Swiss Re

Price Positioning in a Competitive World

Valerie Gilles-Coeur and Raj Yadav, Swiss Re

Agenda

- Impact Analysis
- One step beyond

Impact Analysis

Impact analysis

Personal Lines Pricing Process

- Collect policy, and claims data
- Clean & combine data from different sources
- Spilt data by different perils

- Preliminary analyses
- Develop the frequency and severity models by perils
- Validate the models

- Combine the different models by perils to predict pure premium
- Load for expenses, commissions etc. for office premium

- **Understand the impact of change in factor relativities and other assumptions on office premium to decide the optimal rates**

- Take the final rates to the market

Identify Assumptions to be changed

- **Individual factor relativities**
- **Commission Assumptions**
- **Reinsurance Cost**
- **Fixed Expenses**
- **Variable Expenses**
- **Profit Margin**

** These assumptions can be changed by peril and/or channel etc.*

Assess Impact of Changes

- **Generate scenario premium**
- **Assess scenario premium with existing rates**
- **Assess retention level after the proposed rate change**
- **Assess new business level after the proposed rate change**
- **Assess impact on profits**
- **Assess impact on market share**

Benefits

- **Decide on optimal price revisions for policies**
- **Assess the impact of min/max premium change bands introduced by the regulator in a detariffed market**

Why can't technical relativities be used as final rates?

Technical/GLM relativities need to be adjusted:

- To meet premium target for future periods
- To meet the target loss ratio and capital requirements
- To derive the new base rate applicable following a rate change
- To comply with regulatory restrictions
- To spread out the rate reduction/increases across segments

How to apply changes in rates?

Apply the change to the base rate

- Find out the rate change that is required by the business
- Assume individual factor relativities remain unchanged
- Find out the off-balance factor for base rates to ensure that the overall change is revenue neutral
- Calculate the new base rate as:
  - Current Base Rate *(1+Rate Change)/(1+off-balance factor)

Limiting the relativities of individual variables

- Proposed relativities are different from current relativities
- For particular factors, there is a cap on the increase/decrease in premium allowed because of the proposed rates
- It will be an iterative process in which
  - Shortfall/excess premium will need to be spread over non-capped levels
  - Proposed relativities will be adjusted to comply with the cap
  - Base rate will need to be adjusted to cover shortfall/excess premium and to comply with the cap

