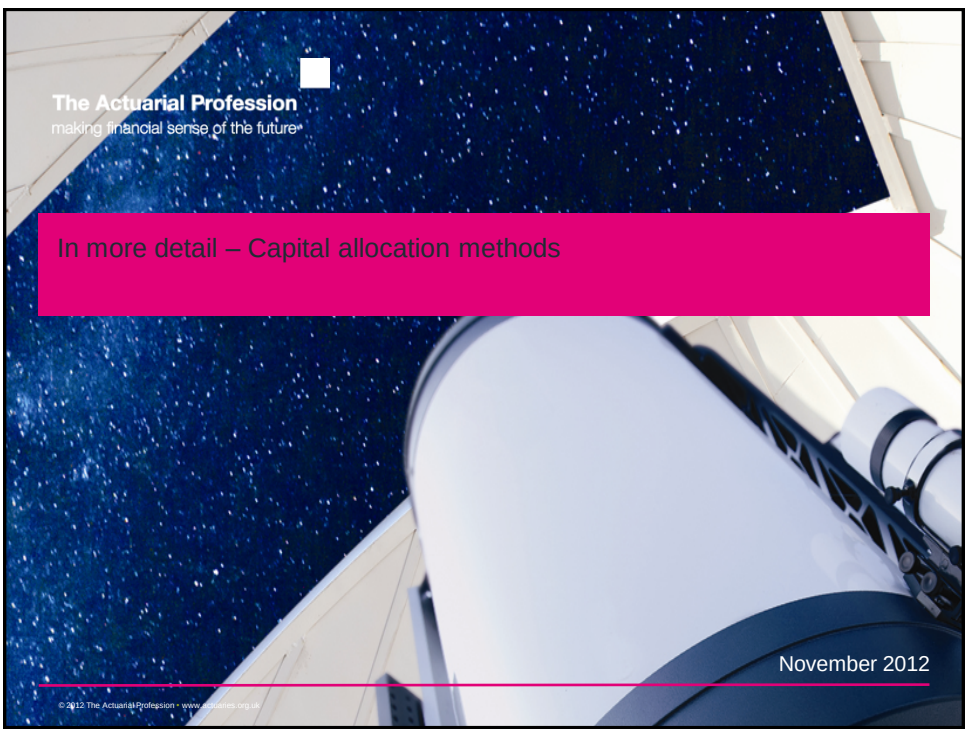
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## Common methods to allocate diversification

| | Method | Description |
|---|---|---|
| 1 | Pro-rata - simple | Pro-rata in proportion to capital requirements |
| 2 | Pro-rata - marginal | Pro-rata in proportion to marginal contribution of unit to group capital diversification |
| 3 | Euler<br>(Also called the continuous marginal method) | Capital allocated in proportion to the marginal contribution of each unit i.e. the rate at which the group diversified capital changes with respect to the standalone capital of each unit. |
| 4 | Monte-Carlo Simulations – no average | Assign capital based on the loses in each unit in the single 99.5$^{th}$ percentile simulation |
| 5 | Monte-Carlo Simulations – average | Assign capital based on the loses in each unit in the average of the simulations around the 99.5$^{th}$ percentile. |





## Comparison of allocation methods

| | 1 Pro-rata simple | 2 Pro-rata marginal | 3 Euler | 4 Monte-Carlo (no average) | 5 Monte-Carlo (average) |
|---|---|---|---|---|---|
| Simplicity of calculation | ✓✓ | ✓ | ✗✗ | ✗ | ✗ |
| Allows for dependency between units | | ✓✓ | ✓✓ | ✓ | ✓✓ |
| Compatible with RAROC | ✗✗ | ✗ | ✗ | ✓✓ | ✓✓ |
| Avoid potential negative capital allocation | ✓ | ✗ | ✗ | ✗ | ✗ |
| Risk of sampling error | ✓ | ✓ | ✓ | ✗✗ | ✗ |
| Simple to explain | ✓✓ | ✗ | ✗✗ | ✗ | ✗ |

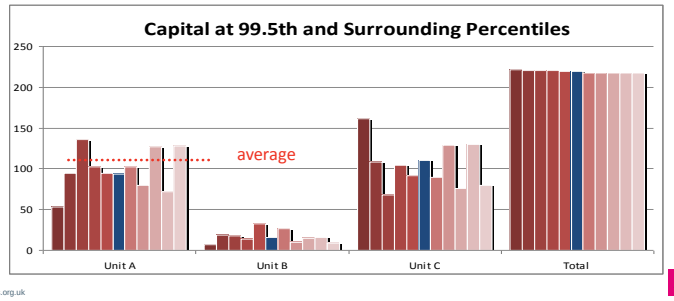
# Illustration of different methods (1 of 2)

