Lessons Learned Through The Economic Capital Modeling Process - DRAFT

Pinkal Pandu • Associate, Capital Management
Krishaanth Shanthikumar, FCAS • AVP, Capital Management
Daphne Lum, FCAS • AVP, Actuarial
October 6th, 2016

Disclaimer

The opinions expressed in this presentation are solely those of the author and not of QBE Insurance Group and its subsidiaries.

Introduction

The opinions of key external stakeholders

"We typically consider the ECM to be credible only if the insurer is applying the ECM results, together with other measures, as the basis of its major decisions"

- S&P Methodology For Assessing Insurers' Economic Capital Models

"The insurance or reinsurance undertaking should ensure that the internal model is used in its risk-management system and decision-making processes in a way that creates incentives to improve the quality of the internal model itself"

- PRA guidelines on the use of internal models for Solvency II

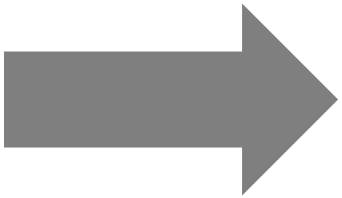
Why do we have an ECM?

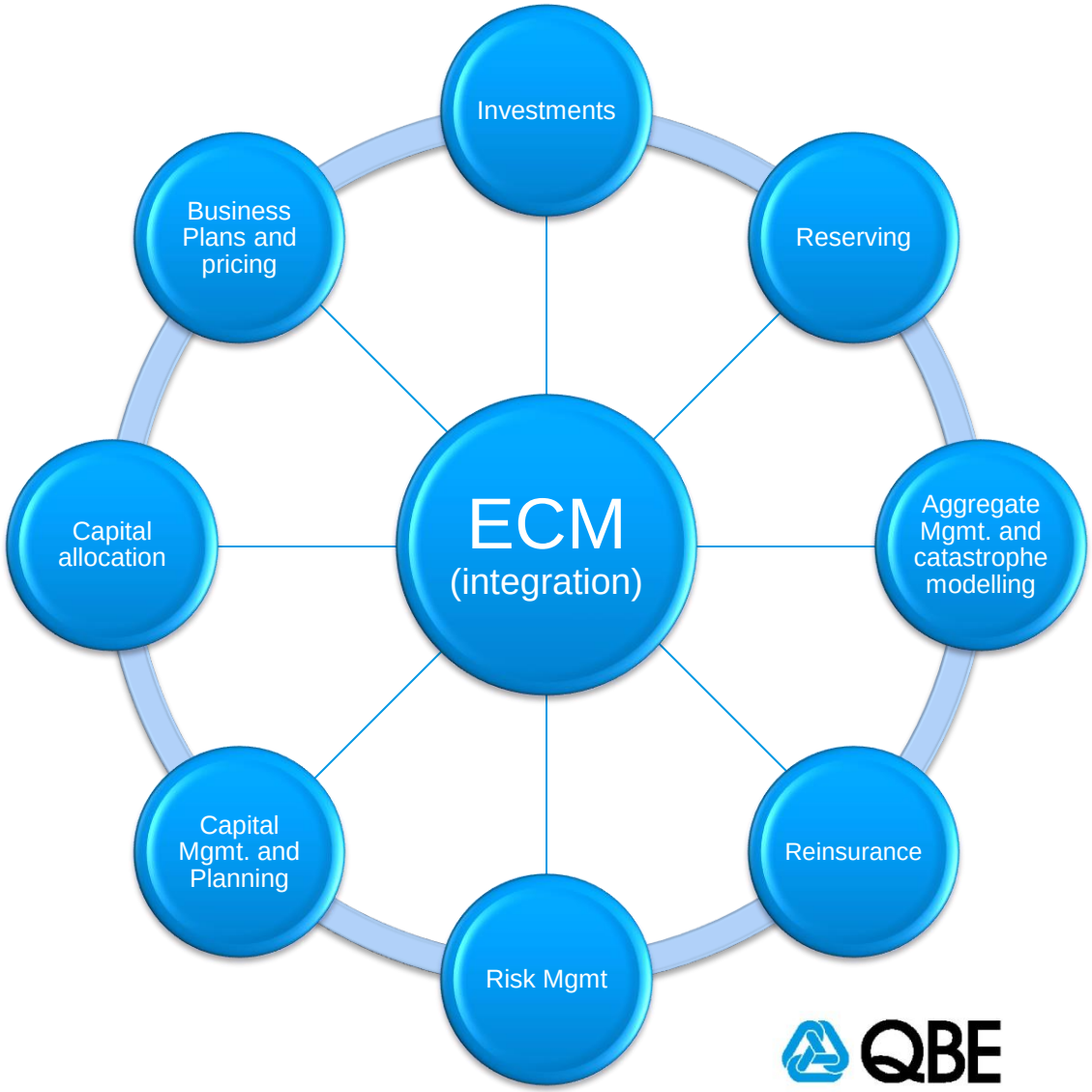
- To model **capital** requirements
  - Regulatory requirement
  - Capital management

