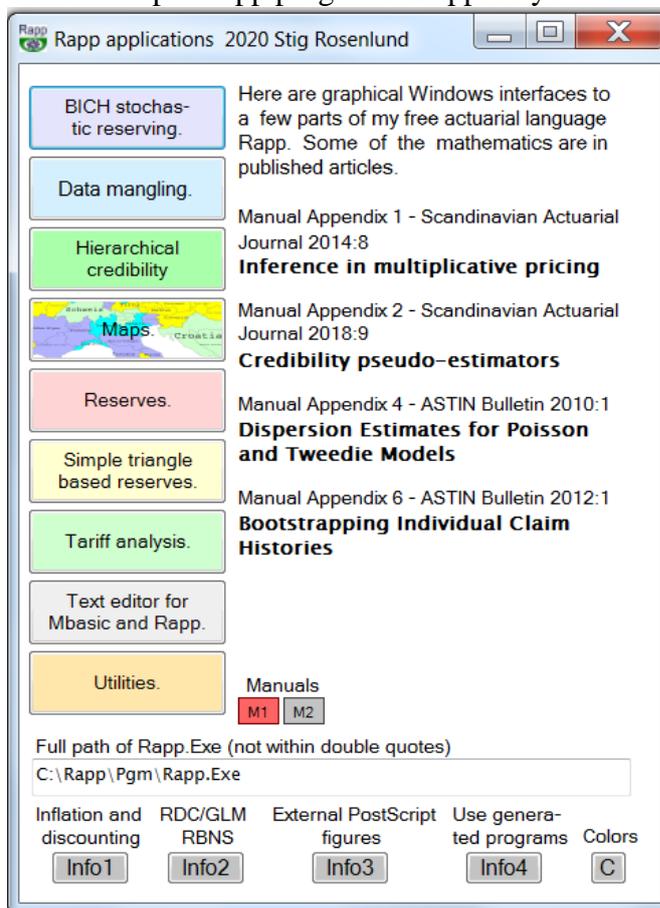


Reserve applications

2020-03-03, Stig Rosenlund

An all-in-one Rapp package is available at <http://www.stigrosenlund.se/rappzip.htm> as a zip file. It contains the essentials and example Rapp programs. Suppose you have started Rappmenus.Exe:



Input data for menu Reserves

Data requirements

The applications presuppose that there is a table of individual payments and their payment dates (Paid) and/or a table of changes in known claim cost (= Paid + Claimhandler-reserve) and their dates (Incurred). Programs in e.g. SAS shall then make two text files for Rapp from these tables.

It is also possible to use simple aggregated triangle files, but RDC cannot be used with them.

Paid infile (file for payments)

After Paid infile: in Reserves you give a text file with lines that look like this. The header line is not part of the file.

ID	A1	A2	A3	A4	T	Claimdt	Reportdt	Paydt	Finaldt	Paymentamount	
02123455111234	THEFT	02	01	L1	110	0	19940103	19940121	19940301	19940901	000001234

where

ID = unique claim ID

A1 = Arg1 = argument 1, such as geographic area

A2 = Arg2 = argument 2, such as line of business

A3 = Arg3 = argument 3, e.g. type of damaged object, e.g. L1 for personal property

A4 = Arg4 = argument 4, such as type of damage, e.g. 010 for fire

T = flag 0/1 for top (large) claim as judged at reporting

The last non-blank character in ID must be in the same position for all claims, and no blanks must be present in ID before that position.

The arguments A1-A4 shall occur with no embedded blanks. Each is required to have the same length in all data lines. Numerical arguments shall have left zero padding if necessary for the requirement. They shall be separated by exactly one blank, not more. If you do not have four arguments, let the superfluous ones have dummy values eg all X. Exactly one blank between dates.

There must a line with Paydt = Reportdt for each claim. If there is none naturally, make such a line with Paymentamount = 0. The file shall be sorted on ID.

2015-09-19. New choice in Rappmenus / Reserves / Files and folders to let Rapp make a line with Paydt = Reportdt for each claim if none exists. The files will be sorted on ID also.

Paymentamount need not be filled with zeros to the left and can have any length.