- Simple example: three units (A, B, C)
  - could be three risks, products, divisions, countries
- Use Normal loss distributions and a matrix of correlations
- A and C have same loss distributions
  A and B are highly correlated, C is lowly correlated with A and B
- Capital at 99.5th percentile for standalone units and a combined group calculated directly and using Monte-Carlo simulation

Correlation matrix used:

| | A | B | C |
|---|---|---|---|
| A | 1 | | |
| B | 0.75 | 1 | |
| C | 0.25 | 0.25 | 1 |

Monte-Carlo simulations, blue column is 99.5th percentile, average is taken across surrounding percentiles



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# Illustration of different methods (2 of 2)

| | | Unit A | Unit B | Unit C | Total Undiversified | Total Diversified |
|---|---|---|---|---|---|---|
| Allocation of Diversified Capital | Standalone capital | 129 | 26 | 129 | 283 | 221 |
| | 1. Pro-rata simple | 100 | 20 | 100 | | 221 |
| | 2. Pro-rata marginal | 107 | 22 | 92 | | 221 |
| | 3. Euler | 105 | 18 | 98 | | 221 |
| | 4. Monte-Carlo no average | 93 | 16 | 110 | | 219 |
| | 5. Monte-Carlo with average | 107 | 18 | 94 | | 219 |

- Units A and C have the same loss distribution and thus same stand alone capital, so pro-rata simple method allocates the same capital.
- Pro-rata marginal and Euler allocate less capital to C compared to A, as C has a lower correlation with the two other risks.
- Monte-Carlo (method 4) without averaging can give misleading results due to high sample error of individual units' losses.
- Monte-Carlo with averaging (method 5) taking a group of scenarios gives a result similar in shape to Pro-rata marginal and Euler.



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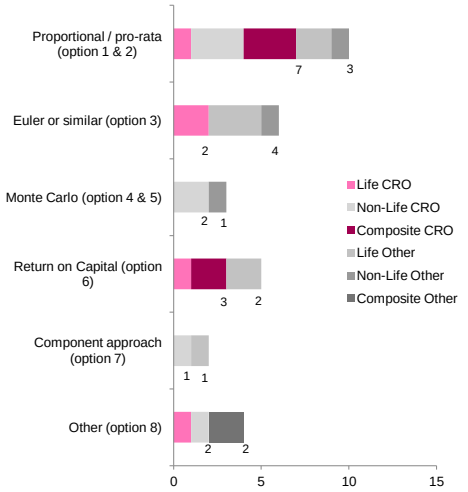
# Survey - methods of allocating diversification




- Majority of firms use the proportional method
- Nearly half of the CRO companies that responded to the survey use a proportional / pro-rata method of allocation.
- Only Non-CRO companies currently use the Euler method.
- Three out of seven of the non-Life companies that responded to the survey use Monte Carlo simulation.



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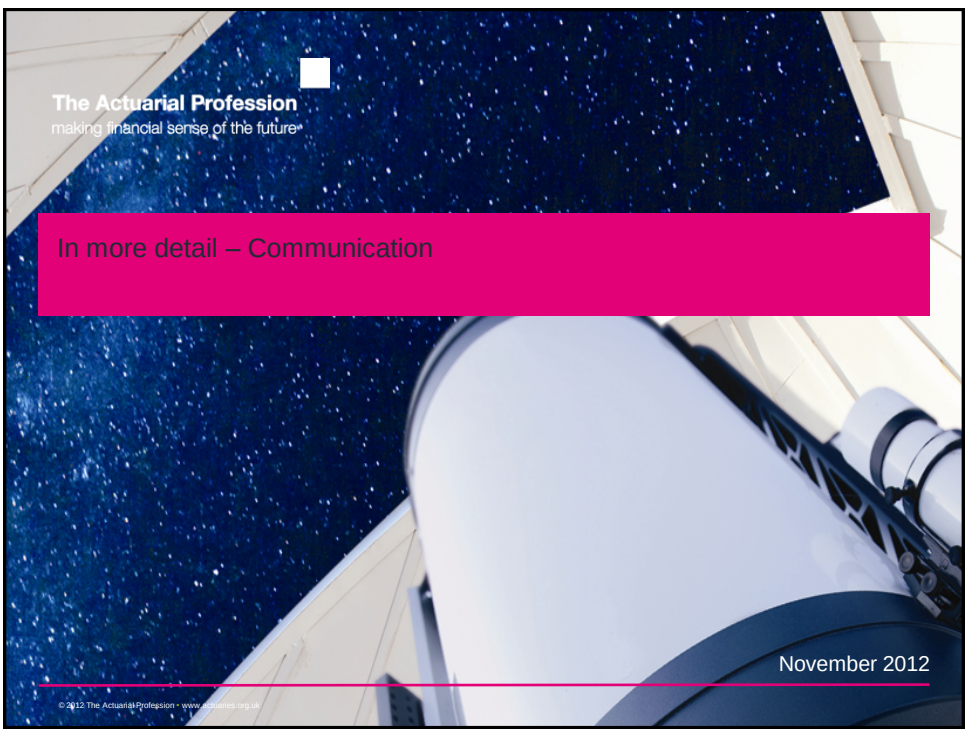

