

Dynamic Management Actions

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Agenda

- Introduction
- Types of DMA
- Modelling DMA
- DMA and Risk Management
- Conclusion

1. Introduction



"Rational behaviour requires theory. Reactive behaviour requires only reflex action."

W. Edwards Deming

What do we mean by DMA?

- Dynamic => actions taken a posteriori by management in response/reaction to real life events and experience
- An action fixed in the same way in the future regardless of actual conditions would not be "dynamic".
- In this context, we consider the pre-planning of these actions before a particular scenario has occurred.
- Decisions made only in the light of particular circumstances as they occur may be dynamic, but certainly cannot be modelled and is unsatisfactory from a risk management perspective

Reasons for lack of development of DMA modelling

- Difficult to express planned DMA in a way which is both meaningful to the management and tractable for modelling
- Practical and technical difficulties in modelling management rules rich enough to approximate reality, and results can be difficult to interpret
- Involves effective communication across a number of functions who may frequently have quite different perspectives
- Cultural opposition from management not wishing to be constrained by DMA rules, nor seeing the value in planning reactions to hypothetical future situations

Reasons for lack of development of DMA modelling (2)



"Everyone who labours under an authority figure tends to lie to and flatter that authority figure in order to protect themselves either from violence or from deprivation of security (such as losing one's job). In essence, it is usually more in the interests of any worker to tell his boss what he wants to hear, not what is true" (Celine's Second Law)

2. Types of DMA

- Bonus/crediting rates on participating policies
- Investment strategy
- Future new business
- Reviewable charges
- Operational management
- Reaction to economic and other crises

Investment strategy

Examples:

- Asset mix
- Assets to buy and sell
- Timing of purchases and sales
- Realisation of gains and losses
- Hedging

How investment strategy can influence liability profiles



Liabilities also dependent on assumed dynamic policyholder behaviour



3. Modelling



"In modelling, there is no point in trying to prove you have a brain, so why even bother? I'd sooner save the energy for something more meaningful." Helena Christensen, Danish Fashion Model

The Goldilocks Principle

Simple DMA rules not realistically reflecting how management would expect to react in circumstances that the model does project => risk not understood properly, capital may be over or understated

Too cold

sophistication of the model, not too hot, not too cold

DMA rules consistent with

Just right

DMA rules more sophisticated than the scenarios produced by the model => redundant logic and risk of confusion over what the model is capturing

General Principles

- Reflect actual documented intentions of management under model scenarios
- Be consistent with other management actions and other aspects of the model
- Be comprehensive
- Be capable of being coded into the model
- Consider knock-on effects of actions

Management Action Plan

- Solvency II requires insurers to "establish a comprehensive future management actions plan" which should:
 - □ Be approved by management.
 - Describe how reflected in BEL
 - □ Be realistic and consistent with current business practice and strategy
- Key foundation of risk management and governance
- Critical link between Solvency II Pillars I and II

Selection of factors driving DMA

- Derivable from model inputs or outputs
- 3 types
 - Economic conditions or similar
 - Current and projected assets
 - Current and project liabilities
- If factors not derivable from model:
 - Improve sophistication of model
 - □ Use proxies
 - Exclude

Selection of factors driving DMA (2)



Determining DMA rules

Agree:

□ Broad types of DMA to model

- □ Factors likely to drive them
- Derive discrete scenarios; management agree intended reactions
- Propose generic rules
- Agree and sign-off

Determining DMA rules (2)



Example

Driver – economic	Driver – cashflows	Action	Reason
Mkt interest rates fall to 2.5%pa, Equities fall 40%	No sales / purchases	Turn over 10% equities	Gradually pass losses to policyholders
	Sales	Sell proportional mix	Maintain target yield by containing realised gains/losses
	Purchases	Buy 2 year bonds; turn over 10% equities	Avoid being locked into low interest rates
Mkt interest rates rise to 6.5%pa, equities fall 40%	No sales / purchases	Turn over 10% equities	Gradually pass losses to policyholders
	Sales	Sell proportional mix; sell bonds shortest first	Avoid realising large losses
	Purchases	Buy 75% bonds matching duration; 25% 2 yr bonds; turn over 10% equities	Lock into higher interest rates

The link to DPB

- DMA can have direct or indirect effect on DPB
- Not considering policyholder reaction can overstate benefit from DMA
- E.g.
 - □ Bonus rate cut =>higher lapses
 - Medical insurance premium rates => anti-selective lapses
- Possible feedback loops; "lapse dancing"

4. DMA modelling and risk management



"We haven't got a plan so nothing can go wrong"

Spike Milligan

DMA and models for risk management

- Actuarial projection model
 - □ Too little (or no) DMA
 - □ Too much DMA
- DMA is a strong assumption
- For risk management starting point therefore needs to be
 - □ Model
 - □ With appropriate DMA
 - Understanding of model limitations

Applications of DMA within risk management

- An appropriate DMA-enabled model can contribute significantly to risk management
- Some potential applications are
 - □ DMA control cycle
 - Agency risk
 - Decision testing

DMA Control Cycle

- Plan/document management actions
- Suggests control cycle, i.e. in face of past events
 - □ Actual management actions, vs
 - □ Expected actions (model, plans)
- E.g. run prior-year model to represent actual experience; compare actual vs expected DMA
 Impact of deviation
 - □ But complex analysis, and care needed (externals)
- Include actual vs expected DMA outside model
- Could encourage "managing to model"?

DMA Control Cycle



Agency risk

- DMA can aid in management of agency risk
- Can look to compare

□ Actual past actions in face of past events, with

□ Management action plan

- Justify and potentially quantify differences
- Positive variance not necessarily indicative of no issue

Excess risks

Performance attribution

Need to understand what management are doing and what they intend to do

Management action decision testing

- Use DMA-enabled model to test expected effect of different actions
 - □ Is proposed action plan optimal?
 - Justify differences between proposed and optimal actions
- E.g. dynamic ALM techniques
 - □ Run DMA to determine optimal investment strategies

But need to

- Be aware of factors not captured by model
- □ Avoid letting model decide
- □ Deal with model saying "do A"; real life says "do B"

DMA and Solvency II risk management

Use Test

DMA are both inputs and outputs to internal model and risk management process

ORSA

Opens up the modelling to much wider framework

- E.g. future new business
- Greater range of DMA considerations
- DMA derived in context of ORSA then used in Pillar I
 - Reflect actions management intends to take
 - May not optimise SCR

5. Conclusion



Conclusions



"Mathematical finance lends credibility and false precision to the dismal reality of risk management" – Satyajit Das, "Traders, Guns & Money"

"Accepting the absurdity of everything around us is one step, a necessary experience: it should not become a dead end. It arouses a revolt that can become fruitful."

– Albert Camus (1970)



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