



Asset Liability Management for Australian Life Insurers

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Contents of Discussion

1. Definition of ALM
2. Potential for ALM in Australia
3. Practical Considerations for ALM Implementation
4. Discussion



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What is Asset Liability Management?

A definition (US SOA task force):

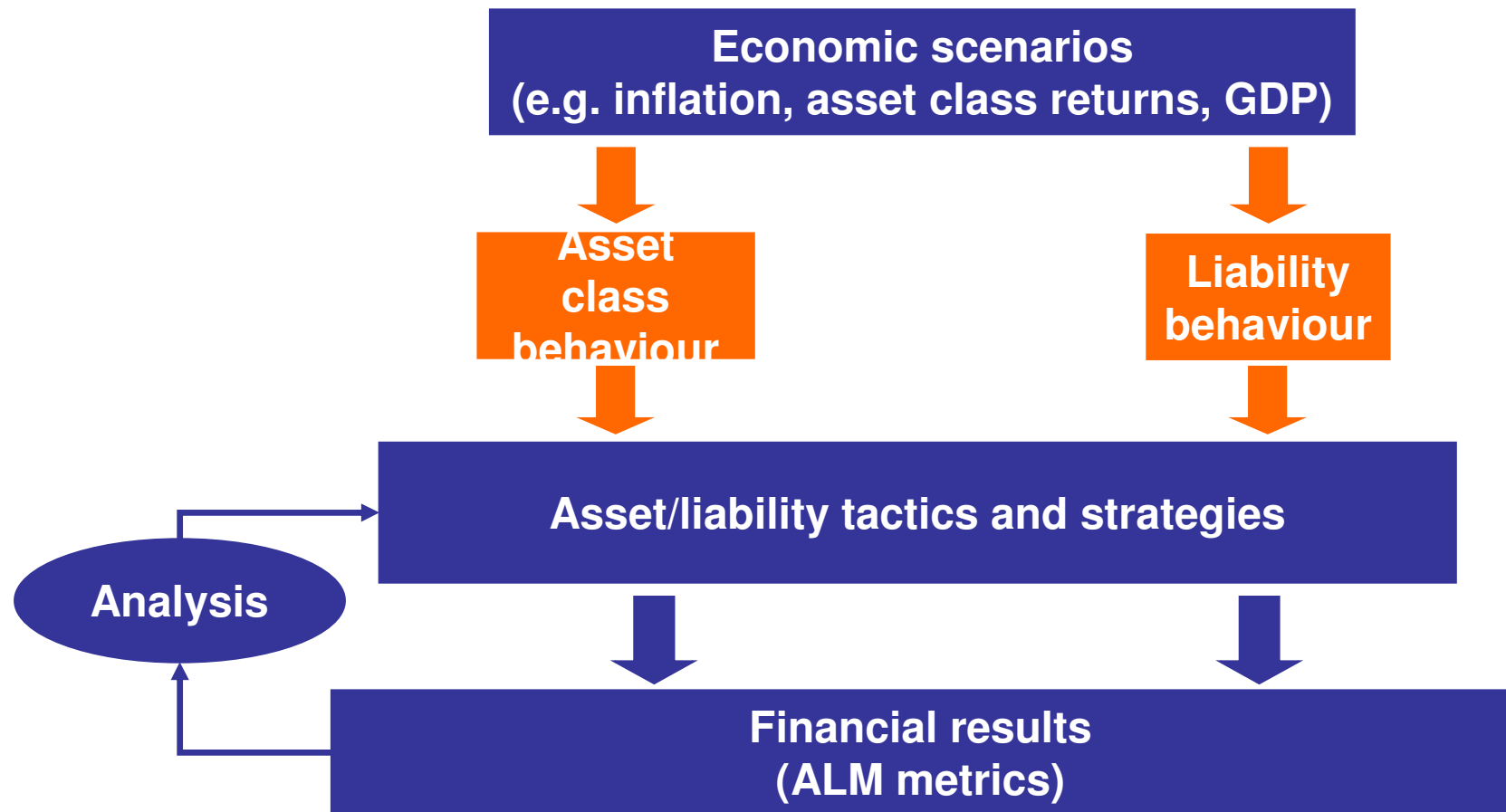
"**Asset - Liability Management** is the ongoing process of formulating, implementing, monitoring, and revising strategies related to assets and liabilities in an attempt to achieve financial objectives for a given set of risk tolerances and constraints."