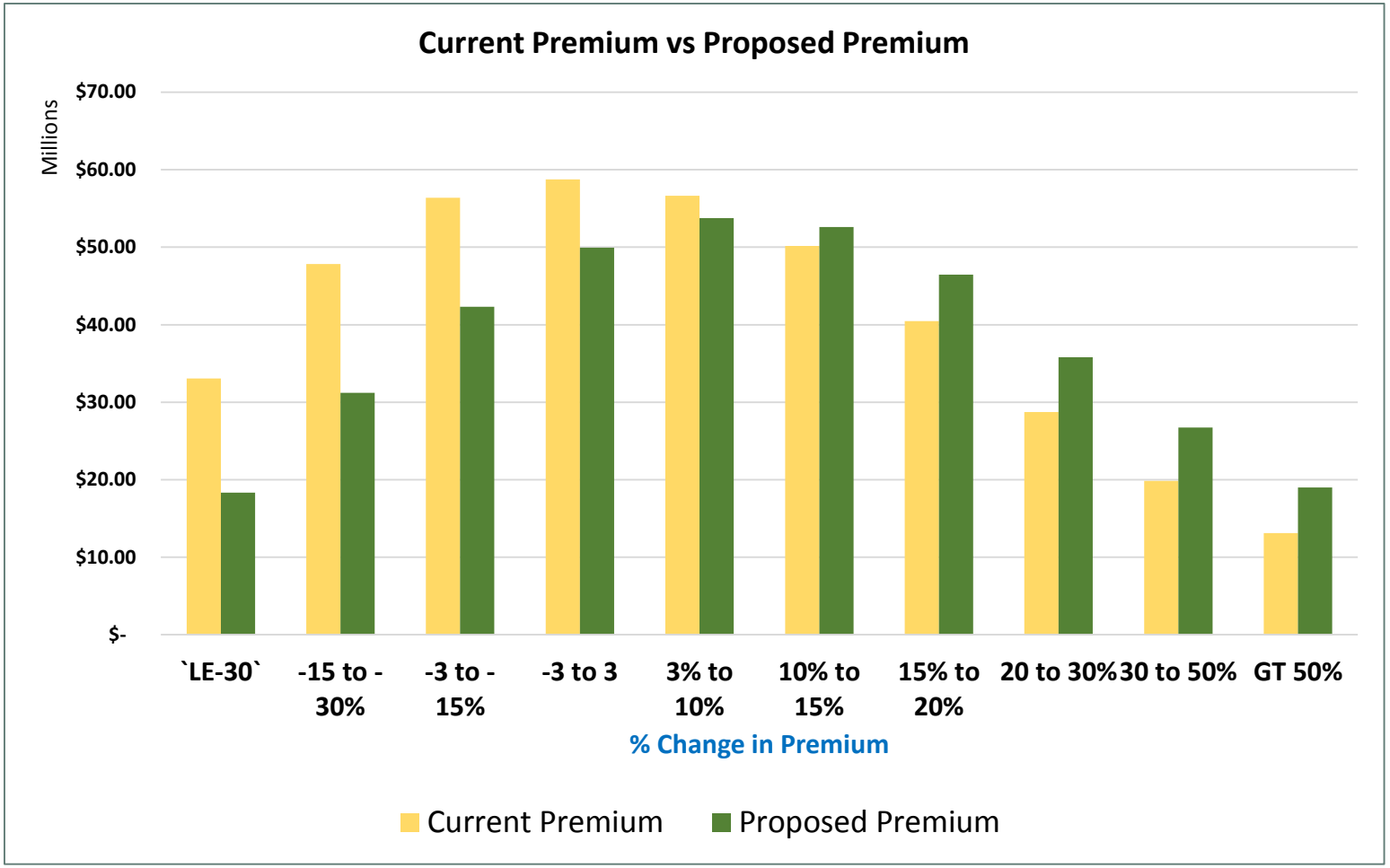
Data requirements

Factor Name	Desciption	Relativities		
		OD	TPPD	TPBI
Base		**20.66**	**37.56**	**89.98**
Customer Age	16-25	1.60	1.45	1.30
Customer Age	25-30	1.22	1.18	1.02
Customer Age	30-35	1.05	0.95	0.95
Customer Age	35-40	1.00	0.90	1.03
Customer Age	40-45	0.90	1.00	1.00
Customer Age	45-50	1.03	1.07	1.11
Customer Age	50-55	1.10	1.11	1.13
Customer Age	55-60	1.20	1.14	1.02
Customer Age	60-65	1.25	1.18	1.15
Customer Age	Greater than 65	1.35	1.20	1.22

* Similar information will be required for **all other relevant factors** from the rate plan

Channel	Type of Loading	Amount
Agency	Fixed Expenses	$30
	Variable Expenses	8.50%
	Reinsurance Cost	1.50%
	Profit Margin	7.00%
	Commission	10.00%
Bancassurance	Fixed Expenses	$15
	Variable Expenses	5.00%
	Reinsurance Cost	1.50%
	Profit Margin	6.00%
	Commission	0.00%
Branch	Fixed Expenses	$30
	Variable Expenses	8.50%
	Reinsurance Cost	1.50%
	Profit Margin	7.00%
	Commission	10.00%
Online	Fixed Expenses	$30
	Variable Expenses	8.50%
	Reinsurance Cost	1.50%
	Profit Margin	7.00%
	Commission	10.00%

