Introducing ICRFS-ELRF™ A.M. Best Schedule P 2013

A.M. Best Co., a global provider of insurance industry financial data and credit ratings, has added access to Insureware's ICRFS-ELRF™ software using Best's Schedule P data to its product offering. The combination of A.M. Best data with the specialized software from Insureware adds value by facilitating effortless access to information in a structured database and providing statistical tools for performing loss reserve analysis at various levels of segmentation.

A.M. Best customers will have access to ICRFS-ELRF™ A.M. Best Schedule P 2013, the ICRFS-ELRF™ (point and click) software that has been pre-loaded with A.M. Best's Schedule P data - including Net (20x10 and 10x10) and Gross (10x10) arrays, at no additional charge beyond the cost of purchasing the loss reserve data from A.M. Best.

Schedule P data, triangles, exposures, and Earned Premiums, are grouped by company and Line of Business into Triangle Groups (the objects in the database). All the objects within a triangle group relate to the same company Line of Business or Industry Total.

ICRFS-ELRF™ A.M. Best Schedule P 2013 also pre-computes a number of triangles and risk metrics such as reserves held, and survival and loss ratios. Data can be sorted by the additional risk metrics as well as by standard categories. The suite of analytic tools includes most of those that are widely in use by actuaries, both deterministic and stochastic, including Mack, other regression formulation of link ratios with the bootstrap technique, Murphy and extensions thereof.

ICRFS-ELRF™ A.M. Best Schedule P 2013 delivers

Structured access to A.M. Best Schedule P data - Gross and Net

- Fast offline access to Schedule P long-tail liability lines and derived financial metrics, including for the Industry
- Critical financial information (pre-calculated for each triangle group on Net data) at your fingertips including:
  - Reserves Held;
  - %IBNR;
  - Total Loss Ratio; and
  - Survival Ratio.
- Sort companies by any metric or combination of metrics
- Classification variables can be created as needed
- Net and Gross data are provided in triangle format (along with any premium/exposure vectors)
- Companies can be analysed singly or jointly
- Any aggregation of companies can be calculated
- All available Schedule P triangles including:
  - Paid losses;
  - Case Reserve Estimates;
  - Incurred Losses (not including BULK and IBNR);
  - Bulk and IBNR;
  - Number of Claims Reported; and
  - Number of Claims Closed.
- Additional triangles (where they can be calculated):
  - Reserves Held (CRE + BULK and IBNR);
  - Ultimates Held (Incurred Losses including BULK and IBNR).
Analytical tools including the Mack method and the bootstrap technique

Two modeling frameworks are included: the Extended Link Ratio Family (ELRF) and Link Ratio Techniques (LRT). The ELRF module formulates link ratio methods as regression estimators and extends them.

- Methods include:
  - Mack (regression formulation of volume weighted average, chain ladder);
  - Exclusion of whole periods or individual points from estimations;
  - Murphy;
  - Bornhuetter-Ferguson; and
  - Much more!

Within an interactive, intuitive, graphical interface.

- Comprehensive diagnostic tests to validate that assumptions made by link ratio and related methods are carried by the data - including the bootstrap technique.

- Link ratio techniques:
  - Volume weighted average, Chain ladder;
  - Arithmetic average;
  - Last N diagonal weighted average;
  - Two parameter smoothing;
  - Three parameter smoothing;
  - Bornhuetter-Ferguson; and
  - Much more!
Examples of Schedule P 2013 data navigation and organization

Schedule P data are grouped by company and Line of Business into triangle groups.

ICRFS-ELRF™ A.M. Best Schedule P 2013 allows up to 32 top level variable classifications with unlimited sub-categories and sub-levels to be associated with triangle groups. The variable and value classification system ensures navigation to individual triangle groups (and triangles within triangle groups) is achieved within a few mouse clicks.

The following screenshot is of the A.M. Best Schedule P 2013 data organized in an ICRFS-ELRF™ database. All the data are organized within triangle groups with automatic appropriate variable association for swift navigation.

Navigation within the database is accomplished via the tree view on the left-hand panel with variables describing the attributes of the accompanying triangle groups. Triangle groups are listed in the right-hand panel and they contain all available triangles, and other available data, relevant to each company.

