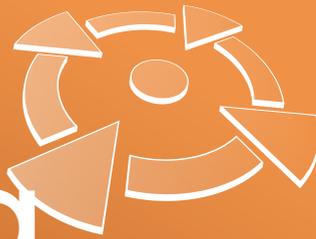# addactis®
Pricing
SOLUTION

Pricing challenges in a continuously changing market

The intensity of competition between non-life insurance companies is increasing rapidly and margins are tightening. Emergence of price comparison websites and new technologies have led to increased competition on price, making it more difficult for insurers to make (or retain) profitable margins – and keep existing customers satisfied.

Business models exchanges have accelerated and customer behaviour is also changing. This is mainly explained by websites when comparing premiums and tariffs on a daily basis.

These developments have made it more important than ever for insurers to get their tariffs right. This implies that insurance companies need to be:
- Adequately compensated for the risk they take;
- Continue to be competitive;
- Avoid anti selection.

Actuaries must also make decisions knowing that a single error could potentially lead to significant losses.

Following all these developments, insurers will need to:
- Operate very rapidly in a continuously changing and competitive market;
- Price their products correctly and therefore use appropriate data, sophisticated and best practice pricing models;
- Have well documented and transparent pricing processes in place, triggered by Solvency II.

To overcome all these increasing challenges that insurers are facing, addactis® has developed a new pricing tool, addactis® Pricing. The features and functionalities of this advanced and modern tool are fully described below.

addactis® Pricing solution overview

addactis® Pricing has been designed to answer all the challenges insurers are facing nowadays and will be facing in the immediate future.

With addactis® Pricing, pricing actuaries have the entire calculation process embedded in one powerful and user friendly application. The tool has therefore a full audit trail in place. As a result, pricing actuaries teams can invest their time on analysis and decision making rather than on data handling and data manipulations. A lot of time can therefore be saved, which is very precious in a market where tariffs are changing on a daily basis.

Essential functionalities for an advanced pricing process are included in addactis® Pricing. These are:

1. Data collection and preparation;
2. Risks and tariffs modeling using Generalized Linear Models and Data Science;
3. Customer behaviour analysis with elasticity information;
4. Profit testing;
5. Price Simulation.

These 5 topics are further described in detail below.

1) Data collection and preparation

Data preparation and pre-analysis of data are key parts of the pricing process.

addactis® Pricing allows the pricing specialist to import data (policies and claims from flat files or directly from any kind of database including SAS using ODBC) and to perform several data transformations and manipulations. In addition the data can also be validated, where by for example missing values can be detected, data errors are identified or where claims without policies are filtered.

All these operations can be carried out within the same software tool; and as a result, each change is automatically tracked in the audit trail.

addactis® Pricing also provides the pricing specialist with user friendly tools to prepare data for the GLM, such as:
- Creation of homogenous claim segments;
- Definition of large claim thresholds using graphical

representation of statistical methods (eg Hill estimate, Mean Excess function and Gertensgarbe);
- Tools to analyse the data based on several methods (one way analysis, two ways analysis and automatic calculations of correlations);
- Data Mappings.
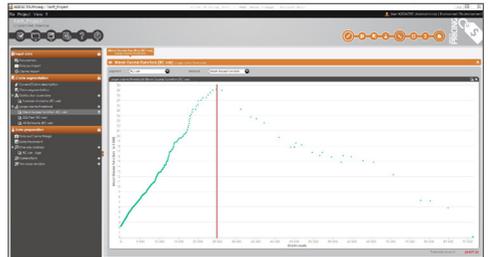
2) Risks and tariffs modeling using Generalized Linear Models and Data Science

GLM is the current market standard for pricing. addactis® Pricing embeds a powerful GLM engine which is able to handle a large amount of data while ensuring high performance.

Moreover many options and graphics are available to help actuaries find optimal tariffs.

Several GLMs are available (such as Frequency, Amount, Tweedie, Propensity) in order to fit the data. Models (nested as well as non-nested) can be compared automatically using statistical criteria.

In addition, addactis® Pricing provides pricing specialists with additional tools such as:
- Residuals observation;
- Type III test calculation for included and excluded factors;
- Integration of interactions and conditions;
- Ability to apply splines;
- Polynomials;
- User defined restrictions.

The inbuilt GLM engine allows pricing actuaries to define many models. In addition, the factor behaviour (included as well as non-included factors) can easily be observed with the help of automatically generated graphs.

Thanks to the Data Science module, the user can use, in parallel with GLMs, machine learning methods such as CART, Random Forest and Gradient Boosting. These methods allow the user to identify the most significant variables, to detect interactions, to model tariff indicators and to compare the models obtained with the GLM models. During the consolidation of these models, the user has the possibility to mix both types of models.

For geographical areas, in most cases, there are too many categories (segments) in order to be able to treat these as a single standard factor (when there are too many segments they have on average a low exposure and are therefore insufficiently predictive). In order to make it possible to work with geographical areas, special methods have been built in addactis® Pricing so that several areas with a similar behavior are aggregated. In addition, "zones" can be defined, so that ultimately these can be included in the GLM as a factor. This will ultimately save a lot of time and improve the predictive power of the model.

