# Cloud computing brings technological advance to reinsurance pricing models



# Introducing SMART Re™

Standard pricing methods with integrated workflow, robust data warehouse and automated renewals that will save at least 30% of your time



SMART Re is the easiest and most intuitive pricing application I have ever used. Switching to SMART Re has simplified our workflow from having to manipulate 6 or 7 spread sheets and having to manually transfer data between them, to having everything in one place with a database and easy downloads.

We were a bit concerned about the system being "a black-box", but the technical training easily explains all the mathematical nitty-gritty behind the scenes, which is all based on standard pricing techniques. Referrals, updates and last minute structure changes are very easily done within the system. Now most of the work is done by our underwriters and we have plenty of time to focus on using the data to perform market benchmark analysis and curve fitting.

Treaty pricing actuary Lloyd's syndicate

#### **Head Office:**

#### How to contact us:

MatBlas Limited
Davenport House
16 Pepper Street
Canary Wharf
LONDON E14 9RP

Phone: +44 (0) 20 7510 9690 E-mail: ana.mata@matblas.com

### **Foreword**

Every treaty pricing actuary and underwriter I know dreams of a pricing tool in a single file, with integrated workflow from data to CR/ROE with a data warehouse that captures all claims, premiums, exposures, benchmarks and each and every selection used throughout the rating process.

Many understand that Microsoft Excel® is not the ideal platform for this, yet most pricing models being developed and used out there are in Excel. The common workflow involves manipulating several spreadsheets and moving data around. The amount of time wasted waiting for Excel to respond or finding bugs is simply outrageous!

Gathering and aggregating information for updating benchmarks (curves, rate changes, LDFs, etc.) tend to consume most of the summer months, just getting the data ready may take a huge chunk of "the summer project".

Renewing accounts should be straightforward taking much less time each year, but as tools are updated, bugs fixed and new features added during "the summer project", every year pricing an account involves starting from scratch.

Technology evolves daily and we use it in our personal lives, take cloud computing and web server applications as examples, but why are we falling behind in the industry, almost being stuck with inefficient time wasting tools?

SMART Re was born out of frustration and need. As a consultant I have been asked time and again to help clients review their models, fixed their models and even start models from scratch, then help them with account pricing and often help them with benchmarking. For me there is an obvious missing piece in most reinsurance rating models I have come across: integrated workflow with data warehousing, which is not an easy goal to achieve in Excel/Access models.

SMART Re is a web application in a .NET platform with all code written in C# with MySQL database behind the scenes. SMART Re embeds in a single record an integrated workflow for all standard pricing methods: experience, exposure, mixed/hybrid together with aggregate loss distributions to evaluate loss dependent features from data input to economic target.

SMART Re can cope with as many lines and sub-lines of business as needed, different segmentation for experience and exposure, any number of layers, in any currency.

SMART Re is not a ground breaking new mathematical way to price treaties. SMART Re is not about the maths, is about the platform. SMART Re brings you the solid methodology you are used to in a cutting edge platform with integrated management information reporting tools.

SMART Re is designed to save you time that you can invest doing more in-depth analyses and interesting projects. I invite you to go through this booklet to get a feel for how SMART Re looks like and then take a look at the quick "live" demo I have put together for you.

Get in touch and I or any member of my team would be delighted to give you a live demo.