- To **inform** the business and facilitate **better decision making**, e.g. through the following types of analyses:
  - Reinsurance modeling
  - Cat modeling
  - Capital allocation
  - Business planning
  - Risk appetite
  - Reserve variability

  In order to effectively do this we need to have integration with the business

Embedding the ECM in the business





Embedding the ECM in the business

Why is this important?

- We can **leverage** the expertise and resources of different functions
- Stakeholders in the business are ultimately the **end users**
- Easier to get **buy-in** from key internal stakeholders, if they have provided the key assumptions & judgments in the model
- Validation from independent business experts is a key test to prove the model is **appropriate** and of a **reasonable standard**
- Facilitates the company having **one view of risk**

The ECM should be used by the business to inform key decisions, with feedback from these processes then being used to further enhance and refine the model

ECM issues and challenges

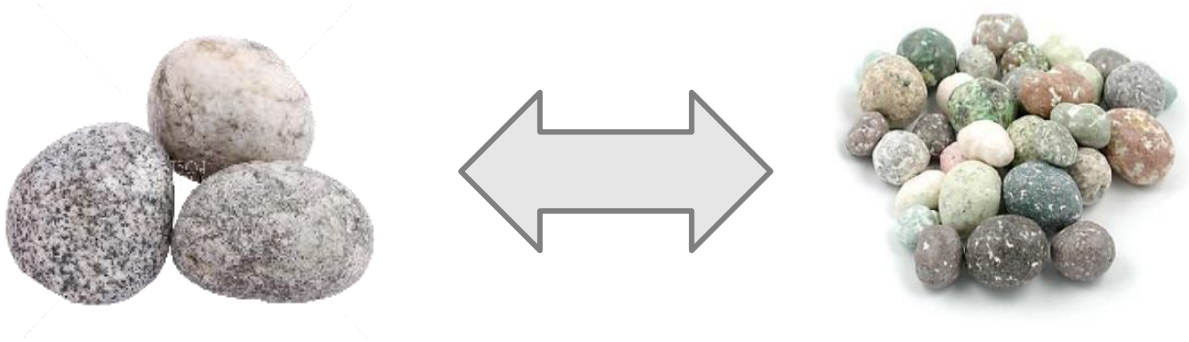
Class Structure

Finding the right balance

"A key factor affecting our ECM assessments is how insurers have decided to balance the need for complexity to support decision-making against the practicality of using the model"

- S&P Methodology For Assessing Insurers' Economic Capital Models

Considerations in determining class structure



- Generic issues in any actuarial analysis have a greater impact here due to complexity and scale of the ECM
  - Homogeneity vs credibility
  - Granularity vs resources required
  - Materiality

Considerations in determining class structure

The ECM provides an enterprise level view of risk, and therefore relies on business experts across multiple functions to provide depth of knowledge.