- Coordination of decisions about assets and liabilities
- ALM is an ongoing process, not a one-time exercise
- The purpose of ALM is not necessarily to eliminate or even to minimise risk
 - The goal is to achieve financial objectives subject to risk tolerances and other constraints



ALM provides the ability to quantify the financial impact of changing economic conditions & different company strategies

This is the foundation of integrated risk and capital management



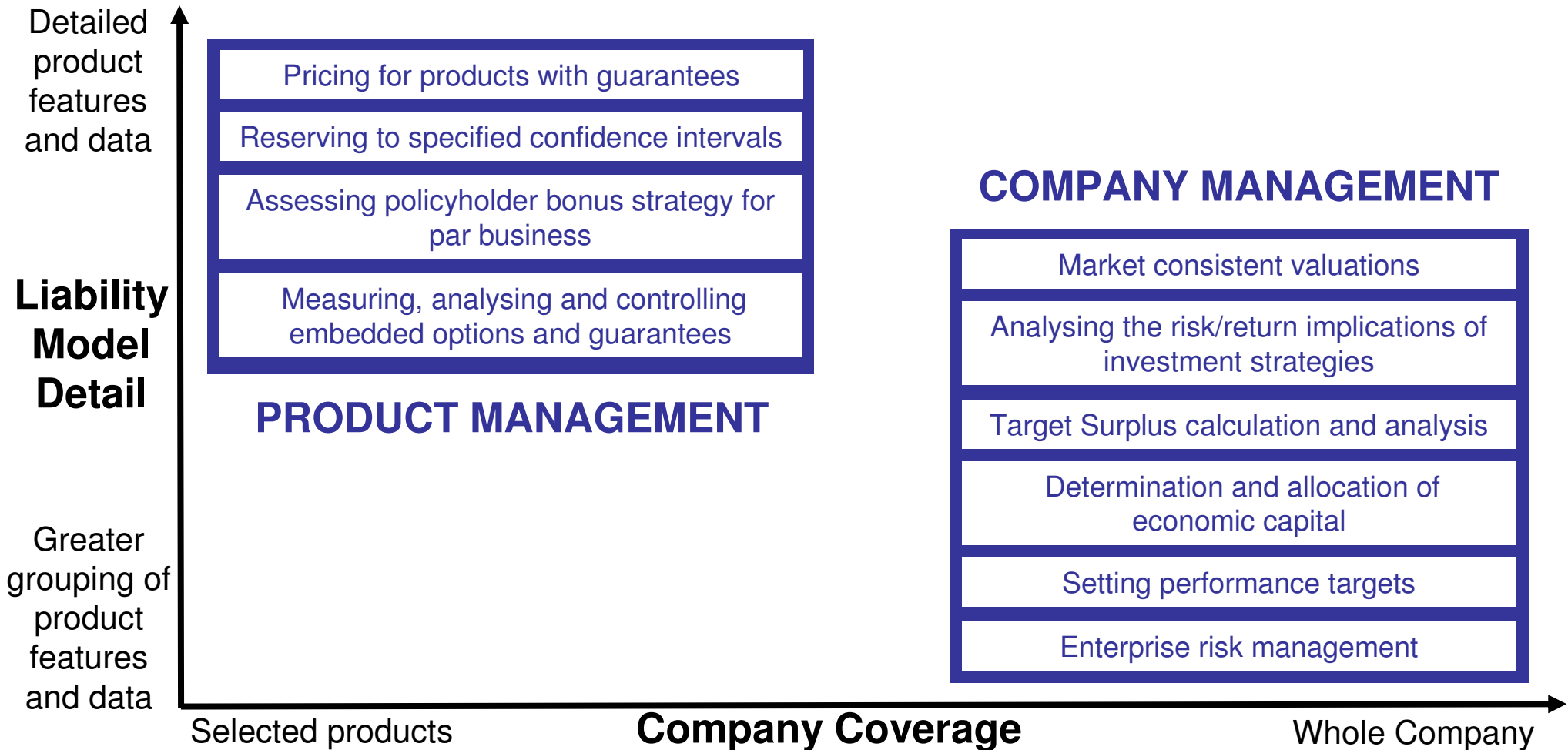


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There are many opportunities to use ALM in Australia, requiring different degrees of model complexity