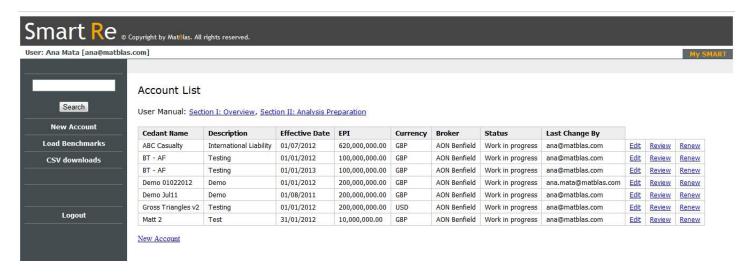
Yours sincerely,

Ana J. Mata, PhD,ACAS
Managing Director and Founder

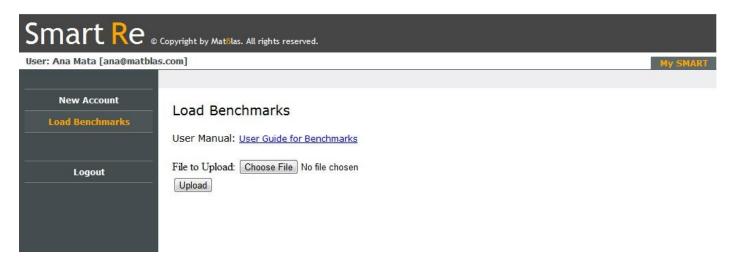
## Core benefits – why SMART Re

- 1) No spreadsheet expertise is required. Everything flows through the application minimising the need for you to move things around across models or spreadsheets. In the London Market, the majority of SMART Re users are underwriters.
- 2) <u>Ease of workflow:</u> from single layer/class/currency treaty to global multi class treaties, SMART Re allows you to keep everything in a single record.
- 3) <u>Single record</u> with comments boxes and ease of workflow facilitates peer reviews, referrals, updates and audit trails.
- 4) Free data warehouse: everything is saved to a database and you can access and download data to Excel. Pricing your accounts through SMART Re automatically builds up your database of claims and premium by class, rate changes and loss development factors, which can be used for benchmarking. In Excel application, this is typically a manual process that can be very time consuming.
- 5) <u>Standard actuarial methods:</u> SMART Re has built in most standard pricing techniques for exposure, experience and combination methods. You decide how you apply inflation, development and exposure curves simply by selecting the methodology in the Analysis Design. The calculations are all built in.
- 6) <u>Easy to switch between methods:</u> if a specific account or data availability prevents you from using your standard method, it's easy to switch to other methods. With SMART Re there is minimal need for ad-hoc analysis outside the application.
- 7) Mobility: work anywhere you are as long as you have access to the Internet, even on your iPad! No dongles, no software to install, live updates without affecting prior records and easy access while on the road.
- 8) <u>Benefit from your peers' suggestions:</u> users regularly provide feedback and request additional features. We continually enhance the application and updates are covered by the license agreement.
- 9) Free technical and actuarial training for beginners: users are trained by a dedicated team not only on how to use and navigate the application, but also on the actuarial side of things.
- 10) Easy to renew and compare year on year pricing assumptions and results: the renewal functionality copies everything that was done the previous year and the only thing that needs to be updated on renewal is the submission data: claims, premiums and risk profile and refresh pages are needed.
- 11) <u>Resources:</u> as a SMART Re user, you will have discounted rates to access to a pool of data analysts and actuaries that can assist you with data formatting to prepare the submission data and even can provide short term actuarial pricing support when you need extra resources.
- **12)** <u>Bespoke products:</u> while SMART Re is our standard application, we can easily customise it to suit specific companies' workflows and methodology and integration with other systems and databases within the company.
- 13) FREE no obligation trial licence: each quarter we offer 20 FREE no obligation trial licences and during the trial licence we work closely with users throughout the familiarisation process. To get a trial licence get in touch by e-mail ana.mata@matblas.com or by phone +44 (0) 20 7510 9690

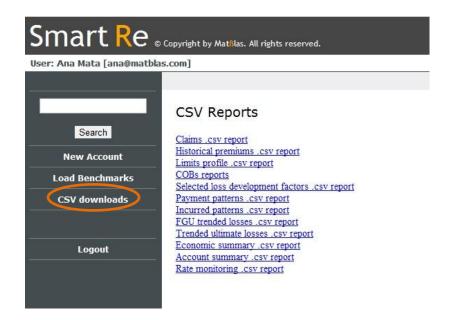
MySMART: this page allows you to manage your accounts, edit, review (view only, ideal for audits and peer reviews), renew. Create new accounts, load benchmarks from Excel files (standard template) and generate reports.



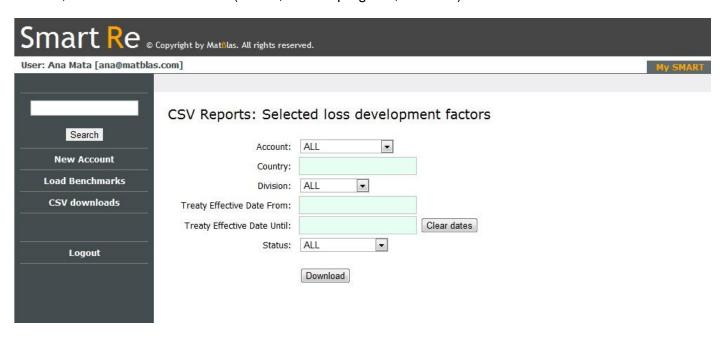
Benchmarks are prepared in a standard Excel template that is loaded in the system. The benchmarks are classified by class of business and include loss ratios, curve, loss development patterns by attachment point, rate changes, severity trend, frequency trend, exposure trend and payment patterns.



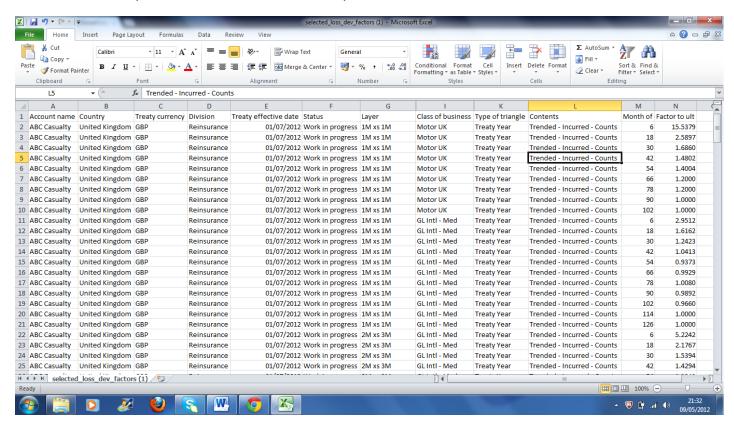
From MySMART you can generate downloads of everything you have loaded or selected while pricing your accounts:



For example, you can download selected development patterns filtered by account, country of domicile, division, effective date and status (bound, work in progress, declided)

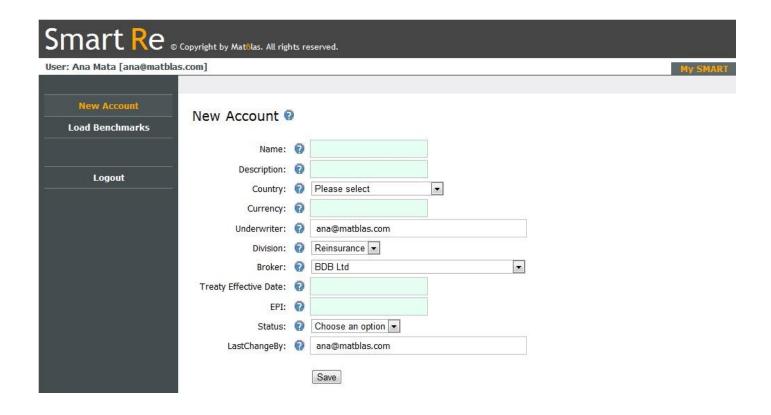


The download will produce a .csv file that can be opened in Excel and looks like this:



The same can be done with claims, premiums, limits profile, benchmarks used by accounts, user selections, economic summaries and account summaries. This is one of the greatest benefits SMART Re offers, truly a time saving feature!