- Potentially conflicting views from stakeholders
  - Different functions use different segmentations
  - Reserving may place less importance on growing books of business, and may not have enough data to perform analysis on these
  - Stakeholders who focus on particular business units may have differing opinions to experts with a more high level view

Considerations in determining class structure

- Stakeholders may lack understanding of the ECM and its input requirements
  - ECM considers entire distribution, with more focus on tail risk
    - More data requirements than for point estimates
    - Greater reliance on judgment required
  - Time horizon of future business
  - Required bases for inputs
- Correlations
  - Parameterization is difficult and subjective
  - Changes to class structure may create unintended impacts to level of diversification

Considerations in determining class structure

- Reinsurance modelling
  - May need granular subject loss information to accurately model covers
  - How do we balance this with materiality and proportionality considerations?
- Potential future business decisions
  - Do we separate out certain books that are under more scrutiny from the business, and for which decisions *may* be made?
- Harmony with segmentation used in existing risk measurement and assessment tools
  - Reserve variability assessed at a different level of granularity

Discussion topic

Optimizing class structure

- What other challenges have we faced?
- How have we overcome these challenges in the past?
- How can we better deal with these going forward?

Lessons learned

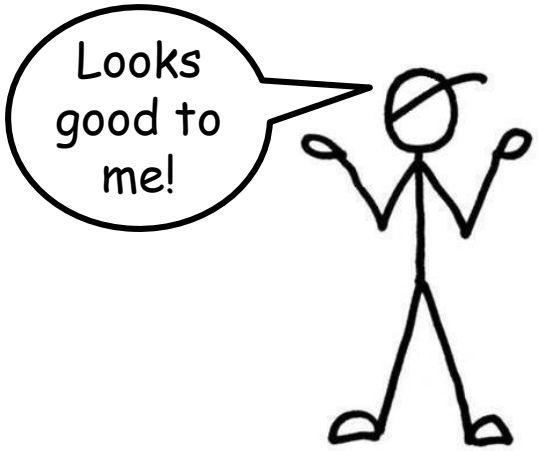
- Accept overall complexity of the problem
  - Class structure may need to be simpler than in other functions
- Understand rationale behind the various perspectives and their relevance to the ECM
- Assess impact on model use
  - Prioritize by use as required considering current and potential uses
  - Plan for alternative solutions
    - External calculation kernels, leveraging existing parameters
- Consider impact on parameterization and validation by business experts
  - Implicit agreement that they will help parameterize and validate at the chosen level of granularity

Reserve Risk

How did we achieve a better measure of reserve risk?

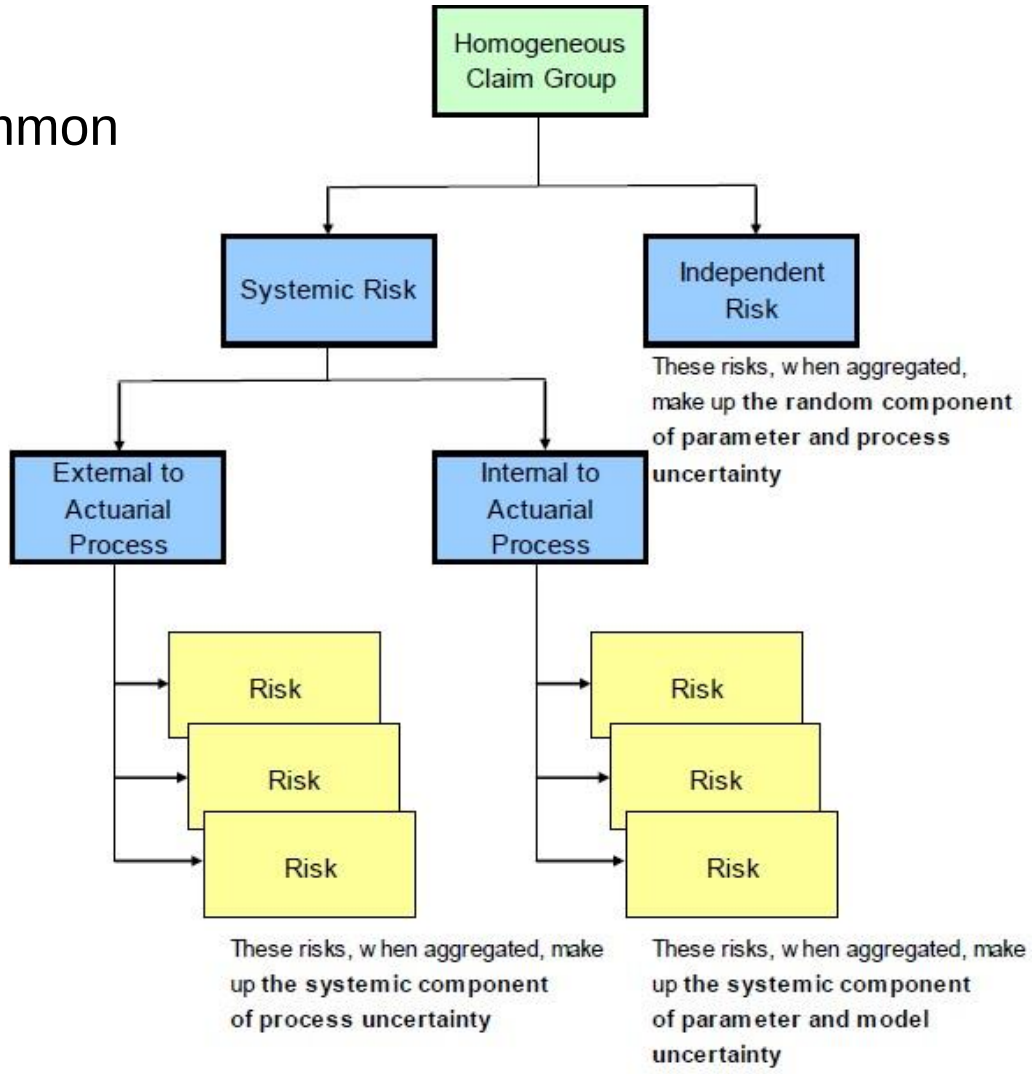
In the past, ECM actuaries parameterized reserve risk independently, with sign-off from reserving actuaries.