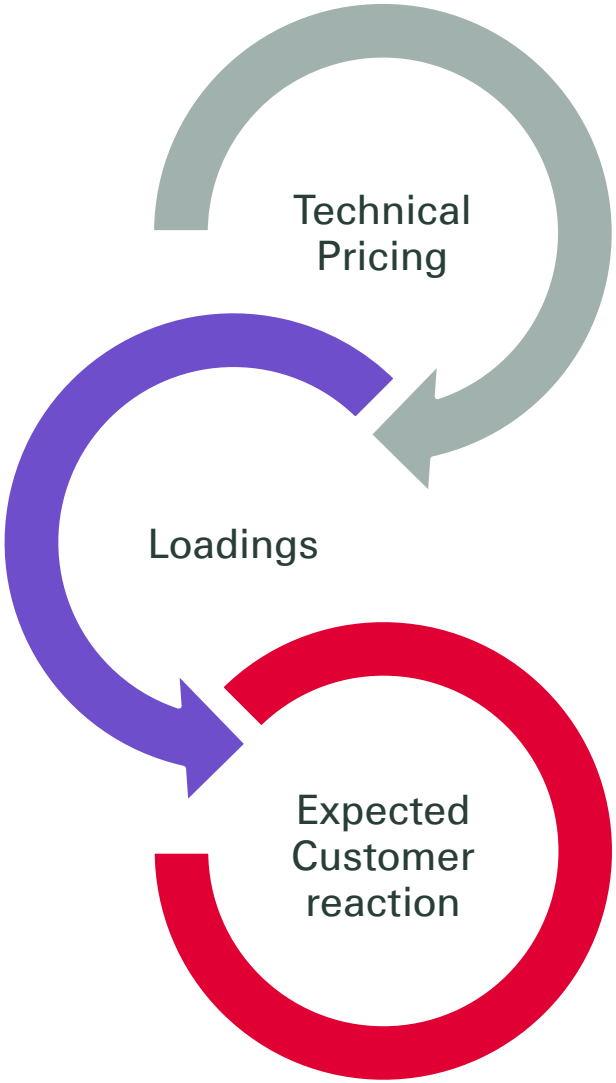
Impact analysis – Moving to a detariffed market



One step beyond

One step beyond: Embedding Price Elasticity

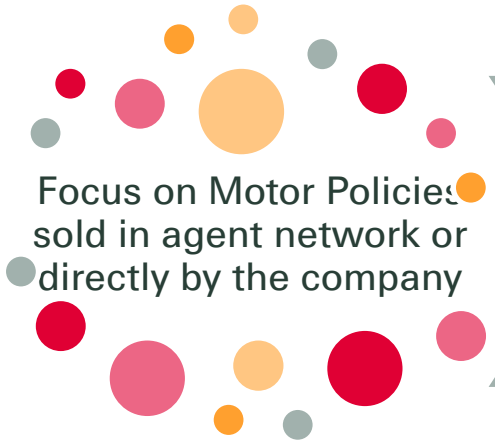
Because not all clients will react the same way to the price change you will be proposing



Which Data?

Think first to scope your analysis	• Should your elasticity model cover all your policies or just part of them?
Tariff	• Motor Price Elasticity in Malaysia • Here, Health data in Malaysia • Others possible
Key necessary information	• Current price • Proposed price

Our analysis



Focus on Motor Policies sold in agent network or directly by the company

Assume that business at car retail shops will be less price sensitive; same for business written by banks in the context of a loan

Reference data: Health insurance renewals analysis, over several years

- Renewed Y/N
- Price change vs current price
- Use variables that could be found in a motor policy as well
  - Age
  - Gender
  - Instalments
  - Loyalty

Build / Train the model on 2012 data then validate on 2013 policies

The model: Logistic Regression

GLM model, with Logit link

Binary Target Variable (Renewed Y/N) Coded 1 if Renewed = Y 0 if Renewed = N	Logit link => Get a probability in result (Probability to Renew) Can be transformed into a binary result • Here, we just kept the probability for our next step • We used the binary result to assess the predictive capacity of the model	The PROBIT link would also have been an option but we did not assess it We were happy with the logit results (84% prediction capacity)

More info on Logit / Probit / Logistic Regression under:

- Intro level for actuaries: "Beyond the Cost Model: Understanding Price Elasticity and Its Applications", Serhat Guven, FCAS, MAAA, and Michael McPhail, FCAS, MAAA
- More advanced with detailed exampled: "The Customer, The Insurer and The Market" by Christophe Dutang, PhD at Université de Lyon – Université Lyon 1

Some tricks

Sampling or not?

- Mind the data stability in time

Frequency of target variable (how many renewed vs not renewed in your data?)