Incurred infile (file for changes in known-claim-cost)

After Incurred infile: in Reserves you give a text file with lines that look like this. The header line is not part of the file.

ID	A1	A2	A3	A4	T	Claimdt	Reportdt	Changedt	Finaldt	Changeamount					
02123455111234	T	H	E	F	T	02	01	L1	110	0	19940103	19940121	19940301	19940901	00000016

where

Changedt = date of change in known-claim-cost (payment or reserve change)

There must a line with Changedt = Reportdt. If there is none naturally, make such a line with Changeamount = 0.

Changeamount need not be filled with zeros to the left and can have any length. Rapp can read numbers with a minus sign, eg -10753, and negative Zoned Decimal numbers generated by Easytrive in the mainframe. For example, 00001075L which is equal to -10753, and 00000016â, which is equal to -160. Positive Zoned Decimal numbers generated by COBOL do not work, however. (Note. These comments on Zoned Decimal is a legacy from my time at the mainframe. Would be almost totally without interest by July 2014. I keep them for sentimental reasons.)

If you have no Incurred file it can be omitted. Likewise, if you have Incurred but not Paid (a case not likely to appear in practice), the Paid infile can be omitted.

For both files the menus admit wild card specifications of argument values with underscores. This is done in the menu accessed by button Adv (for Advanced).

Overview of the applications' function

Extracts of the files selected by values of A1-A4 and T are created. Exactly two of A1-A4, e.g. A2 and A3, shall be kept in the extracts. The menu "Reserves" then performs reserve calculation with one or both of the two kept arguments as grouping variables. Menu "BICH stochastic reserving" uses the same kind of infiles.

Setup instruction

Create folder C:\Rapp, or another suitable folder, and fill it with the files from Rapp.zip at my website. Template Rapp programs, for use in the menus "Reserves" and "BICH stochastic reserving" and in four other menus, are found in folder Rpp. Init.Rpp is also found there. Template (example) parmfiles, for use in "Open parmfile" in the menus, are found in BRparm and other folders ending

with parm. All needed data files for the template reserving parmfiles are found in Data, after running Mangle1.Rpp and Mangle2.Rpp. They are all fakes - no business secrets revealed. Needed folders and files are stated in the "Files and folders" menu in Reserves. Their names are included in the parmfile.

Files and folders for Reserves

Close Give all file and folder names without double quotes, even if they contain blanks. Rapp

Edit Sort and complete detailed files with lines where payday = reportdate.

Init Rpp: E C:\Rapp\Rpp\Init.Rpp

Template Rpp: C:\Rapp\Rpp\TemplateR.Rpp

Temp Rpp: C:\Rapp\Rpp\Rtmp1.Rpp

Folder data: C:\Rapp\Data

Folder txt: C:\Rapp\Txt

Folder Pdf: C:\Rapp\Pdf

Folder Xml: C:\Rapp\Xml

Temp parm: C:\Rapp\BRparm\Rtmp1.Txt

User file/nms:

Copy the right one of the Rapp exes on <http://www.stigrosenlund.se/rappexes.htm> to Rapp.Exe. The folder for Exe's can be on a server. But large data files should be placed on the C-disk for speed.

Running the application Reserves

Start Rappmenus.Exe. You do not install it in the Windows Install sense. A shortcut can be pinned to the Destop and/or Startbar. The submenu Reserves is self-explaining. It looks like this.

Rapp Claim reserves by several methods with Rapp Right-click choices for info 2020 Stig Rosenlund

Open parmfile Save parmfile Save parmfile as

Files and folders Run GLM States => Xml View Xml

User factors Recompute View Pdf 2 Current parmfile: C:\Rapp\BRparm\DemoRDC2.Txt

Namepart: -R2 Logo: Rappicon Descript: Per Region and LineOfBusiness

Method: RDC Graphs? Arg names: Regetc LOfBus Object Cltype Include args: Regetc LOfBus [Argx Argy, x < y] Adv

Select Regetc

Select LOfBus

Select Object HC

Select Cltype 010 011

Triangle or list files for all methods except RDC. They have priority over the detailed files. N, D files for Schnieper.

Incurred: W N D

Paid: W N D

Detailed files for all methods with one line per change in incurred or payment.