ECM team gathers and reconciles data → ECM team performs analysis independently → Reserving actuaries sign-off



How did we achieve a better measure of reserve risk?

Adopted a common framework for assessing risk margins:



How did we achieve a better measure of reserve risk?

- Parameterization of reserve risk transferred to reserving actuaries
  - Reserving actuaries understand the business better
- Prescribed framework gave the reserving actuaries **guiding principles**
- This led to improvements in:

Consistency	Validation	Documentation
• One view of reserve risk • Within and across divisions globally	• Reserving actuaries are better equipped to reasonability check their results	• Components of reserve risk are separated

Challenges faced

- Reserving actuaries may be lacking technical understanding of the methods
  - Triangle methods - Bootstrapping, Mack, etc
  - The prescribed framework, and its approach to separating components of reserve risk
- Prior methodologies used
  - Influences how the new framework is applied
  - Differences in terminology used
  - Challenges in creating consistency
- Reserving class structure differing to ECM class structure
- Ensuring that the overall reserve risk distribution is reasonable

Transferring parameterization

- What difficulties have we faced in transferring parameterization of reserve risk?
- Have we faced similar issues for other risk types?
- How have we addressed these issues?

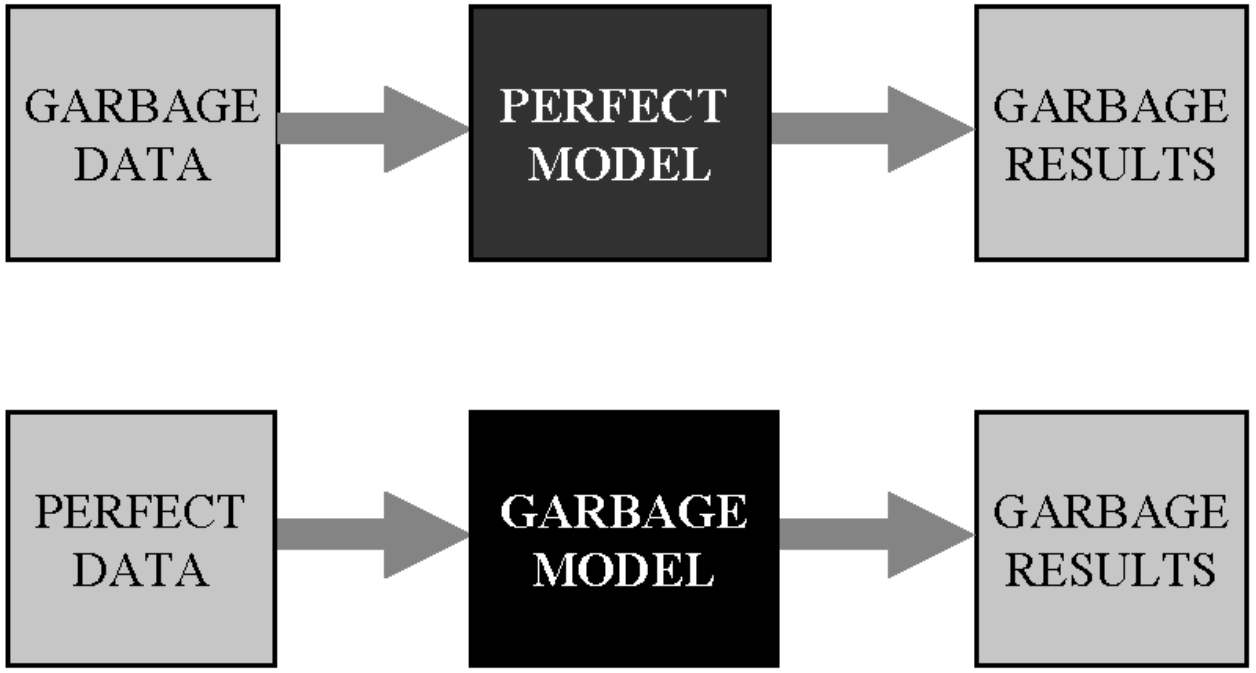
Lessons learned

- Communication is half the battle
  - Setting expectations upfront helps alleviate future confusion
- Consistency, consistency, consistency!
  - High level reviews minimize the effects of an individual's bias
  - Cross-validation across divisions and lines of business
- Continued technical training
  - What are the underlying assumptions of the different reserve variability methods?
  - How does one make bootstrapping work in segments that may not lend themselves easily to it, and should they in the first place?

