



Institute
and Faculty
of Actuaries

Capital Modelling to Capital Management: Learning from Solvency II

Daniel Grace (Willis Towers Watson)

11 May 2017

Agenda

- Introductory Concepts
- What is Solvency II?
 - Where did it come from?
 - Why are we talking about it?
- Regional Variants
 - RBC (Hong Kong)
 - C-ROSS (Mainland China)
- Capital Impact

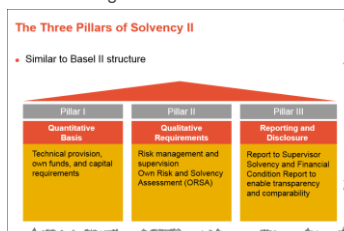
Solvency II in one Slide

“It is a harmonised, sound, robust and proportionate prudential supervisory regime to be applied across the European Union.

Solvency II is an advanced supervisory regime [and] is based on the latest international developments in risk-based supervision, actuarial science and risk management.”

- Pillar I – Calculation of capital reserves
- Pillar II – Management of risks and governance
- Pillar III – Reporting and disclosure

Source: EIOPA
<https://eiopa.europa.eu/Pages/Supervision/Insurance/Solvency-II-Going-Live.aspx>



11 May 2017

3

What is Capital Modelling?

In *very* general terms, there are three questions that P&C actuaries seek to answer:

- The **pricing** question: how much should I charge for a particular risk?
- The **reserving** question: for the business on my books, how much do I need to keep in the bank to pay claims?
- The **capital** question: how much should I put away, given I need to keep my policyholders, regulators and shareholders happy?

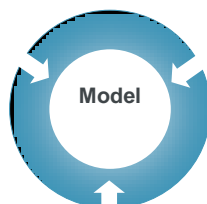
11 May 2017

4

... and why do people do it?

External Demands

- Regulatory (Solvency II, RBC)
- Rating Agencies eg S&P ERM Ratings
- Peer Pressure



Business Objectives

- Business Planning
- Reinsurance Evaluation
- Risk Management
- Capital Management
- Performance Measurement
- Asset Strategy
- M&A

Internal Objectives

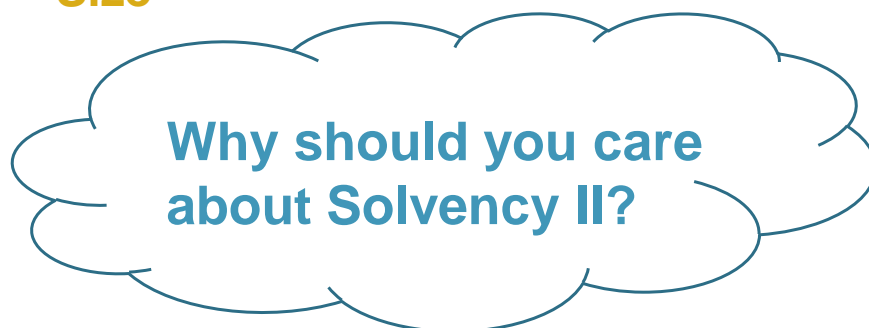
- To understand better the risk profile of the business and the various sources of risk
- To make informed financial decisions based on risk vs. reward
- To pull together a coherent view of the whole business

11 May 2017

5

**Market
Size**

**International
Reach**



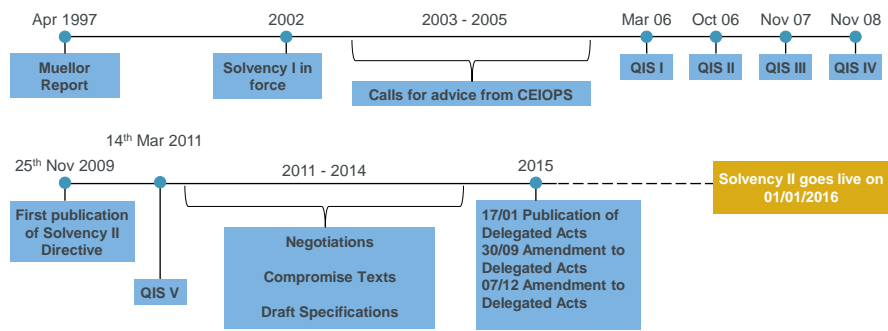
Sophistication

Primacy

11 May 2017

6

Solvency II in more than one Slide - timeline



Solvency II in more than one Slide – internal tensions

It is a harmonised, sound, robust and proportionate prudential supervisory regime to be applied across the European Union.

Solvency II is an advanced supervisory regime [and] is based on the latest international developments in risk-based supervision, actuarial science and risk management.