In the illustration above, the triangle groups have been selected where:

- Companies (AMB Group) writing Commercial Auto/Truck Liabilities (CAL); with
- Loss Ratios between 70 and 75;
- Dimensions of 10x10 (10 accident years and 10 development years); and
- Sorted by Total Earned Premium (not shown).

There are only 17 companies falling into this category.
The query view (see below) allows more complicated queries with multiple attributes per query along with searching by name.

The query above displays the 60 triangle groups in the database with the following attributes:

- Line of Business: D-Workers Compensation;
- Aggregation: AMB Group;
- Survival ratios: 4 < SR <= 6; and
- Dimensions of 10x10 (10 accident years and 10 development years).

The query can be sorted by any column. Here the illustration shows the triangle sorted by Reserves Held.

Initial variables and values are provided (including those calculated from A.M. Best Schedule P data) as illustrated above.

Users of the application can:

- Create their own variables and values;
- Create new triangle groups by combining existing Schedule P triangle groups allowing:
  o Aggregations by company;
  o Aggregations by Lines of Business; or
  o Any other combination desired by the user!
Inside a triangle group

Some contents of the triangle groups are shown below:

Gross data are suffixed with a G (for example PL(C)G for paid losses cumulative Gross) to distinguish them from Net data.

The above objects are contained within a triangle group.

Items within a triangle group include,

- Triangles (loss development arrays);
- Exposure vectors;
- Premium vectors;
- Datasets;
- Models;
- Forecast scenarios; and
- Links to reports.

Datasets connect triangles with optional exposure, inflation, and premium vectors.

All these objects are organized transparently in the triangle/dataset listing.
Analytical tools: the Extended Link Ratio Family, Mack, the bootstrap technique, and Link Ratio Techniques

ICRFS-ELRF™ A.M. Best Schedule P 2013 incorporates the Extended Link Ratio Family (ELRF) and Link Ratio Techniques methods (LRT) modules. The default model in ELRF is the Mack method (equivalently volume weighted averages). The bootstrap technique can be applied to any link ratio model (including Mack).

Extended Link Ratio Family (ELRF)
The Extended Link Ratio Family (ELRF) modeling framework formulates average link ratios as regression estimators and is extended to include intercepts (Murphy) and constant trends down each development year across accident years.

The Mack method is currently the most popular method in use amongst actuaries. It is a statistical regression formulation of the Link Ratio method known as the chain-ladder. A ratio ‘to ultimate’ can also be set.

ELRF also contains a number of statistical model diagnostics that measure how well the respective model fits the data. These diagnostics are not as widely used in the actuarial community as they should be.

It is now common to supplement the use of the Mack or other similar methods with additional techniques used to derive a loss distribution. The most commonly used of such methods is called the bootstrap technique. The ELRF module also includes a bootstrapping module that obtains loss distributions for pure link ratio models (including Mack).

The analytic tools add significant power as:

- Standard actuarial methods are available within a flexible, easy to use GUI for all A.M. Best Schedule P data;
- The ICRFS-ELRF™ database structure provides a complete warehousing solution for all associated data, models and notes;
- Extensions of actuarial methods formulated within a regression framework allow more advanced application of the standard methods - including the bootstrap; and
- Comprehensive diagnostics tools are included to test whether models are appropriate for a company’s data.

Brief examples of analytical tools
Comprehensive diagnostic tools assess ratio methods applied within a regression framework. Ratio methods are extended to include intercepts and trends. It is insufficient to simply compute an answer, rather the diagnostics should be used to assess whether the answer obtained from the method(s) are credible.

For instance, consider the Mack method applied to this dataset in A.M. Best Schedule P 2013.
When the residuals are plotted versus the time dimensions (development, accident, and calendar) we can instantly see that the residuals versus calendar year are not random - they exhibit a strong positive trend. Since residuals represent trend in data minus trend estimated by the method, the (Mack) method trend is lower than data trend. Accordingly the mean reserve of 1.4B produced by the Mack method is much too low!