Creating accounts is easy, simply create a record using the New Account button on the screen and fill the form.

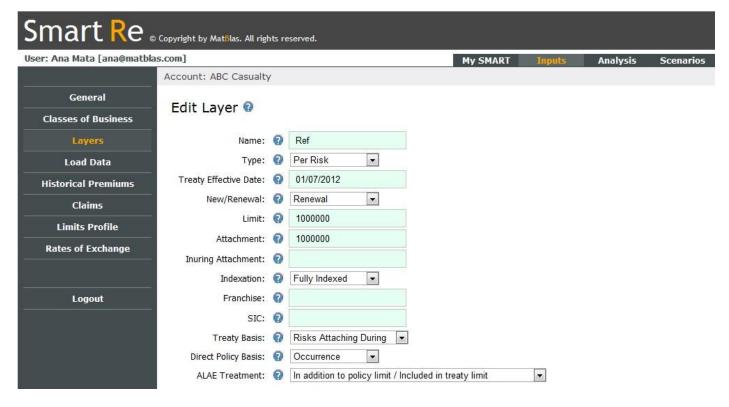


Select the lines or classes of business from the benchmarks list. Can add as many classes as needed for experience rating, the exposure rating breakdown can be done at a more granular level at a later stage.



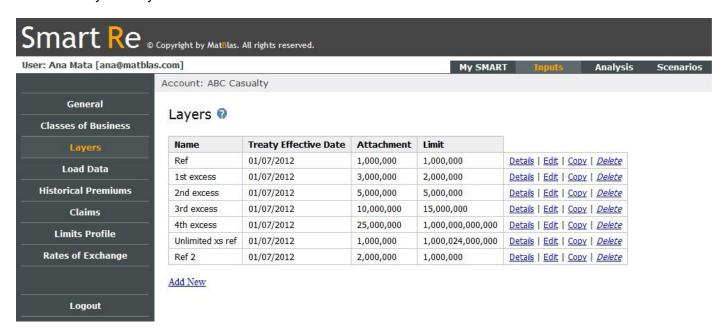
Everything within the class of business benchmark can be manually overwritten, to allow for differences between the specific account and the benchmarks. When a class of business is added, this is copied from the benchmarks database to the specific account. **Overwriting benchmarks for a specific account does not alter the benchmarks.** Furthermore, changing benchmarks does not alter past records. So you always know which factors were benchmarks and which ones were changed for the account.

Adding a layer is also easy, we can add as many layers as we need, and each layer is independent of each other. You could have LOD layers and RAD layers within the same treaty or layers with different ALAE handling.



SMART Re allows you to include both per risk or risk excess layers as well as clash layers.

The list of layers may look like this:



We are then ready to load the submission data: claims, premiums and limits profile.

The submission data is formatted in Excel in a standard template. You can include historical premiums in any breakdown you want, by state, class of business, hazard, etc. Types of premiums include written or earned, calendar year or treaty year. Exposures can also be included in the premiums page.

Claims can be identified by class, sub-class, hazard and state. There is a clash ID identifier for clash layers. Claims can be triangulated or latest position only or could be aggregated by year or individual claims. Split of paid, incurred, indemnity and ALAE could also be included.

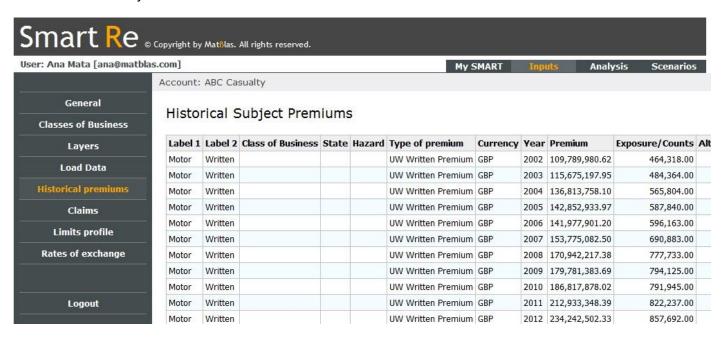
Limits profile could also be classified by class, sub-class, etc, even historical profiles could be included. SMART Re can also work with full individual risk download with stacked policies.

All inputs could be included in original currency and SMART Re would convert to the rating currency selected.

Once the Excel file is ready, you find it, upload it and EVERYTHING is automatically copied to the database for later use.