Source: EIOPA
<https://eiopa.europa.eu/Pages/Supervision/Insurance/Solvency-II-Going-Live.aspx>

Solvency II in more than one Slide – internal tensions

It is a **harmonised**, sound, robust and proportionate prudential supervisory regime to be applied **across the European Union**.

Solvency II is an advanced supervisory regime [and] is based on the latest international developments in risk-based supervision, actuarial science and risk management.

Source: EIOPA
<https://eiopa.europa.eu/Pages/Supervision/Insurance/Solvency-II-Going-Live.aspx>

11 May 2017

9

Solvency II in more than one Slide – internal tensions

It is a harmonised, sound, robust and **proportionate** prudential supervisory regime to be applied across the European Union.

Solvency II is an **advanced** supervisory regime [and] is based on the latest international developments in risk-based supervision, **actuarial science** and risk management.

Source: EIOPA
<https://eiopa.europa.eu/Pages/Supervision/Insurance/Solvency-II-Going-Live.aspx>

11 May 2017

10

Solvency II in more than one Slide – internal tensions

It is a harmonised, sound, robust and proportionate **prudential** supervisory regime to be applied across the European Union.

Solvency II is an advanced supervisory regime [and] is based on the latest international developments in risk-based supervision, actuarial **science and risk** management.

Source: EIOPA
<https://eiopa.europa.eu/Pages/Supervision/Insurance/Solvency-II-Going-Live.aspx>

Regime Comparison

	Future Underwriting	Catastrophe	Interest Rate	Credit Spread	Operational
C-ROSS	Factor Based (NWP)	Factor Based	Up/Down stress (asset Cfs only)	Factor Based	Regulatory Score & Sanctions
RBC	Factor Based (URR)	Data gathering exercise	Up/Down nominal IR stress (Assets & Liabs)	Stress Spreads	Not covered
Solvency II (standard formula)	Formula Based (earned exposure)	Mix of Scenarios & factors	Up/Down real & nominal IR stress (Assets & Liabs)	Stress Spreads	Formula Based (earned exposure)

European Environment

The picture for Europe is not rosy with the economy yet to recover to 2008 levels of output and ...

The diagram illustrates the DuPont equation for Return on Equity (ROE). It shows the relationship between Injected Equity, U/W Leverage, U/W Return, Investment Leverage, and Investment Return. The equation is as follows:

$$\text{Injected Equity} \rightarrow \frac{[P]}{[E]} \times \frac{[U]}{[P]} + \frac{[L] + [E]}{[E]} \times \frac{[I]}{[A]} = \frac{[U] + [I]}{[E]} = \frac{[R]}{[E]} = \text{ROE}$$

Key components highlighted in green boxes:

- U/W Return**: $\frac{[U]}{[P]}$
- Investment Return**: $\frac{[I]}{[A]}$
- UW Leverage**: $\frac{[P]}{[E]}$
- Investment Leverage**: $\frac{[L] + [E]}{[E]}$

Legend:

- [E]** equity to write premium **[P]**
- Generates **[U]** u/w return
- Loss Reserves **[L]**
- Assets **[A] = [L+E]**

11 May 2017

13

European Environment

The picture for Europe is not rosy with the economy yet to recover to 2008 levels of output and insurers are increasingly financing less and less of their capital via debt.

The diagram illustrates the DuPont equation for Return on Equity (ROE), similar to the one above, but with red X marks indicating a decline in leverage and return components. The equation is as follows:

$$\text{Injected Equity} \rightarrow \frac{[P]}{[E]} \times \frac{[U]}{[P]} + \frac{[L] + [E]}{[E]} \times \frac{[I]}{[A]} = \frac{[U] + [I]}{[E]} = \frac{[R]}{[E]} = \text{ROE}$$

Key components highlighted in green boxes:

- U/W Return**: $\frac{[U]}{[P]}$
- Investment Return**: $\frac{[I]}{[A]}$
- UW Leverage**: $\frac{[P]}{[E]}$
- Investment Leverage**: $\frac{[L] + [E]}{[E]}$

Legend:

- [E]** equity to write premium **[P]**
- Generates **[U]** u/w return
- Loss Reserves **[L]**
- Assets **[A] = [L+E]**