Example 1: Calculation of target surplus and determination and allocation of economic capital

Potential for ALM

- Calculate the probability of breaching pre-defined thresholds given:
 - Your existing liabilities
 - Different investment strategies
 - Different new business strategies
- Calculate the economic capital required to limit the probability of ruin to an acceptable level
- Analyse strategies available to limit the amount of economic capital required
- Allocate this economic capital to different business units to assist in the comparison of return on capital across these business units

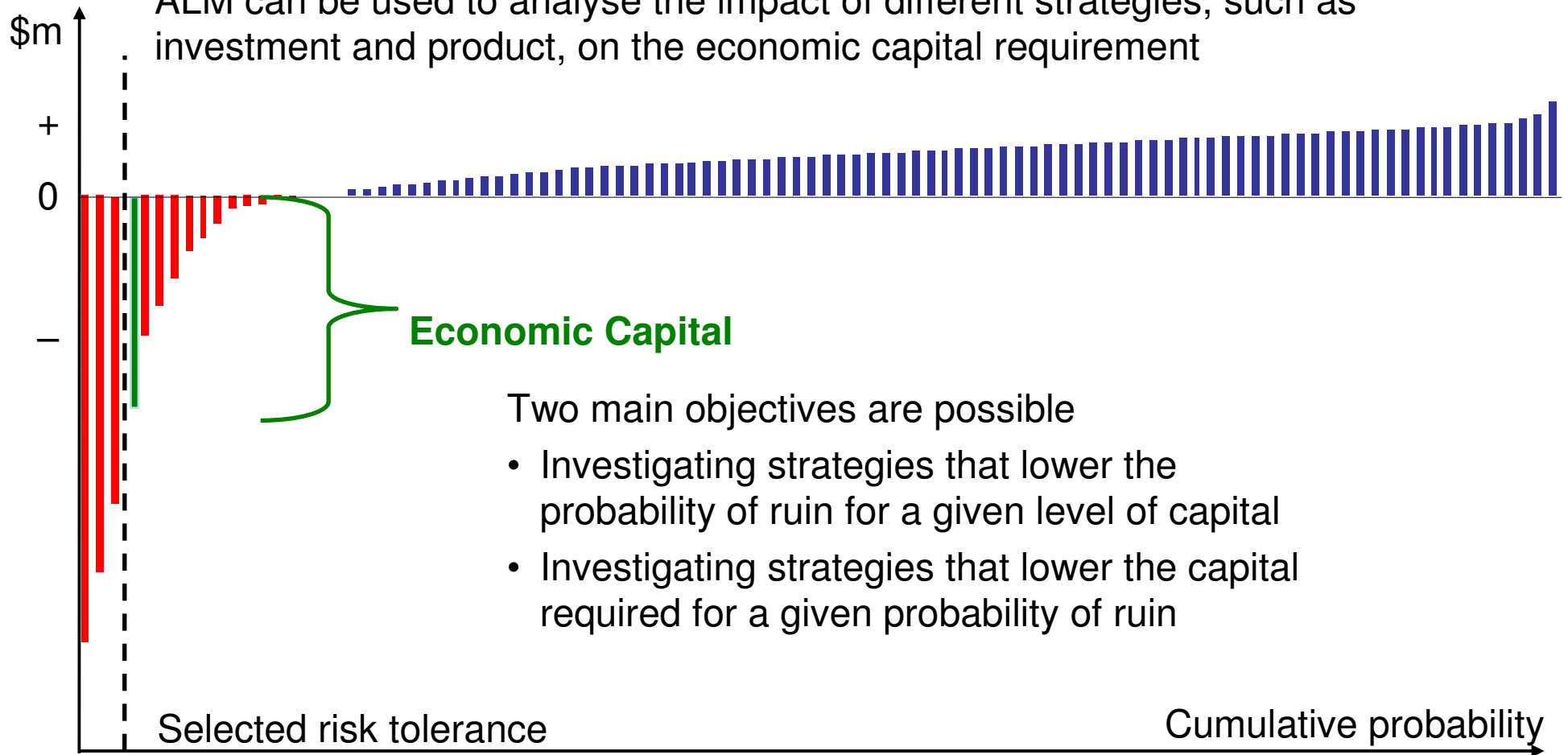
Requirements

- Complete model of assets and liabilities is required
 - Interactive asset and liability model
 - Dynamic policyholder behaviour
 - Dynamic company behaviour
- Model/data need to be tailored to facilitate reasonable run time
 - Any differences between models should be understood
- Management needs to define
 - Target thresholds
 - Acceptable probability levels



Analysing economic capital and the probability of ruin

ALM can be used to analyse the impact of different strategies, such as investment and product, on the economic capital requirement



Two main objectives are possible

- Investigating strategies that lower the probability of ruin for a given level of capital