# Communication – further insights (1 of 2)

"There is growing engagement on [capital allocation] as it continues to be embedded."

In general respondents feel that audiences engage on capital allocation.

Communication difficulties can arise all over the business, not just in capital management.

CRO Forum companies have stronger links between capital allocation and the organisations stated aims and objectives

It's not just the actuaries talking capital allocation (management, auditors, treasury etc)

"…other areas of the business [are] talking capital too, such as the Bank, and also the regulator through SII helps reinforce the importance."

"[The source of diversification benefit] is probably a concept that people are getting more familiar with now in the context of ICAs…"

There are few difficulties found in explaining the sources of diversification benefit.

Most organisations' capital allocation is notional and therefore have no problems communicating the difference between physical and notional allocation.





# Communication – further insights (2 of 2)

Difficulties in capital management communication include;

- Communicating the links between the model and the allocation
- Communicating the links between the methodology and how this should change and influence behaviour
- The choice of method and why it has been chosen

Difficulties in communicating the approach to capital allocation;

- Contention or lack of buy in from local teams
- Technicality and lack of training
- Lack of appreciation that it will make a difference

"It is not easy to communicate how dependent the allocation is on the underlying modelling."

Obstacles to buy-in include;

- Many say that it is not a priority
- Instability and consequent evolving methodology
- Incompatibility of risk measures

"I would say it is a lack of appreciation that it will make any difference to business decisions"

Communication problems usually arise in the following stages of the lifecycle;

- Changes since last allocation
- Allocation and use

A common theme amongst the top tips given by the survey participants was to keep capital allocation simple and stable.


## Conclusions

- Capital allocation is gaining increasing focus and levels of engagement, not just from the actuaries, however there is still a long way to go in this regard.
- Simplicity and stability of method seem to be a key priority for companies, this however needs to be balanced against loss of accuracy.
- CRO Forum companies tend to take the simpler methods to allocation and also seem to have fewer communication problems as a result.
- For Non-CRO Forum companies the opposite seems to be true.

## Working party – next steps

- ……TO BE DECIDED

- Your input is welcome
- Some possibilities:
  - Develop thinking around the most suitable allocation methods for different purposes
  - Try to establish an Institute recommended framework to assist companies with communications and buy in
  - Extend the survey to Banks





## Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenter.


## Illustration results – more detailed explanation

- Units A and C have the same loss distribution and thus same stand alone capital requirement, so pro-rata simple method allocates the same capital.
- Pro-rata marginal and Euler allocate less capital to C compared to A, as C has a lower correlation with the two other risks, thus unit C benefits form the diversification benefits their business brings to the group.
- Pro-rata marginal allocates more benefit for diversification.
- Monte-Carlo methods lead to a slightly different total diversified capital than the other methods. This is a result of sampling error. (We could scale the numbers to remove this issue if it is felt to be a distraction)
- Monte-Carlo (method 3a) without averaging can give misleading results due to high sample error of individual units' losses.
- Monte-Carlo with averaging (method 3b) taking a group of scenarios gives a result similar in shape to Pro-rata marginal and Euler.
- The difference between Monte-Carlo with and without averaging also illustrates the instability which could arise between time periods when using a without averaging approach causing challenges for communication, pricing and performance management.