11 May 2017

14

Capital Management Tools

Areas of Capital Management					
Financial/ actuarial	Business management	Investment	Reinsurance	Capital solutions	Business reorganisation
Review models for prudence	Product redesign/ repricing	Asset portfolio redesign/ restructure	Reinsurance optimisation	Equity raising	Discontinue/ run-off certain lines of business
Review actuarial reserves/DAC for prudence	In-force management	Cashflow/duration matching	Internal reinsurance	Debt structuring	Reorganisation of corporate legal structures
Accounting and tax optimisation	Ongoing business volume/mix management	Derivatives/static/ dynamic hedging	Risk transfer/ external reinsurance	Contingent capital	Redomiciling/ branch structures
Regulatory arbitrage	Underwriting and claims management	Credit	Financial reinsurance	Sidecars or equivalent	Internal captives/ resources
Inter-group arrangements	Expense management and outsourcing	Alternative Investments	Securitization	Other (non- reinsurance) internal transactions	Purchase/sale of business/blocks of business
Possible Capital Management Actions					

11 May 2017

15

New offerings – Parametric Policies

Problem: Insure the Uninsurable

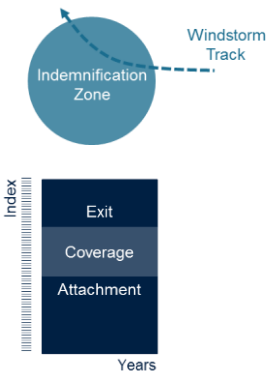
- Loss of Earnings Cover
- Automatic Trigger
- Schedule of Claim Amounts

Key Benefits

Expands Market for Insurance

Transparent Policies

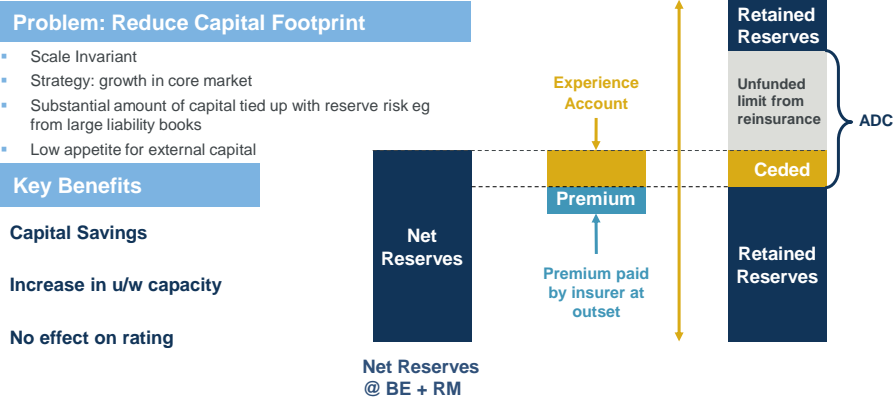
Diversifies Traditional Nat Cat Risk



11 May 2017

16

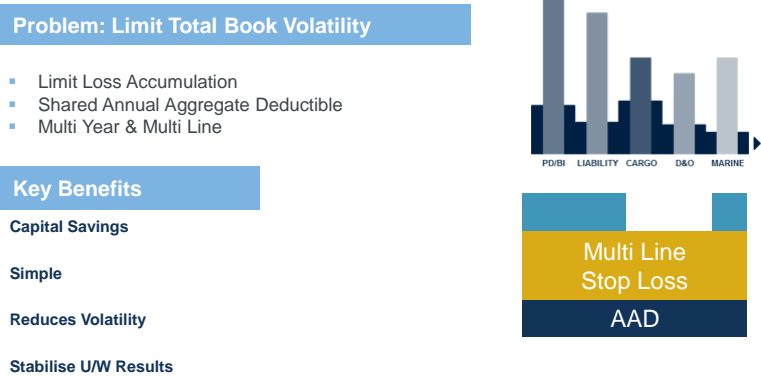
Protection/Risk Transfer – Adverse Development Cover



11 May 2017

17

Reinsurance Restructuring



11 May 2017

18

Conclusions

External Demands

- Regulatory (Solvency II, RBC)
- Rating Agencies eg S&P ERM

Business Objectives

- Business Planning
- Reinsurance Evaluation
- Risk Management
- Capital Management

How much should I put away, given I need to keep my policyholders, regulators and shareholders happy?

- M&A

Internal Objectives

- To understand risk
- To make informed financial decisions based on risk vs. reward
- To pull together a coherent view of the whole business

And, what is the **most efficient** way to do it?



The views expressed in this [publication/presentation] are those of invited contributors and not necessarily those of the IFoA. The IFoA do not endorse any of the views stated, nor any claims or representations made in this [publication/presentation] and accept no responsibility or liability to any person for loss or damage suffered as a consequence of their placing reliance upon any view, claim or representation made in this [publication/presentation].

The information and expressions of opinion contained in this publication are not intended to be a comprehensive study, nor to provide actuarial advice or advice of any nature and should not be treated as a substitute for specific advice concerning individual situations. On no account may any part of this [publication/presentation] be reproduced without the written permission of the IFoA [or authors, in the case of non-IFoA research].