- Building a model on an adjusted population (50-50 or so)
  - Need to adjust the results to end up with the proper frequency of renewed in the full population
  - Without adjustment, we got a frequency of renewed at 49.5% while it should have been 87%

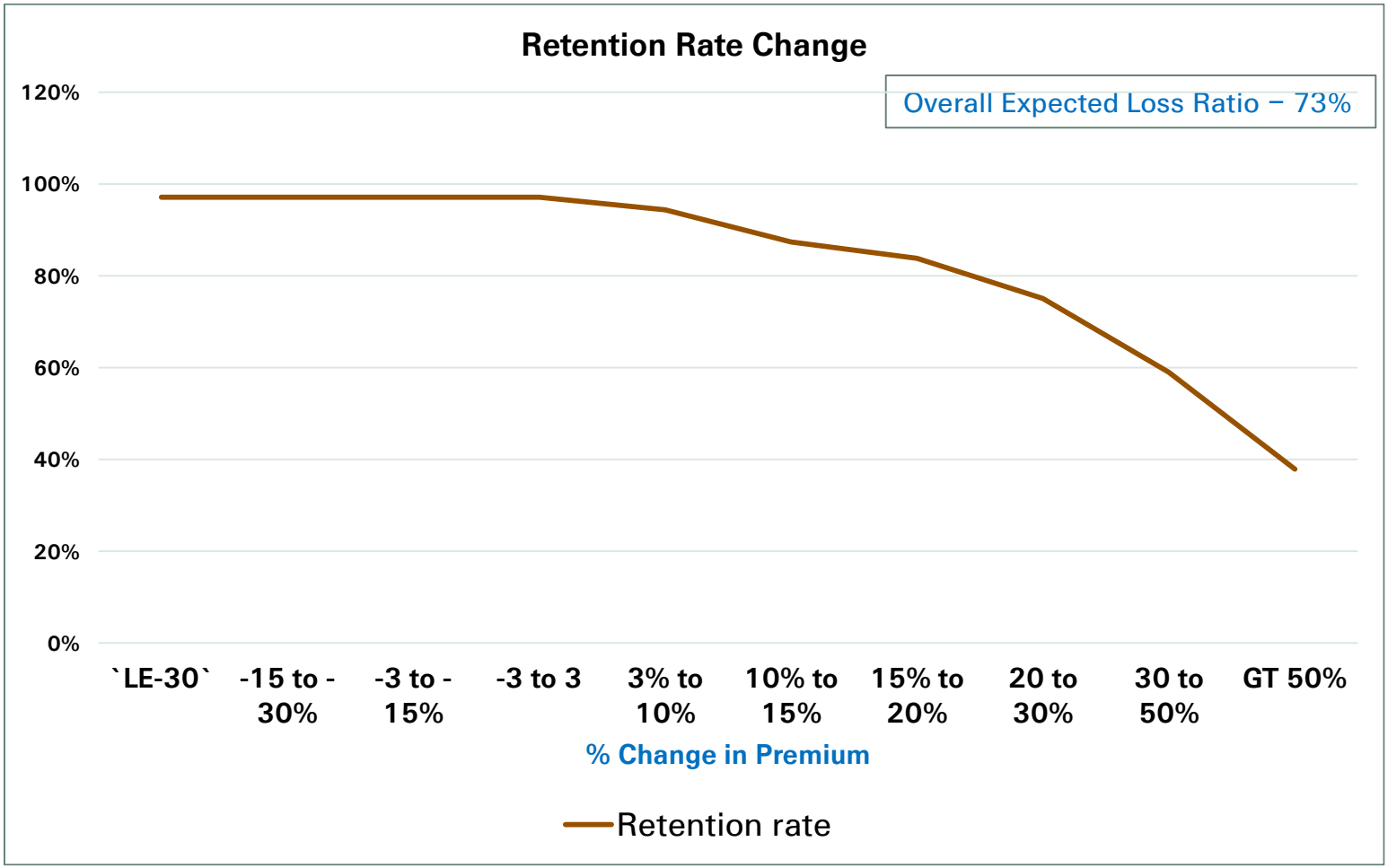
Using “banded” variables or continuous ones?

- 84% good classification in one case, 56% in the other...

That's a fun model to build...