Complete the square and you get an total mean reserve of 1.4B. Forecast distributions are produced by cell and for the aggregates.

What if we fit the average trend down each accident year, intercepts and link ratios?

The residuals now appear random (zero trend). Here the data trend appears to be ‘equal’ to the method trend. The total mean reserve projected from this model is 1.85B!

The difference (~450M) is not a small amount – and this is without taking into consideration a ratio to ultimate!
The bootstrap technique can be applied to any link ratio method. Further, the user can enter in suitable model means overwriting the projected means allowing the bootstrap sample distributions to be associated with arbitrary forecasts.

For instance, the bootstrap technique applied to the Mack method (left) shows the bootstrap sample with the Mack mean on the total. If instead, we use the means obtained from the full ELRF model (ratio, intercept and accident year trends) we can still run the bootstrap on the Mack residuals but use the means from this method instead. This produces the result on the right. Simulations of the distributions can be examined by accident year, calendar year, or total (the latter is shown below).

In this way, we observe that the Mack method severely under predicts the loss reserve distribution arising from the bootstrap samples - assuming the full ELRF model is generating reasonable results. Value-at-Risk (VaRs) and Tail-Value-at-Risk (T-VaRs) are calculated for the distributions.

In addition to the analyses above, Bornhuetter-Ferguson calculations are also produced.
Link Ratio Techniques (LRT)

The standard link ratio methods as calculated automatically in the LRT module are:

- Chain Ladder (Volume Weighted Average)
- Arithmetic Average
- Geometric Average
- Average Without Min/Max
- Last N Diagonal Weighted Average
- Last N Diagonal Average
- Last N Diagonal Geometric Average
- Maximum Ratio
- Minimum Ratio
- Weighted Excluding High/Low
- Average Without Min/Max of Last N
- Weighted Average Without Min/Max of Last N
- Two parameter smoothing
- Three parameter smoothing

By default, N is set to be 4 periods, but N can be changed to any calculable value. A ratio ‘to ultimate’ can also be set.

Brief examples of analytical tools
All commonly used standard actuarial methods are available. These methods can be applied to any data type including Incurred Losses (below) and Paid Losses. Smoothing techniques are also included.

Further information
To see the database and analytical tools in action please visit:


If any modeling support is required for a particular segment by any A.M. Best client, Insureware can provide this support on a fee-for-service basis.

Contact info@insureware.com for more information.
Best’s Schedule P

(Loss Reserves) Property/Casualty - United States

Inadequate loss reserves are a leading cause of insurer insolvency. *Best’s Schedule P* delivers the insight you need to plan for the future, providing powerful tools for discerning property/casualty industry norms and trends in this vital area.

**Use Best’s Schedule P to:**

- Study loss and expense reserves, Incurred But Not Reported (IBNR) reserves and loss payments by line of business.
- Determine the appropriate level of loss reserves for a company.
- Perform claims and loss analysis.
- Compare your company’s results to those of other companies or the industry.
- Observe reserving trends over a 10- or 20-year period in the major casualty lines.
- Assess the impact of a company’s reserving practices on its financial strength.
- Access the latest financial data online with *BestLink*®.
- Open online Statement pages in *Excel*®.
- Integrate the latest financial data into your custom research projects using *BestLink for Excel*, which pulls online data directly into Excel spreadsheets.

**Your purchase includes:**

- Eleven years of loss reserve data for more than 3,100 property/casualty companies and groups, from Schedule P, Parts 1 through 7 of the NAIC annual statement.
- Data for up to 10 accident years for 19 lines of business.
- A.M. Best-calculated ratios, such as Paid Loss and Allocated Loss Expense; and A.M. Best-calculated percentages, such as Percent Paid to Incurred.
- Accumulated prior-year totals and totals for all years.
- Earned-premium information from Part 6.
- Standard statistical and analytical reports, including Claims Development, PALS (Schedule P Assets Liabilities Surplus) Summary and more.
- Comprehensive 20-year analytical reports.
- Companies’ Corporate Structure and 25-year Best’s Financial Strength Rating history.
- *BestAlert Service*® company tracking and notification system.
- *Best’s Review*® magazine.

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