- Investigating strategies that lower the capital required for a given probability of ruin



Example 2: Analysing the implications of investment strategies

Potential for ALM

- Establish formal guidelines around your investment strategy to ensure it is in line with your risk and return preferences
 - Guidelines based on robust analysis of interaction of assets and liabilities
 - Guidelines cover the current investment strategy, as well as how it should change under different economic conditions
- Gives more confidence regarding the suitability of your assets, given your liability profile
 - Different investment strategies can be objectively compared

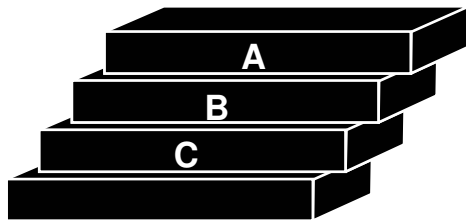


Requirements

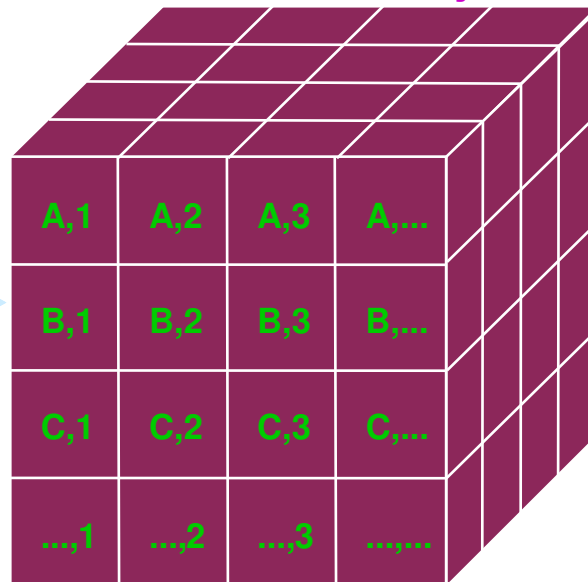
- Complete model of assets and liabilities is required
 - Interactive asset and liability model
 - Dynamic policyholder behaviour
 - Dynamic company behaviour
- Model/data need to be tailored to facilitate reasonable run times
 - Any differences between models should be understood
- Management need to determine the risk and return metrics used to compare different investment strategies
- Results should be incorporated into the investment guidelines

ALM Process for investment strategy analysis

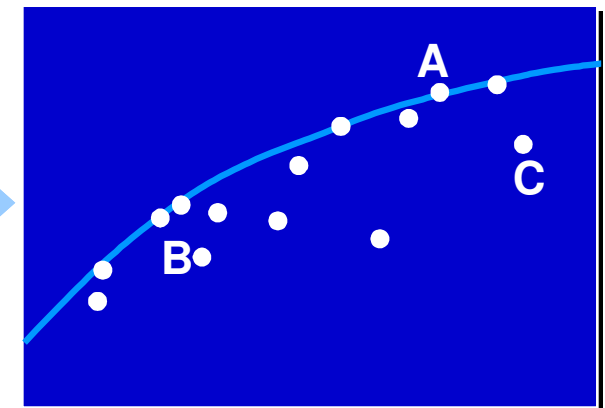
Asset Investment Policy & Strategy to Analyse