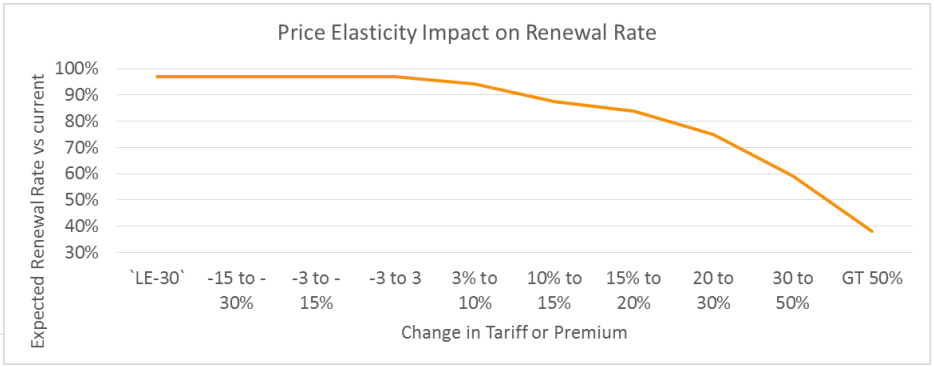
... What do we get in return?

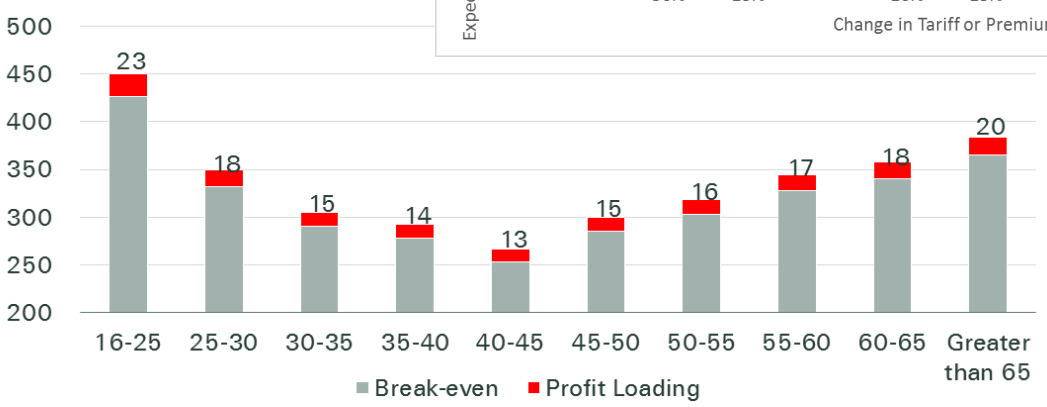
Impact analysis – Change in renewal levels

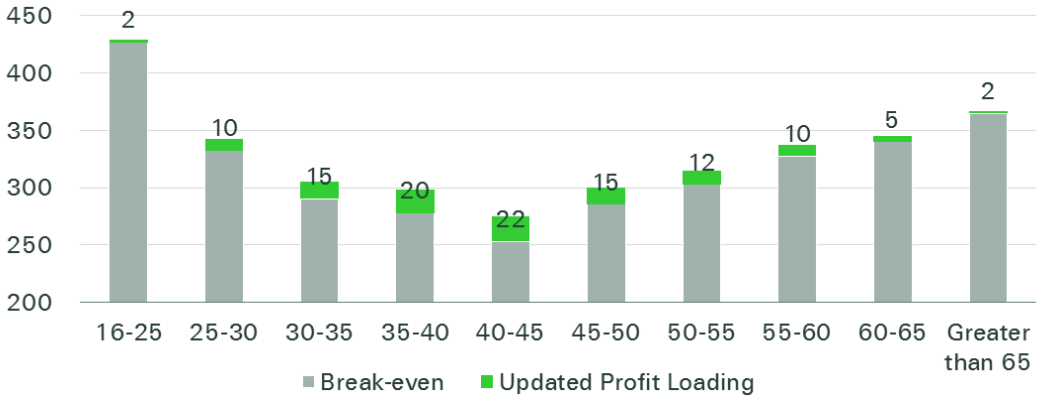


Impact analysis – Adjust profit loading

Channel	Type of Loading	Amount
Agency	Fixed Expenses	$30
	Variable Expenses	8.50%
	Reinsurance Cost	1.50%
	Profit Margin	7.00%
	Commission	10.00%