The algorithm integrated in addactis® Pricing combines credibility theory with geo-spatial smoothing on residuals. It allows to separate the geographical effect from the random noise and is able to define homogenous and predictive geographic zones.
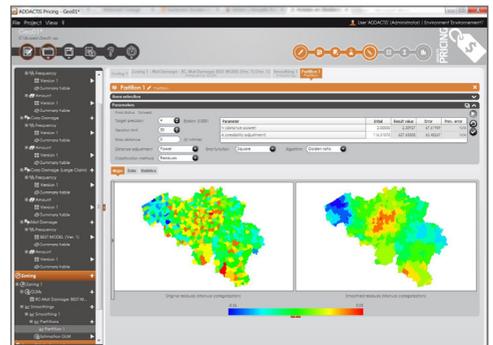
3) Customer behaviour analysis with elasticity information

The powerful GLM engine within addactis® Pricing is also used to model the customers behaviors at key moments such as at sale, renewal or lapse.
With this functionality, price elasticity for each customer segment can be derived.

The combination of models for pricing and customer behavior makes scenarios comparison more realistic because it includes customer responses into premium changes. Actuaries can evaluate the impact on sales and/or renewal of their possible premium changes that helps to take business decisions.
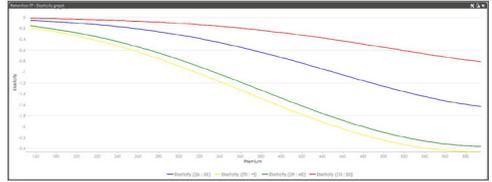

4) Profit testing

addactis® Pricing reporting functionalities allow pricing actuaries to define their own reports such as dynamic tables. These can be based on the data used for the tariff structure, but can also be based on external data.

Hence, it is relatively straightforward to compare several versions / scenarios with each other looking at different rates or cost structures.

The reports can for example be provided by factor or by segment which have previously been created or imported.

This feature is extremely powerful as a lot of time can be saved. In addition, several scenario analyses can be carried out this way, without the need to change the model.
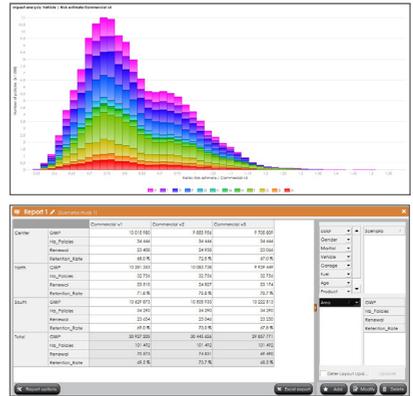

5) Price Simulation

The price simulation module within addactis® Pricing will help insurers improve the commercial premium structure. There are 2 additional calculation models that can be used:
• The Simulation model can allow for several thousand automatic scenario tests created by rate variations. For any factor the pricing actuary can analyze the possible impact of a premium variation on standard indicators like profit or volume. If several factors/categories are chosen, then for all possible combinations the previously defined indicators will be calculated and the most appropriate scenario can be selected.

• The Individual premium standard method is able to analyze individual premiums. The algorithm calculates the optimal premium (that maximizes a previously defined goal function) for each individual risk, respecting previously defined constraints (such as the minimum and maximum premium) and respecting a global constraint (such as the number of policies).

If the pricing actuary wishes to obtain a rate structure for this optimized premium, reverse engineering (with GLM) can be applied.
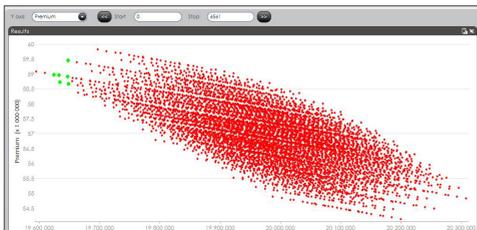
addactis® Pricing solution features

addactis® Pricing is/has:
• An integrated tool: The entire pricing process can be carried out within the same application. This makes it easier to understand the decisions made by another member of the actuarial team, to exchange projects, to share reports and to correctly interpret results;
• Easy to use: The combination of graphs and tables helps the actuary to understand the data and the statistic models, in order to take the right decisions. addactis® Pricing is a very flexible pricing tool with a user friendly interface;
• Transparent: A full audit trail is provided for all changes made during the tariff project. addactis® Pricing also allows printing and exporting all intermediate results with a possible access to SAS data;
• Fast: addactis® Pricing is especially designed to model the needs for non-life pricing. The GLM engine is designed to handle big amount of data and to obtain the detailed results in a few moments;

• Functional reporting: with addactis® Pricing the entire pricing process is integrated and documented. Several tailor made reports can be developed;
• A Wide-ranging technical functionality: all required and best practice functionalities that are used together with GLM models are built in addactis® Pricing. Our solution includes for example, splines, large claim handling and model comparison to find the best model, impact analysis and out-of-sample simulations to prepare the correct business decisions.

A stepwise implementation is possible. The pricing actuary can continue with the current business processes and work with addactis® Pricing in parallel and then step by step transfer more tasks to the new solution.

addactis® Pricing solution IT requirements

addactis® Pricing is an independent software solution without any external components or dependencies. It works on any recent 64 bit Windows platform (Windows 7 or later/Windows server 2008 or later) with standard requirements on hardware for these kind of solutions. Local and server licenses are available for the product.

All software products are addactis® full property and have no external dependency.

addactis

📱 +32 2 526 13 10
@ pricing-info@addactis.com
🌐 www.addactispricing.com

🐦 in ▶

addactis® is the global brand of software and consulting services offering a broad range of actuarial (re)insurance solutions around pricing, reserving, modeling and reporting.
For over 25 years we have been helping our customers to solve ever-evolving actuarial challenges. With our innovative software we drive the digital transformation of the actuarial function – for actuaries, by actuaries.
Present in 24 locations around the 5 continents with an extensive network of business partners, the addactis® experts ensure an effective and responsive support across Europe, Latin America, Asia-Pacific and Africa. Over 500 (re) insurance companies worldwide and 2000 software users in over 50 countries have already chosen addactis®.