Stochastic Future Financial Projection



Expected ROE (example of measure)



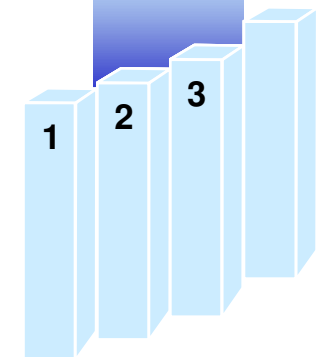
Analysing

Select Measure

Calculating the financial results for each pair of one strategy/policy & one scenario

The financial results from each strategy/policy are compared

Selection of the investment strategy based on risk preferences



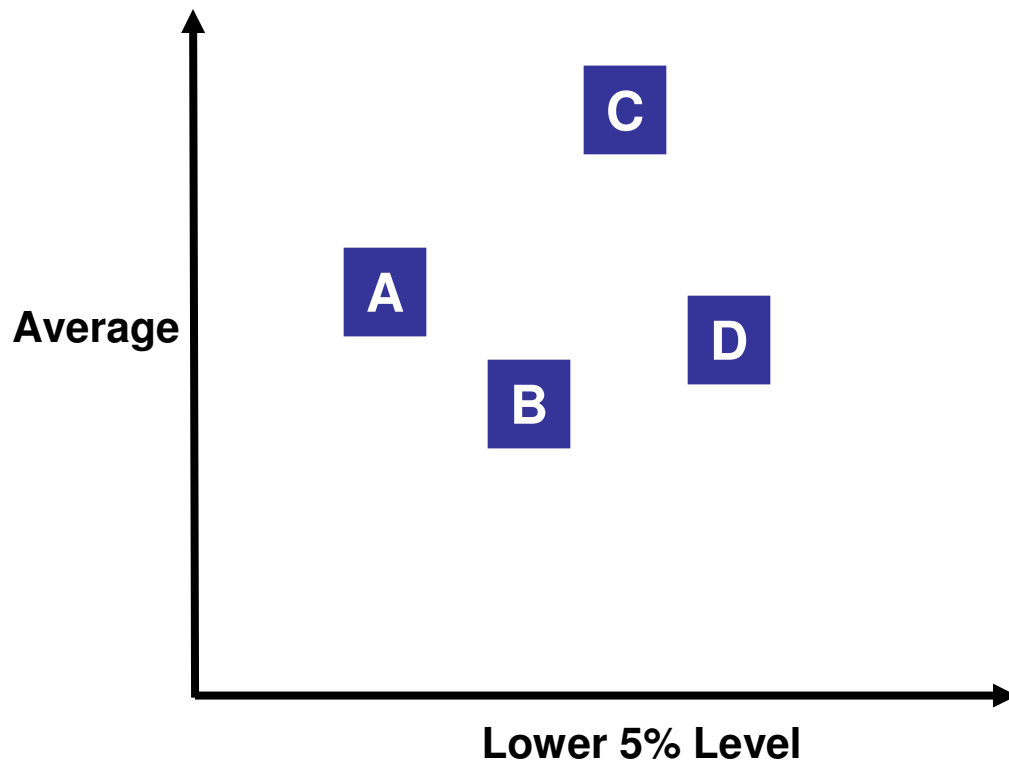
Scenarios to Analyse

Stochastically generated scenarios



Comparison of investment strategies

Accumulated Profit after 5 years for a range of investment strategies



- Different investment strategies can be analysed in terms of your defined risk and reward preferences
- Analysis can incorporate dynamic company and policyholder behaviour
- Investment strategy and dynamic behaviour rules can change over time



Example 3: Assessing policyholder bonus strategy for participating business

Potential for ALM

- Test the adequacy of current reserves to support the current bonus strategy under a range of scenarios
- The key levers that can be adjusted when analysing bonus strategy are:
 - Initial assets
 - Investment strategy
 - Bonus strategy
- Metrics used to compare different combinations of these levers are:
 - Probability of ruin
 - Cost of guarantees