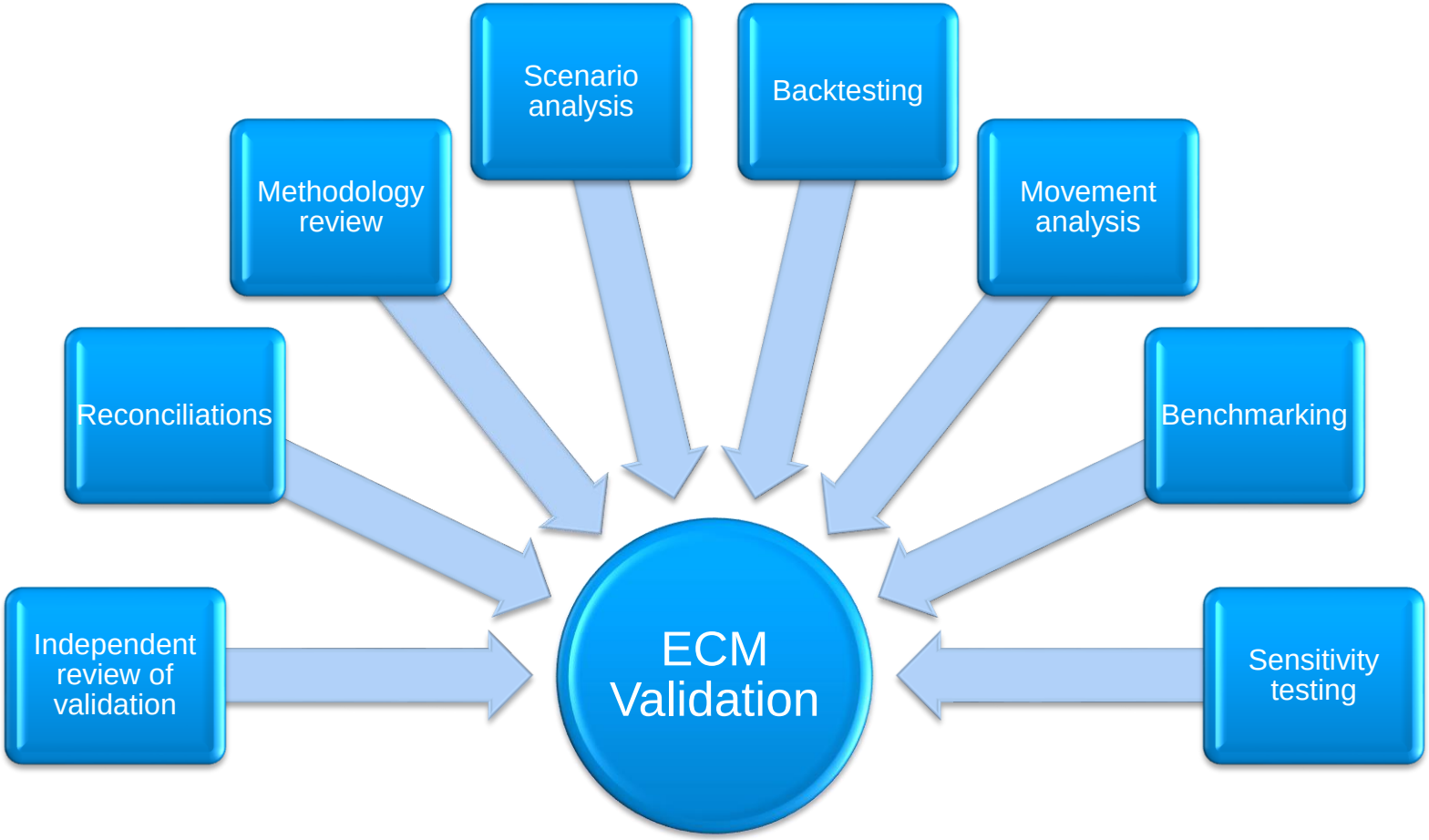
Considering reserve variability more extensively can encourage reserving actuaries to think about their business in new ways

Validation

The importance of validation



Discussion topic



What challenges do we face in these areas?

Lessons learned

- Independent validation
  - Challenge in finding stakeholders who are independent, yet have the technical/business knowledge to validate ECM outputs
    - Explaining outputs in a way the business can understand is key
  - Communicate the full scope of review in detail – quantitative outputs, methodology, validation process followed
    - Ensures reviewers understand what is required

- Reconciliation / benchmarking / backtesting
  - Cross divisional validation can be useful
  - Understand potential differences in bases between internal processes, and compare to ECM
  - Consider relevance of benchmarks, both internal and external
  - Adjust data for changes/differences in underlying risk profiles

Lessons learned

- Scenario analysis
  - Understand the basis of calculation
    - Return periods – e.g. 1 in 200 California quake ≠ 1 in 200 US quake
    - Risk types / items considered – e.g. large cat event may be offset by profit on liability lines
  - Avoid spurious accuracy
  - Consider challenges in getting experts to think about tail events
  - Proportionality

- Should build in sufficient time to validate and incorporate this feedback into the ECM assessment
- Ideally perform light validation on an ongoing basis to identify issues as they arise

Final Thoughts

Key challenges and takeaways

- Leadership
  - Management and Board buy-in gets things done
- Communication
  - Anticipating confusion
  - Asking the right questions
  - Setting the right guidelines
  - Setting expectations ahead of time
- Replicating processes across divisions – easy in theory, but difficult in practice
  - What works well in one place might create complications elsewhere
- Inadequate technical understanding
  - Proactively training and supporting stakeholders
- Balancing complexity with practicality
  - K.I.S.S.
  - Prepare for compromises

Q&A

Thank you

Krish Shanthikumar, FCAS
AVP, Capital Management
212.894.7799
krishaanth.shanthikumar@
us.qbe.com
www.qbena.com

Pinkal Pandu
Associate, Capital Management
212.894.7843
pinkal.pandu@us.qbe.com
www.qbena.com

Daphne Lum, FCAS
AVP, Actuarial
212.894.7767
daphne.lum@us.qbe.com
www.qbena.com