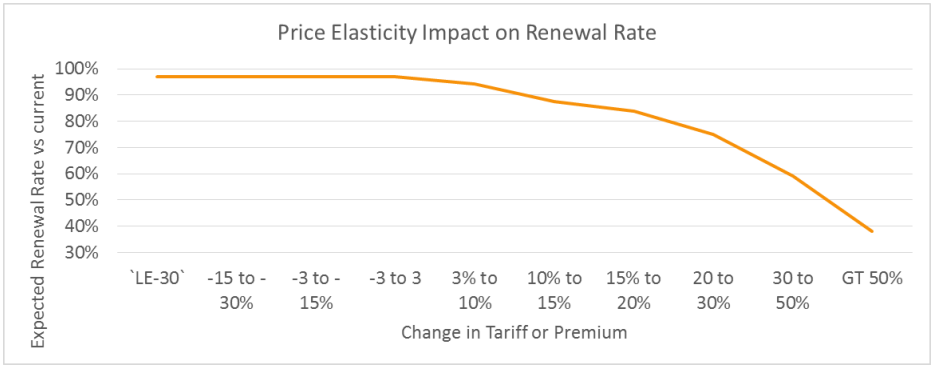


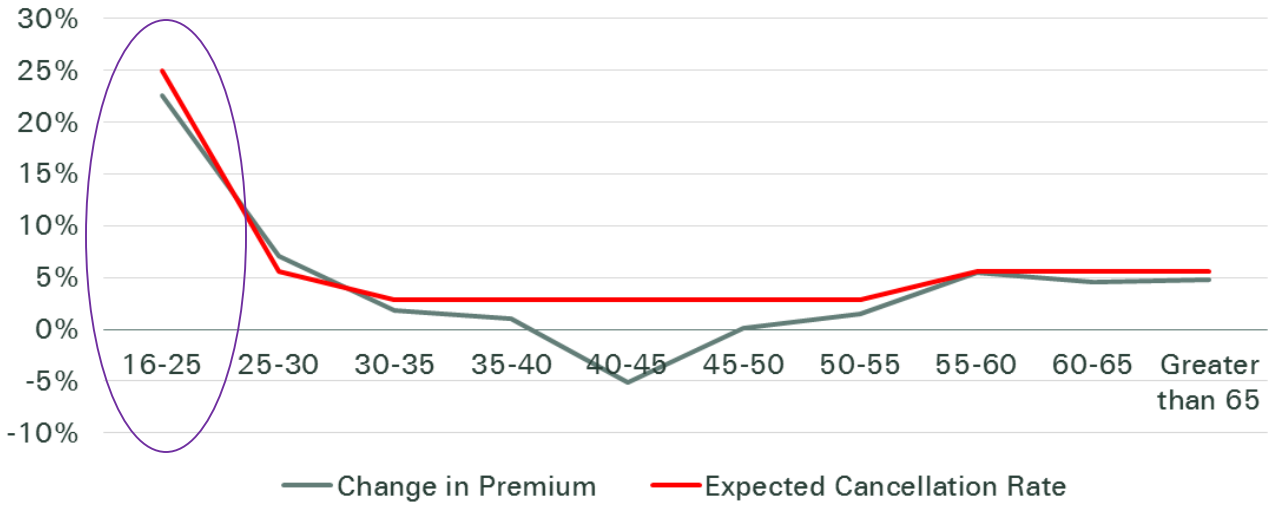




Impact analysis – Warn agents on clients more likely to cancel

Channel	Type of Loading	Amount
Agency	Fixed Expenses	$30
	Variable Expenses	8.50%
	Reinsurance Cost	1.50%
	Profit Margin	7.00%
	Commission	10.00%