Incurred infile: C:\Rapp\Data\ResI-2.txt

Paid infile: C:\Rapp\Data\ResP-2.txt

RDC parameters w₀: 1 q₀: 500 [See my paper in ASTIN Bulletin 42(1), Section A.2. Manual M2 in first menu, Appendix 6.]

Separate/aggregated: S1 Small/Top/All claims: A Munich Chainladder? [Check for Quarg and Mack method in chainladder.]

Sim/Paid/Incurred: S [Simultaneously paid and incurred / Paid only / Incurred only] Best cal.year? []

Period: M [M=1 Q=3 T=4 H=6 Y=12] 1: st claimdate: 2012-01-01 [Def equal periods] Last claimdate: 2012-12-31 [Def end of last month]

Tail parameters Incurred %: Paid %: Equalize: 0 Tail method: A Show nonparams? []

Curve parameters for tail and rectangle Tail curve years: 0 Inference years: 0 Rectangle curve years: 0 Change triangles? []

ID length: Excel blanksep? [] Excel money unit: Kilo Futureprices -I? -P? Discrete I %: 0 P %: 3

Pricecorr I? File: Colno time: Colno price: Yearly interest rate %: per month I? P? []

Pricecorr P? [] File: C:\Rapp\Data\Kpim.Txt Colno time: 1 Colno price: 2 []

Statres I? File:

Statres P? [] File: C:\Rapp\Data\Statres-demo-R.Txt

Benktander/Bornhuetter-Ferguson/Cape-Cod/Schnieper files Edit

Read I? Cre I? File: C:\Rapp\Data\BHultI.Txt []

Read P? Cre P? File: C:\Rapp\Data\BHultP.Txt []

GLM related: IG IO PG PO Manual1 Manual2

View all Excel View all Pdf Pdf 1 Pdf 4 # claims inc Pdf 3 Pdf 5 # claims acc On IBNR extensive segmentation <http://www.stigrosenlund.se/rapp.htm>

The background colors are intended to help locate parameter groups quickly. For example green for Excel parameters and output, turquoise for parameters belonging only to method RDC, and sandy brown for price correction parameters. Yellow buttons for start of Rapp runs, with a red border if partial computations relying on previous runs are to be made. Press third grey button C in first menu for information.

Recomputation after changes: You change increment values in View Xml 1 / first sheet, including tails, and make them affect accumulated values and all other values deduced from increments. Also some other output files, including PDF graphs, are affected. Do not change increment values in the block Total - they will be recomputed automatically. Do not put formulas in increment blocks. Leave Excel while saving changes in the same Xml-file. Press Recompute. Press View Xml 1 to see the results. Do not make another Run or open another parmfile between the Run that produced this Xml 1 and the second View Xml 1.

The GLM and "User factor" buttons and their output at "GLM related" are described in menus of Rappmenus. For some explanation of box Adv, see Appendix 1.

New 2018-04: Choice to use a file with yearly interest rates that change every month. See label "Yearly interest rate % per month" in the menu. Explanations given in the manual Rappmane.doc or Rappmane.pdf and in right-click windows in the menu.

Interpretation of the output

In the parameter file you select a part of the out-file-names. Assume that the part is X.

Output files in C:\Rapp\Txt, C:\Rapp\Pdf, C:\Rapp\Xml

The following folders are given in "Files and folders" :

C:\Rapp\Txt for text files

C:\Rapp\Pdf for PDF files

C:\Rapp\Xml for XML Excel files

Output file	Brief contents description
ResvX-1.Pdf	One graph per region and/or line of business showing Known-claim-cost + IBNS + tail for the claim periods and for rolling 12-month periods.
ResvX-1.Xml	XML-file with several sheets. Main sheet made from ResvX-1x.Txt if it exists, otherwise from ResvX-1.Txt. The text file is easier to treat further with other programs.
ResvX-2.Pdf	One graph per region and/or line of business and claim period showing the incremental values.
ResvX-3.Pdf	One graph per region and/or line of business and claim period showing the accumulated values.
ResvX-4.Pdf	As ResvX-1.pdf, but with Paid + IBNS + tail-paid next to Known-claim-cost + IBNS + tail for the claim periods.
ResvX-5.Pdf	One graph per claim period for the regions and/or lines of business next to each other. Shows Known-claim-cost, Known-claim-cost + IBNS + tail in mono-color bars and Paid, Paid + IBNS + paid-tail in bars with lines.
ResvX-n-inc.Pdf	As ResvX-2.Pdf for the number of claims.
ResvX-n-acc.Pdf	As ResvX-3.Pdf for the number of claims.