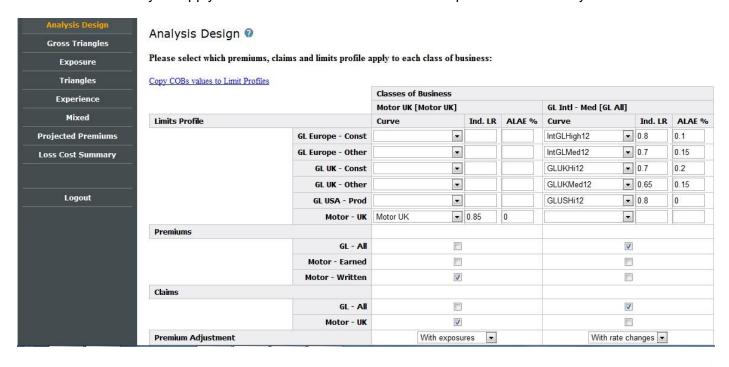
SMART Re shows you on screen what has been loaded.



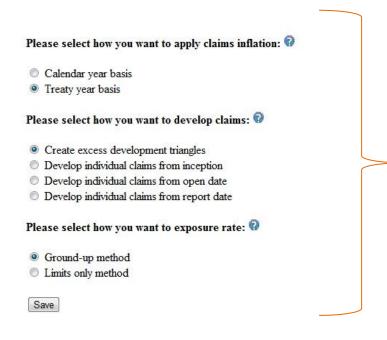
The core of the pricing workflow is defined in the Analysis Design page (see next page), where SMART Re displays the labels or identifiers of the profile, premiums and claims and the classes of business selected. Here is where we can assign different curves by profile and class of business for exposure rating. The dropdown under Curve will show you all curves available from the benchmarks. Exposure rating will be done by layer, class and curve and finally aggregated by layer/class.

For example there are 5 sub classes of limits profile for GL, each one has a different curve and loss ratio, but all of them fall on the same GL class. This will allow you to compare loss costs for experience and exposure at the same level later.

Premiums and claims are assigned to each class of business using the check boxes. Finally, you tells SMART Re which layers apply to each class and which methods to perform for each layer.



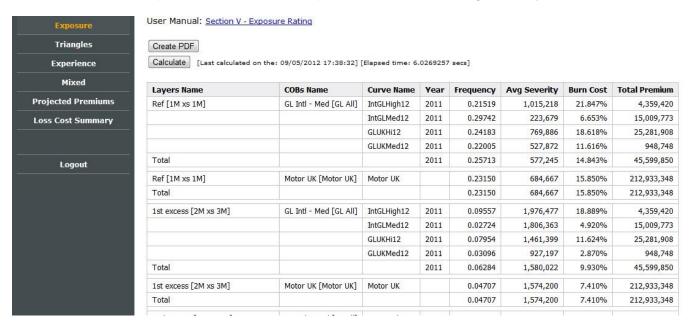
Layers			
Ref [1M xs 1M]	Exposure	V	
	Experience	V	<b>V</b>
tet aveces [OM vs OM]	Exposure	V	V
1st excess [2M xs 3M]	Experience		<b>V</b>
2nd excess [5M xs 5M]	Exposure	V	<b>V</b>
and excess [5M xs 5M]	Experience		<b>V</b>
2-4	Exposure	V	
3rd excess [15M xs 10M]	Experience		<b>V</b>
4th excess [1000000M xs 25M]	Exposure	V	
4th excess [1000000M xs 25M]	Experience		
Unlimited ve sof [1000024M vs 1M]	Exposure	V	
Unlimited xs ref [1000024M xs 1M]	Experience	<b>V</b>	
Bof 2 [1M vo 2M]	Exposure	V	
Ref 2 [1M xs 2M]	Experience		



You decide how you want to apply your methodology: how claims are trended, which method of claims development would be used and whether direct policies attachment or excess would be accounted for in exposure rating.

Now you are ready to start analysing. The first method performed is the exposure rate. Exposure rate is displayed by layer, class of business and sub-class given by the selected curve. The results are displayed for the latest year in the profile if multiple years of profile are available.

Standard methods and adjustments are used for exposure rating including currency conversions and ALAE adjustments. Exposure rating results are presented by frequency, severity and total loss cost or burn cost. It also shows the total premium included in the profile converted to rating currency.



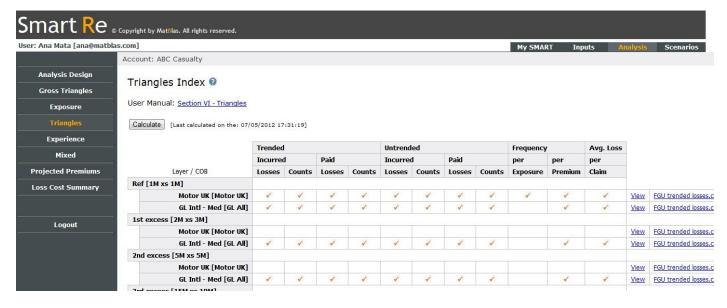
These results could be printed and saved as PDF, simply by pressing the PDF button.

Apart from exposure rating as a method, the results are also used later for:

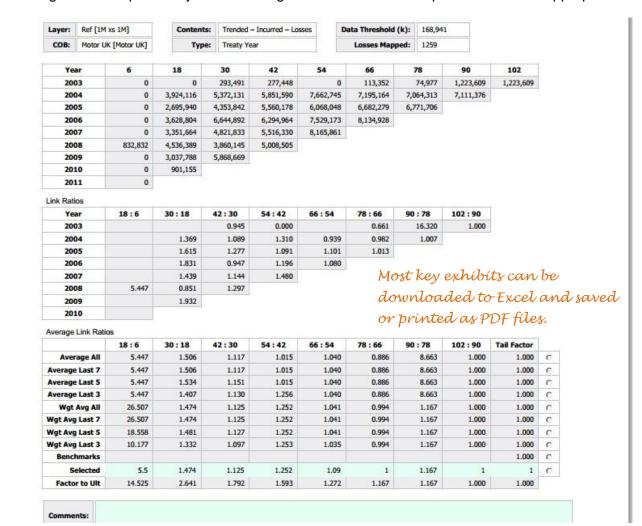
- A priori for the BF method
- Historical exposure rating results are used to calculate an exposure adjustment to experience due to changes in limits profile
- In the mixed or hybrid method to extrapolate frequency to higher layers

Then you start the experience rating method by generating the triangles by class of business and layer. SMART Re produces up to 11 triangles for each combination class/layer including: Incurre/Paid, Losses/Counts, Trended/Untrended, claim counts per unit of exposure, claim counts per million of premium and average loss per claim.