Requirements

- Requires a multiple liability product model, a comprehensive asset model and flexibility to adjust the key levers used in the analysis
- Requires the ability to project the business using stochastic investment scenarios
 - Real world scenarios
 - Risk neutral scenarios
- Management needs to define
 - Acceptable probability of ruin
 - Investment and bonus strategies
 - Risk and return metrics



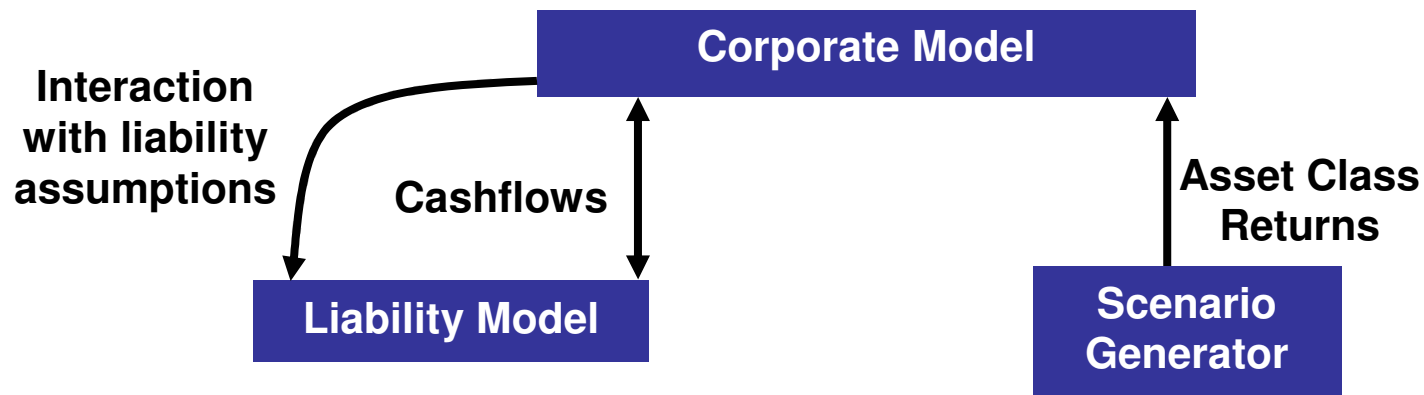
Example 4: Pricing (and reserving) for products with guarantees

The ALM process would be used to

- Calculate the charge required to cover the guarantee
- Calculate the reserving and capital requirements to specified confidence levels
- Perform profit testing

The model design combines a product model with stochastic asset returns

- Corporate model sums across scenarios and controls company behaviour
- Liability model includes policyholder behaviour, such as dependent lapse rates and take-up rates