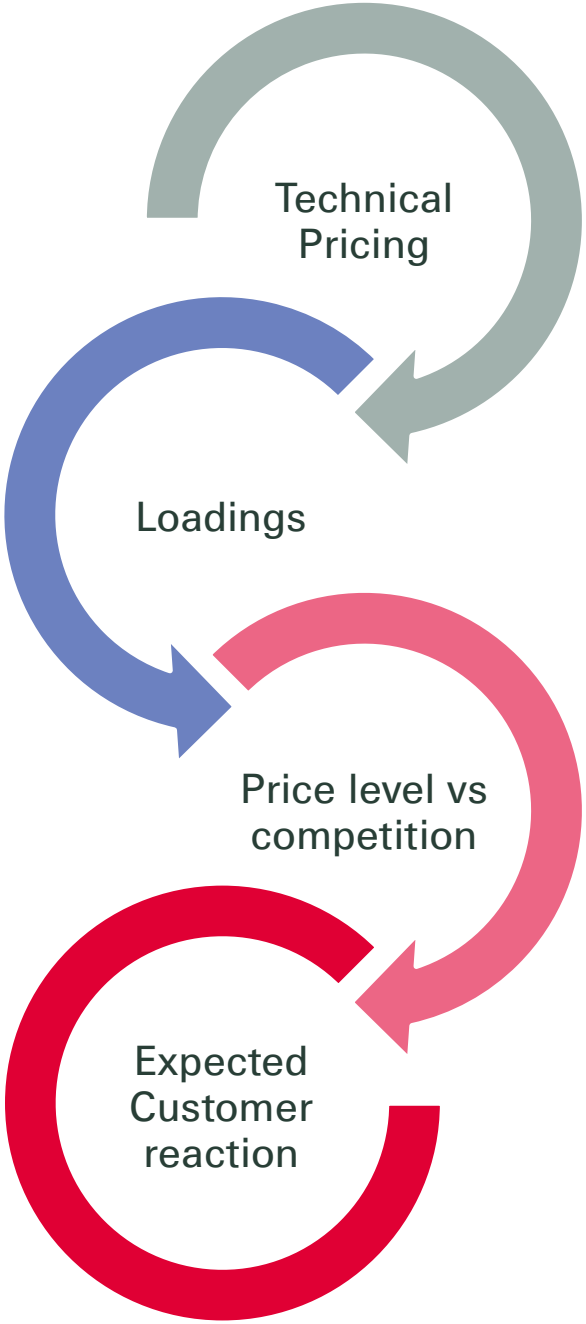




A step further:
Embedding Market behaviour

Because not all clients will react the same way to the price change you will be proposing...

... And this is highly dependant on what your competitors are offering



In the Malaysian context of detarification, How Swiss Re can help

Reinsurance considerations in a detarifed market

Manage Net-to-Gross Ratio

Companies may wish to change maintain the portion of gross premium that goes to reinsurance

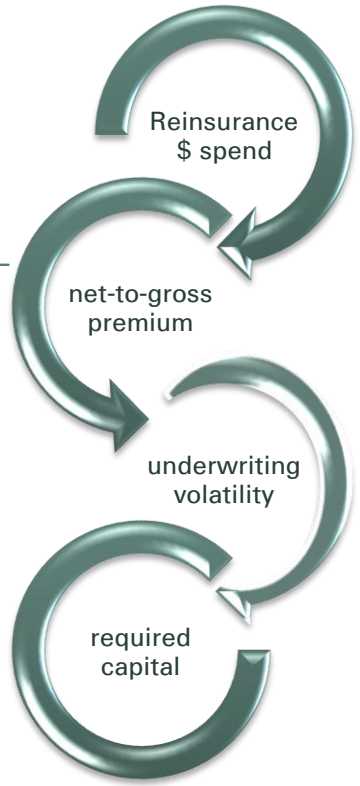
Manage Volatility

Some may want to retain their existing reinsurance placement, and look for ways to manage potential additional volatility

Manage ITCL

Net retained premium may become a secondary consideration for some with a primary focus on managing internal target capital level

Impact to consider...



How to reach us?

- Valerie Gilles-Coeur: Valerie_gillescoeur@swissre.com
- Raj Kumar Yadav: RajKumar_Yadav@swissre.com

Legal notice

The information and opinions contained in the presentation are provided as at the date of the presentation and are subject to change without notice. Although the information used was taken from reliable sources, Swiss Re does not accept any responsibility for the accuracy or comprehensiveness of the details given. All liability for the accuracy and completeness thereof or for any damage or loss resulting from the use of the information contained in this presentation is expressly excluded. Under no circumstances shall Swiss Re or its Group companies be liable for any financial or consequential loss relating to this presentation.