All processing or claims, including trending and layering is done by code behind the scenes. However, on the triangle page you have the option to download all individual claims just before layering, after the application of trend and other adjustments.



You then go to each specific layer/class triangle to select loss development factors as appropriate.



The triangles page will display the closest pattern with the closest attachment point that it finds in the benchmark for that class and layer in the benchmarks row.

A comments box is available for any rationale of selection. If the latest diagonal is not complete, SMART Re excludes it and then interpolates, presenting the interpolated pattern in the summary page. All your selections are saved on the database.

Once you are ready selecting your development pattern, move to the experience summary.



# Most key exhibits can be downloaded to Excel and saved or printed as PDF files.

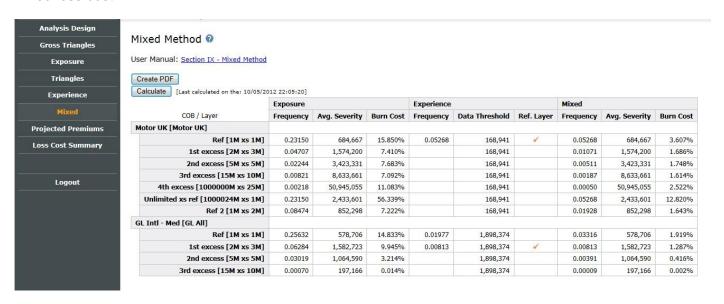
(000s)										(a-priori bu	rn costs for BF	methods)			
	Premium		Losses				Adjustments			9.930%	1.767%	0.050	Selections		
Year	Actual	As if	Untrended Unindexed	Trended Indexed	Burn Cost	XS LDFs	Frequency	Exposure	C. Ladder	r BF (Expo.)	BF (Cape C.)	BF (Market)	Losses	Burn Cost	Weight
2000	315,524,161	678,299,623				1.000	1.00000	0.690							
2001	330,147,451	709,736,114	6,118,623	10,498,023	1.479%	1.000	1.00000	0.690	7,248,455	7,248,455	7,248,455	7,248,455	7248455	1.021%	
2002	425,709,152	630,393,155	515,449	3,767,789	0.598%	1.036	1.00000	0.690	2,695,158	4,776,636	2,988,611	3,696,782	3696782	0.586%	
2003	583,356,275	639,790,729	5,268,887	7,374,950	1.153%	1.200	1.00000	0.690	6,108,933	15,666,435	6,974,009	10,416,758	10416758	1.628%	
2004	604,984,050	615,218,481	5,618,403	8,886,306	1.444%	1.507	1.00000	0.690	9,245,218	26,682,535	9,792,352	16,481,929	16481929	2.679%	
2005	573,255,852	615,106,481	6,895,206	10,438,975	1.697%	1.507	1.00000	0.690	10,860,598	27,750,849	10,863,740	17,552,100	1086374(	1.766%	
2006	505,708,440	592,970,579	8,639,154	14,567,057	2.457%	1.554	1.00000	0.690	15,625,228	31,036,755	13,791,541	20,621,733	1379154	2.326%	
2007	455,000,742	565,213,967	4,506,393	5,822,350	1.030%	1.381	1.00000	0.690	5,552,066	19,506,136	6,776,137	11,818,019	6776137	1.199%	
2008	431,741,669	548,624,498	10,039,929	11,964,666	2.181%	1.359	1.00000	0.680	11,061,596	22,529,761	10,700,628	15,385,711	10700628	1.950%	
2009	392,399,532	484,097,252	3,500,259	4,229,901	0.874%	1,442	1.00000	0.575	3,508,307	17,164,368	5,054,856	9,850,986	5054856	1.044%	
2010	374,062,458	424,595,894	12,604,588	14,189,658	3.342%	1.866	1.00000	0.824	21,816,669	31,256,973	15,174,775	21,544,339	1517477!	3.574%	
2011	367,298,260	386,743,177				4.442	1.00000	1.000		29,757,686	5,295,959	14,984,345			
												Weighte	d Average	1.777%	
												Selected	Burn Cost	0.04613	

The experience summary shows you step by steps the results in the layer: premiums before and after adjusting for rates, incurred claims in layer, trended claims in layer after layer indexation, selected interpolated LDFs, frequency trend, exposure adjustment is done using historical limits profile (if available), chain ladder and 3 choices of BF with different initial or a priori loss costs.