Annual calendar year accounting for chain ladder method

Assume that the data is per RRRRMM30 (or 31, it's the same thing for the program counts business days). Assume that the last claim date is RRRRMM30. (It is not advisable to put a later claim period, for then the program believes that there has been no development after RRRRMM30.)

If month $MM < 12$ two runs are needed: 1. Check the Best cal.year box in the menu.

Then a preparatory chain ladder calculation is made that draws the development to the end of the year, with period length adapted to month MM . For example, if $MM = 10$, the period-length will be two months, for then each calendar year, including hitherto developed in the current year, consists of a certain number of two-month periods. If $MM = 9$, the period-length will be three months (quarter), for then each calendar year, including hitherto developed in the current year, consists of a certain number of quarters.

Output is then for calendar year, but for the current year accounting is only for the period up to and including month MM . To get a full-year estimate of the outcome it is however not appropriate to multiply by $12/MM$, because the remaining months have a greater proportion of development the following years than the past months. Development factors are calculated as if the remaining months of this year were included, so multiplying by $12/MM$ gives on average an overestimation of the outcome.

This account thus fits the years RRRR - 1 RRRR - 2, . . . , but not RRRR.

2. Uncheck the Best cal.year box in the menu.

Set Period to MM , eg 10 if $MM = 10$. Then the outcome of the last period can be multiplied by $12/MM$ for a full-year estimate, of course apart from seasonal variations.

Bich stochastic reserving menu

Runs as Reserves. The same parmfile can be used for both applications. The menu looks like this.

The screenshot shows the Rapp software interface for BICH stochastic claim reserves. The window title is "BICH stochastic claim reserves by several methods with Rapp". The interface includes a menu bar with "Open parmfile", "Save parmfile", and "Save parmfile as". Below the menu bar are buttons for "Files and folders", "Run", "View Xml", and "View Pdf". The current parmfile is "C:\Rapp\BRparm\DemoRDC.Txt". The main area contains various input fields and options for configuring the simulation, including Namepart, Method, RDC parameters, Object, Bootstrap, and various checkboxes and dropdowns.

Key elements visible in the interface:

- Menu Bar:** Open parmfile, Save parmfile, Save parmfile as
- Buttons:** Files and folders, Run, View Xml, View Pdf
- Current parmfile:** C:\Rapp\BRparm\DemoRDC.Txt
- Namepart:** -R
- Logo:** LF
- Description:** Per Region and LineOfBusiness
- Method:** RDC
- Graphs?:**
- Arg names:** Region, LOFBus, Object, Cltype
- Include args:** Region_LOfBus [Argx Argy, x < y] Adv
- Select Region:** (empty)
- Select LOFBus:** (empty)
- Select Object:** HC
- Select Cltype:** 010 011
- RDC parameters:** w_0 : 1, q_0 : 500 [See my paper in ASTIN Bulletin 42(1), Section A.2. Manual2 Appendix 6]
- Period:** M
- Separate/aggregated:** S1
- Small/Top/All claims:** A
- ID length:** (empty)
- Excel blanksep?:**
- Excel money unit:** Kilo
- Object:** 1: th old: 2012-01-01 Last old: 2012-12-31 Infile: C:\Rapp\Data\ResP-1.txt
- Bootstrap:** 1: th old: 2011-01-01 Last old: 2011-12-31 Infile: C:\Rapp\Data\ResP-1.txt
- Section 4.1 subsets?:** b_1 : (empty) b_2 : (empty)
- Section 4.2 subsets?:**
- Section 6.2 ρ_n test?:**
- Nrep = B:** 2000 Nrep2: (empty) Nrep3: (empty)
- Percentiles:** 0.5 1 25 50 75 80 90 95 97.5 99.55 99.6034
- Futureprices?:** Discrete %: 0
- O/Pricecor?:** File: C:\Rapp\Data\Kpim.Txt Colno time: 1 Colno price: 2
- B/Pricecor?:** File: C:\Rapp\Data\Kpim.Txt Colno time: 1 Colno price: 2
- Template Rpp:** C:\Rapp\Rpp\TemplateB.Rpp
- Benktander/Bornhuetter-Ferguson/Cape-Cod/Schnieper file:** Edit
- Read?:** File: (empty)
- Buttons:** View all Pdf, View all Excel
- Manuals:** Manual1, Manual2
- URL:** <http://www.stigrosenlund.se/rapp.htm>