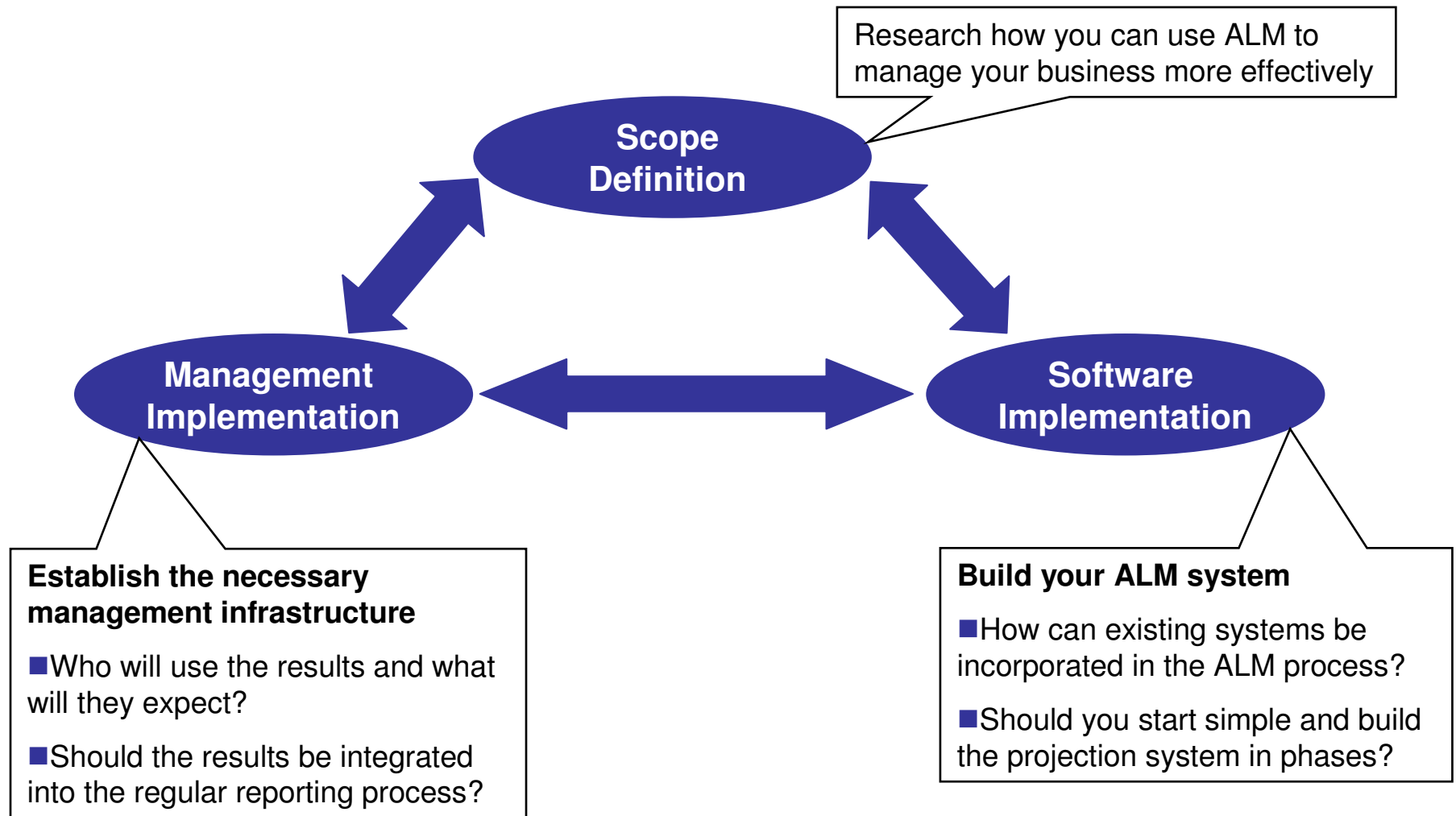




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Implementing an effective ALM system is an iterative process