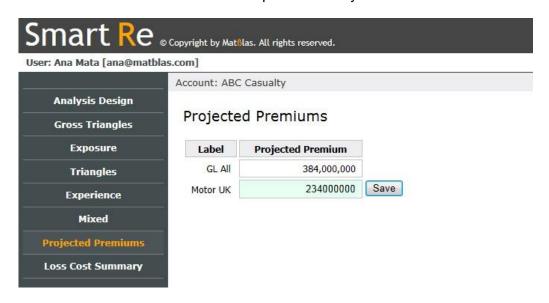
You then select losses by year and the weight to each year to get the weighted average. Finally you make an overall selection.

Experience summaries are produced for incurred losses and counts and for paid losses and counts.

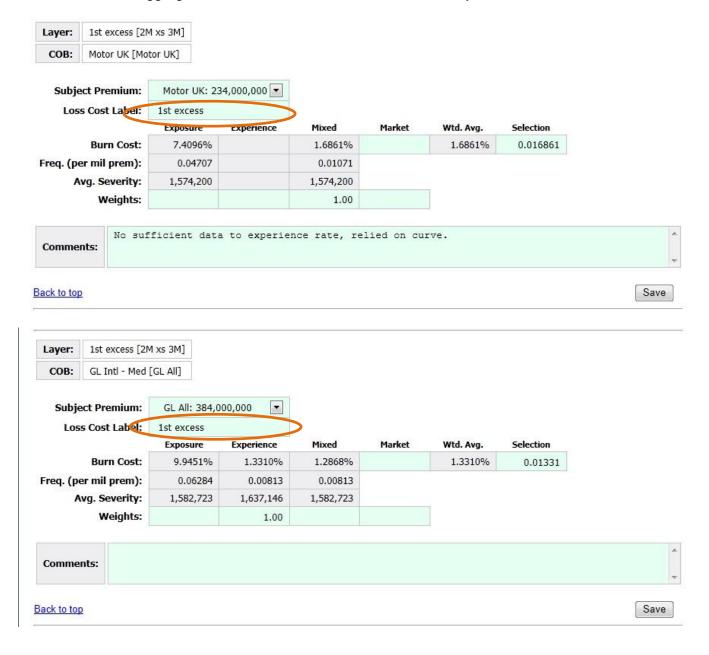
SMART Re also has built in a mixed method of frequency and severity. The application automatically selects a reference layer with the lowest attachment above the trended data threshold. Frequency for this reference layer is extrapolated using the frequency relativities of the exposure method. This we called the mixed frequency. Then severity is selected directly from the exposure results. The combination gives the mixed loss cost.



Finally, before selecting the loss cost, you input the projected premiums for the treaty year by class of business at the same level that the experience analysis was done.

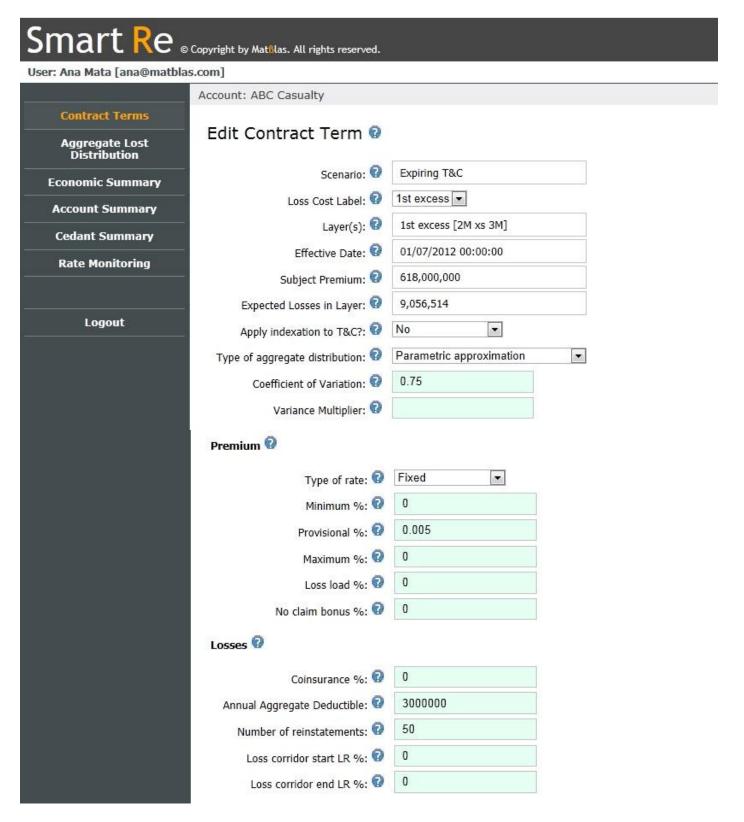


You are now ready to select your loss pick in Loss Cost Summary. Here you can aggregate (using a Loss Cost Label) layers and classes to which the same rate and terms and conditions apply. Below the label 1<sup>st</sup> excess is used to aggregate the loss cost for Motor and GL for the layer 3M xs 2M.