Same coloring of parameters as in Reserves. This should help, since I have not succeeded completely in putting corresponding parameters in the same places as in Reserves.

Appendix 1

Including LofBus as index variable whose reserve sums are reproduced in new GLM statres files
2016-04-23, Stig Rosenlund

On the first white line, 1 2 denotes Region in the underscore-separated variable Regetc. 4 2 denotes LofBus. This entails segmentation on the combination of Region and LofBus. Each such combination is reserved separately in the step before GLM.

On the white lines where Old word numbers and New word numbers are written, the word number 7 has been appended to 2 6. This means that blank-separated word no 7, which contains LofBus, is included in the index variable combinations that shall have their reserve sums reproduced from non-GLM to GLM+adjustments reserves R4.

The more detailed segmentation in step before GLM means that the total reserve can be different and that possibly some claims will not get any positive Statres, although they did get a Statres without LofBus. This is because that combinations might appear without any finalized claims and hence cannot get any reserve. See Bich.pdf. On the last page under B5 is explained how Rapp merges quantile intervals sometimes. Merging groups is not however done over arguments such as Region and LofBus. It would not be appropriate; better to let the user design the grouping to avoid segments without finalized claims.

Advanced - substrings of argument values for selection and/or segmentation. GLM parameters.

Close

1. Non-GLM parameters
Give a sequence of blank-separated numbers StartPos and NoOfPos for each argument, giving substrings to be used. If nothing is given, the whole argument value will be used.

Regetc:

LOfBus:

Object:

Cltype:

The sequences will determine which parts of the argument values that are used for selection and/or segmentation by the arguments. Remaining parts will be replaced by underscores _ . In Select boxes of the previous menu, write underscores in the non-used parts.

2. GLM parameters for RDC/RBNS statres files (not used in BICH)
These will be used instead of the above when GLM is pressed.

Regetc:

LOfBus:

Object:

Cltype:

Old statres files whose reserve sums over chosen index variables shall be the reproduced in new GLM statres files. Give blank-separated word numbers for index variables. Underscores are changed to blanks in the files. When producing infiles with eg SAS, put underscores between GLM arguments, such as sex and diagnosis.

	Old word numbers	New word numbers
Incu: Default	2 6 7	2 6 7
Paid: Default	2 6 7	2 6 7

Suitable index variables are claimperiod, with word number 2, and the smaller segment strings used for old files. These start in word number 6 in old files, following Quantile.

Names of GLM variables, those kept after StartPos and NoOfPos in part 2, instead of Segm01, Segm02,

Region LOfBus Object Cltype

As you can read in the upper part of Adv, the numbers 1 2 etc denote pairs of starting position and number of positions for the parts of the argument that are to be used. I illustrate with a line from some data, putting starting position numbers above the line. It should make clear why 1 2 denotes only region and 1 2 4 2 denotes the combination of Region and LofBus.

```
000000000111
123456789012
38_02_VF_011
```

Another illustration.

```
000000000111111111122
123456789012345678901
F_BIGC-38_M_HC_09_P_1
T_COUN-23_F_VL_07_Q_2
```

1 1 3 4 selects both fire/theft and bigcity/smallcity/countryside to determine R1. (I have written several blanks between pairs to emphasize that the numbers come in pairs.) If you want M/F (gender) also, then write 1 1 3 4 1 1 1.

The use of starting positions and number of positions as parameters works because of Rappmenus' requirement of fixed length for each argument.