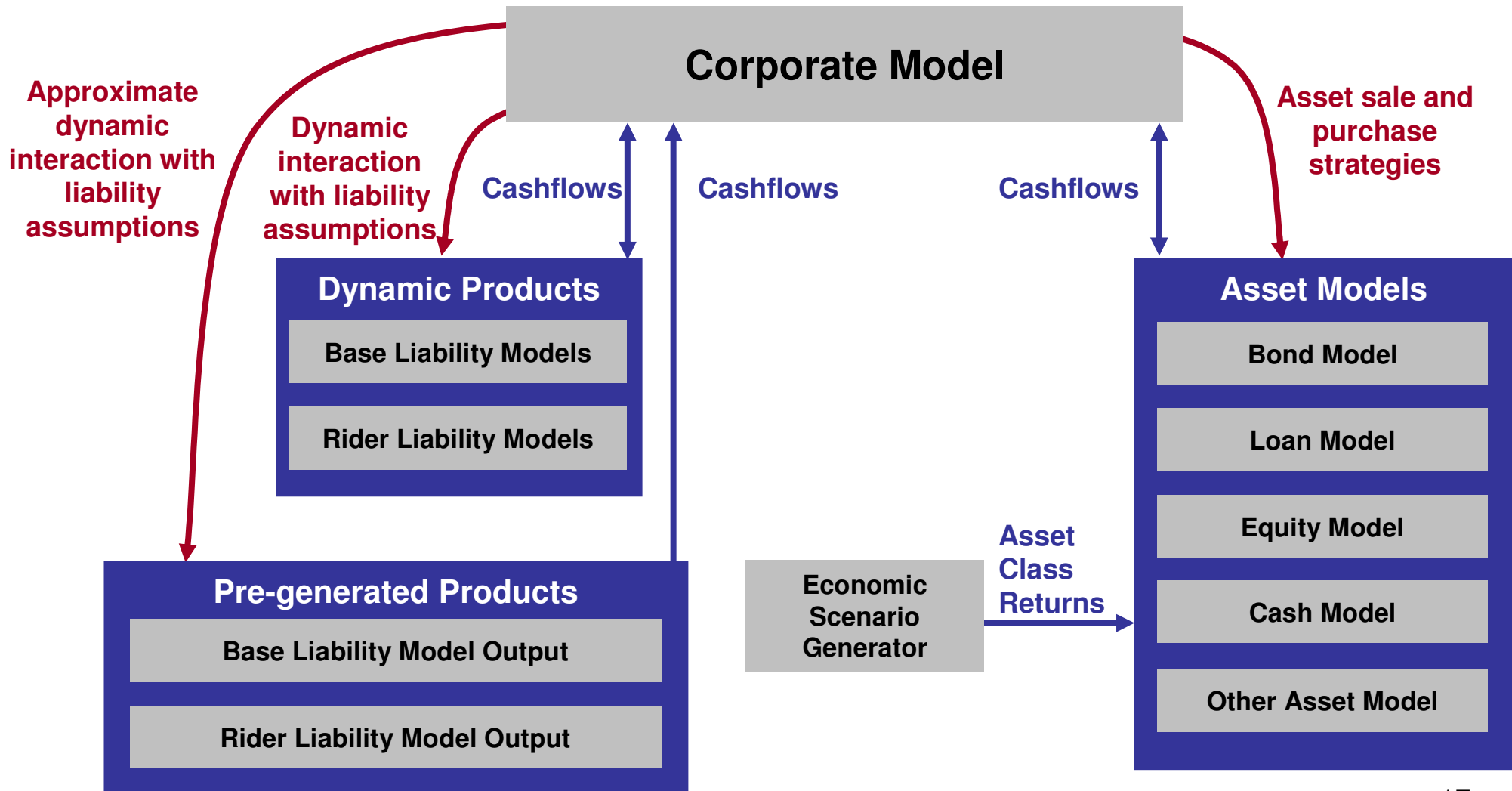
Trade-offs are required when developing an ALM system

- Tension exists between model detail and run speed
- ALM models must run quickly, yet be sufficiently detailed to provide meaningful conclusions
- The impact of different strategies is the key information provided by an ALM system

Model Detail vs. Run Speed

- **Number of model points**
- **Number of scenarios**
- **Projection horizon and time step**
- **Modeling approach for dynamic interactions**
- **Product features modeled**
- **Precision of calculations**
- **Smart modelling techniques, eg customised code, scenario selection**

Corporate ALM system





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Discussion Topics

- One model or two?
- What is stopping greater analysis?
 - No risk?
 - Run times?
 - Insufficiently sophisticated asset models?
- ALM interactions
 - How can dynamic lapses be modelled?
 - Dynamic investment strategies?
 - Other interactions?
- How can ALM systems be tested?
- What are the characteristics of effective ALM systems?
- What is the current level of ALM use in Australia?



Characteristics of effective ALM systems

MODEL FEATURE	EXPLANATION
Stochastic Modeling	Ability to undertake stochastic modelling to calculate ALM metrics and investigate outcomes for different strategies.
Dynamic Modeling	Ability to undertake dynamic modelling to link asset and liability cashflows and incorporate company and policyholder behaviour.
Pre-generated Cashflows	Ability to use pre-generated liability cashflows for products that are not very interest sensitive.
Flexibility and Ease of Use	Flexibility to be able to perform all the necessary analysis and calculate all necessary metrics, and target the calculations to improve efficiency. Ease of use assists quick development and understanding of the model.
Speed	Ability to perform projections of thousands of economic scenarios. Distributed processing is an advantage for large numbers of scenarios.
Flexible Reporting	Ability to produce both deterministic and stochastic reports to meet all internal company requirements.
Audit & Control Tools	Ability to monitor model changes to ensure consistency.



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