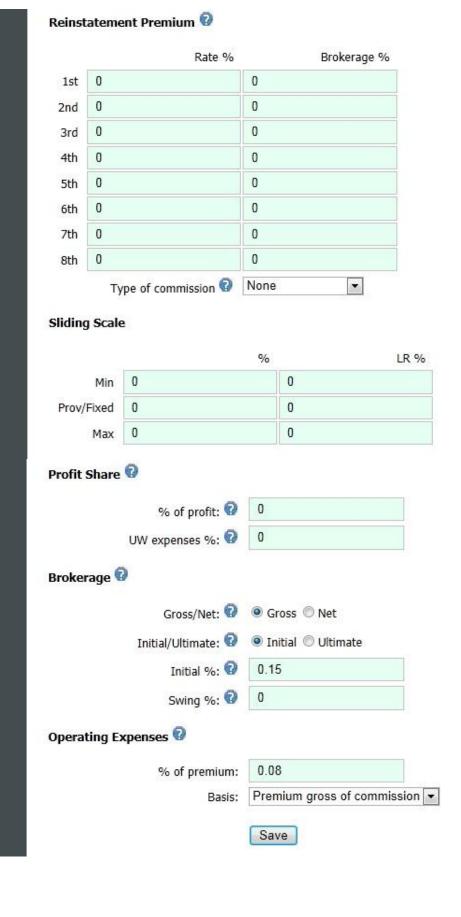


In the Loss Cost Summary you can also leave behind any analysis or reference layer that will not be used in the next part of the analysis.

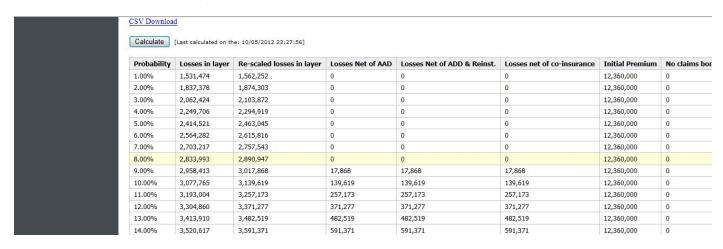
Now you are ready to evaluate terms and conditions such as rate, AAD, reinstatements, etc. This happens in the Scenarios section.



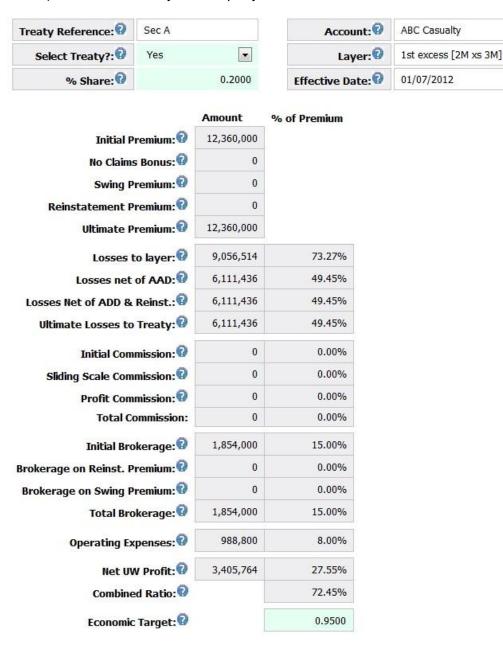
On this page you fill in the features that apply to premiums, losses, commissions and brokerage as well as internal operating expenses. These will be used to arrive at a combined ratio.



An aggregate loss distribution is calculated for each scenario. The step by step cash flows and combined ratio are calculated for each percentile of the distribution.



Finally, an economic summary for each scenario is calculated and this shows the combined ratio for each layer or section of the treaty. You then decide whether this is the final scenario by Selecting the treaty (Yes/No) and the % share your company has taken.



Once a summary has been created for each section of the programme, an overall summary is created and an overall account summary is generated:

	10/	Share % 20.00%		20.00%		Share % 20.00%		
ombined Programme		ec C	9	ec B	9	ec A	5	Treaty Reference:
		% of Premium	Amount 1,236,000	% of Premium	Amount	% of Premium	Amount	Treaty Reference.
	5,191,200				1,483,200		2,472,000	Initial Premium:
0	0		0		0		0	No Claims Bonus:
0	(		0 0 1,236,000		0		0	Swing Premium:
0	(						0	Reinstatement Premium:
91,200	5,191,200				1,483,200		2,472,000	Ultimate Premium:
10,882 73.41	3,810,882	69.74%	862,010	76.70%	1,137,569	73.27%	1,811,303	Losses to layer:
21,866 62.06	3,221,866	69.74%	862,010	76.70%	1,137,569	49.45%	1,222,287	Losses net of AAD:
21,866 62.06	3,221,866	69.74%	862,010	76.70%	1,137,569	49.45%	1,222,287	Losses Net of ADD & Reinst.:
21,866 62.06	3,221,866	69.74%	862,010	76.70%	1,137,569	49.45%	1,222,287	Ultimate Losses to Treaty:
0 0.00	)%	0.00%	0	0.00%	0	0.00%	0	Initial Commission:
0.00	0%	0.00%	0	0.00%	0	0.00%	0	Sliding Scale Commission:
0.00	0%	0.00%	0	0.00%	0	0.00%	0	Profit Commission:
0.00	)%	0.00%	0	0.00%	0	0.00%	0	Total Commission:
78,680 15.00	778,680	15.00%	185,400	15.00%	222,480	15.00%	370,800	Initial Brokerage:
0.00	0%	0.00%	0	0.00%	0	0.00%	0	Brokerage on Reinst. Premium:
0.00	)%	0.00%	0	0.00%	0	0.00%	0	Brokerage on Swing Premium:
78,680 15.00	778,680	15.00%	185,400	15.00%	222,480	15.00%	370,800	Total Brokerage:
15,296 8.00	9% 415,296	8.00%	98,880	8.00%	118,656	8.00%	197,760	Operating Expenses:
75,358 14.94	5% 775,358	7.26%	89,710	0.30%	4,495	27.55%	681,153	Net UW Profit:
85.06	1%	92.74%		99.70%		72.45%		Combined Ratio:
95.00	9%	95.00%		95.00%		95.00%		Economic Target:

For comparison purposes, a summary of the gross, net and ceded position is also generated using the ceding company's gross loss ratio, expected premium income and expenses as the starting point.

				Share %		Share %		Share %				
				20.00%		20.00%		20.00%				
Treaty Reference:	Gross of r	einsurance		Sec A		Sec B		Sec C	Cede	d summary	Net of	reinsurance
	Amount	% of Premium	Amount	% of Premium	Amount	% of Premium	Amount	% of Premium	Amount	% of Premium	Amount	% of Premiun
Initial Premium:	683,000,000		2,472,000		1,483,200		1,236,000		5,191,200		677,808,800	
No Claims Bonus:			0		0		0		0		0	
Swing Premium:			0		0		0		0		0	
Reinstatement Premium:			0		0		0		0		0	
Ultimate Premium:	683,000,000		2,472,000		1,483,200		1,236,000		5,191,200		677,808,800	
Losses to layer:	546,400,000	0.8000	1,811,303	73.27%	1,137,569	76.70%	862,010	69.74%	3,810,882	73.41%	542,589,118	
Losses net of AAD:			1,222,287	49.45%	1,137,569	76.70%	862,010	69.74%	3,221,866	62.06%	543,178,134	
osses Net of ADD & Reinst.:			1,222,287	49.45%	1,137,569	76.70%	862,010	69.74%	3,221,866	62.06%	543,178,134	
Ultimate Losses to Treaty:	546,400,000	80.00%	1,222,287	49.45%	1,137,569	76.70%	862,010	69.74%	3,221,866	62.06%	543,178,134	80.14
Initial Commission:	102,450,000	0.1500	0	0.00%	0	0.00%	0	0.00%	0	0.00%	102,450,000	
Sliding Scale Commission:			0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	
Profit Commission:			0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	
Total Commission:	102,450,000	15.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	102,450,000	15.119
Initial Brokerage:			370,800	15.00%	222,480	15.00%	185,400	15.00%	778,680	15.00%		
kerage on Reinst. Premium:			0	0.00%	0	0.00%	0	0.00%	0	0.00%		
okerage on Swing Premium:			0	0.00%	0	0.00%	0	0.00%	0	0.00%		
Total Brokerage:			370,800	15.00%	222,480	15.00%	185,400	15.00%	778,680	15.00%		
Operating Expenses:	34,150,000	0.0500	197,760	8.00%	118,656	8.00%	98,880	8.00%	415,296	8.00%	34,150,000	5.04
Net UW Profit:	0	0.00%	681,153	27.55%	4,495	0.30%	89,710	7.26%	775,358	14.94%	-1,969,334	-0.29
Combined Ratio:		100.00%		72.45%	- 0	99.70%		92.74%		85.06%		100.299

Finally, there is an optional rate monitoring page, where you can work out the rate change for each section of the treaty by looking at the changes of the component. This breakdown complies with Lloyd's Minimum Underwriting Standard.

EASY AND IN ONE PIECE!! You can only really appreciate the system by using it. Get in touch to access one of the FREE no obligation trial licences, and spend the summer testing and trying SMART Re.

## **About Us**

MatBlas is a consultancy company dedicated to simplifying people's workflow.

Our core services include underwriting management, actuarial pricing and software development. From inhouse interim pricing support to developing pricing and underwriting integrated systems, our goal is make clients lives at work easier.

In general, the insurance industry is known for lagging behind in technology and often internal workflows and systems require repetition of manual entry.

At MatBlas we believe that technology can help us achieve ANYTHING we want, yet the success rate of IT projects in the insurance industry is quite low, often due to an understanding gap between users/clients, project managers and developers. It's challenging to find a team of IT developers that understand insurance and in particular, actuarial techniques.

Our software developers have been thoroughly trained on the fundamentals of actuarial methods in rating, reserving and reinsurance. This facilitates their understanding of each and every project.

Whether we are developing tools for underwriters or actuaries, or working on a systems integration project, we always put ourselves on the user's shoes and focus on their needs.

Here at MatBlas actuaries act as project managers between clients and developers taking clients specifications (often Excel files or handwritten scanned notes!) and translating them to developers in an algorithm or "pseudo programming language" that is very easy for developers to understand and implement.

#### What makes SMART Re unique compared to other software in the market?

We recognise people have preferences in the way the apply trend, claims development, currencies, etc. The needs of a US actuary are different to the needs to an actuary working at Lloyd's pricing global treaties. Our wide experience allowed us to build-in all methods widely used in the market and let users choose their preferred approach.

Also, most pricing models out there have been designed for actuaries as the intended audience. But many underwriters in London wanted to be able to analyse their accounts prior to referring to the actuary, but most models are not user friendly enough for them. **SMART Re is the result of this gap in the market...** 

Ana Mata is the Managing Director and founder of MatBlas Limited. Ana is a qualified actuary with broad experience developing underwriting management solutions for London market and commercial insurance companies. She has extensive pricing experience of Professional Liability, Casualty and Property classes of business.

Ana has held senior pricing roles both in insurance and reinsurance companies in the US and in London. This experience, combined with her candid and pragmatic approach to business, enables her to understand the needs and to develop customised solutions to a wide range of clients.

Ana is an Associate of the Casualty Actuarial Society; she holds a PhD in Actuarial Mathematics and a Bachelor's Degree in Mathematics, she has published a number of articles on pricing and reinsurance and is a frequent speaker at actuarial and insurance conferences.

