Presenting DRM Results to Decision Makers: A Summary Report

CAS Working Party on Executive-Level Decision-Making Using DRM

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Reviewed and Approved by the Dynamic Risk Modeling Committee in July, 2004;
"Presenting Dynamic Financial Analysis Results to Decision Makers" – 2004 CAS Spring Meeting;
"How to Present DRM Results to Decision Makers" - The Actuarial Review, August 2004;
Published in the 2004 CAS Fall Forum

Abstract

Motivation. Creating an effective Dynamic Risk Modeling (DRM) presentation to management is a crucial part of a DRM project. Unless the management team can see results in a form that helps them make decisions, there is no incentive for them to support the use of DRM.

History. The Casualty Actuarial Society (CAS) has recognized the importance of Dynamic Risk Modeling (DRM) for many years and has actively supported research in DRM issues through its committee structure and calls for research papers. In 2003, the Dynamic Financial Analysis Committee (DFAC) of the CAS changed its name to the Dynamic Risk Modeling Committee (DRMC) to recognize, in part, the broader family of risk modeling implied by the name Dynamic Risk Modeling. Accordingly, DRM and DFA could be used interchangeably in many instances, although the DRMC considers DFA to be a specific subset of DRM modeling. Prior to 2004, the DFAC issued calls for research papers under the DFA heading.

Method. The Working Party reviewed slides from past DRM and DFA presentations to find examples of effective slides. The presentations were also reviewed to understand how to sequence the slides to walk an audience through the parts of the study relevant to the decision making process.

Results. A PowerPoint template containing slides developed from the review of past DRM and DFA presentations was produced along with examples of how to use the slides to assemble a presentation and a guideline on giving DRM presentations.

Conclusions. An effective DRM presentation focuses on the financial measures that matter to the management team, which implies that one should establish those

financial measures early in the life of a DRM project. Graphs provide the best approach to conveying the likely range of potential results and how those results can change over time. A number of slides in the PowerPoint template contain graphs that can be adapted to a particular presentation.

Availability. The PowerPoint template as well as the DRM presentation examples in PowerPoint can be downloaded from the CAS Web Site, www.casact.org. This summary report, the PowerPoint template, examples of presentations using the template, and the presentation guideline are on the CAS Web Site with hyperlinks between them at appropriate places.

Keywords. Dynamic Risk Modeling, DRM, Dynamic Financial Analysis, DFA, graphs, presentations.

1. INTRODUCTION

The Working Party (WP) was formed to give practicing actuaries help in developing effective Dynamic Risk Modeling (DRM) presentations for senior management. DRM model usage in practice has been more limited than was anticipated in the early 1990s when the CAS began promoting DFA. One potential reason for the limited acceptance of DRM models in practice may be the lack of effective presentation of such models' results.

The WP reviewed existing DRM and DFA presentations to identify techniques or slides that are effective in communicating to management the results of a DRM study. From that survey and from the ensuing discussions and targeted research, we produced the following items to help practicing actuaries in their presentations:

- this report from the Working Party;
- a PowerPoint template that can be used as a source for final slides;
- a paper describing how the slides in the PowerPoint template help solve some of the unique presentation problems for DRM studies;
- three sample DRM PowerPoint presentations based on the template, discussing reinsurance, investment, and mix of business options; and
- a collection of guidelines for the assembly and presentation of DRM concepts and results.

The report from the WP is a summary document. The other items listed above are hyperlinked[1] attachments to the report that expand upon selected parts of the project. Each item is available to be downloaded from the CAS Web Site. The remainder of this report gives a summary of our findings and a description of the other items listed above.

2. CATEGORIES OF EFFECTIVE DRM SLIDES

The sequence of slides for an effective DRM presentation can be broken down into three categories: Orientation, Presentation of Results, and Conclusion. The content of the slides is dependent on the specific study presented, but the sequence of slides is common across effective presentations.

2.1 Orientation

The goal in the orientation section is to prepare the audience for the presentation of financial results. The items to be presented in this section include:

- Overall goals of the study
- Options to be evaluated
- Financial measures used to evaluate the options
- Modeling assumptions
- Overview of modeling process

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[1] Clicking on a hyperlink in the Working Party's papers will open the referred document. (In Word XP, hold down CTRL when clicking.) If the hyperlink's properties include a location in the referred document, the document will open to the specified location. The hyperlinks in the Working Party's papers use "relative references" – i.e., all materials must be downloaded into the same directory to enable the hyperlinks to function properly.

2.1.1 Overall Goals of the Study

One of the initial slides in an effective DRM presentation states the goal(s) or business purpose(s) of the study. This should briefly summarize the problem being solved with the study, make clear why the presentation is being held and set the stage for the rest of the presentation.

2.1.2 Options to be Evaluated

Another of the initial slides in an effective DRM presentation lists the options to be evaluated as potential solutions to the stated problem. The management team has alternative courses of action among which to choose. These courses of action are the options to be evaluated, and the presenter will provide information that will affect the management team's decision. A slide that lists the options will set up the labeling convention used on the subsequent slides of financial results. The focus of the DRM study will determine the style in which the options are presented. The options may be stated as a series of investment strategies, reinsurance structures, or business growth plans, for example. For some presentations, the overall goal(s) and options being evaluated can be effectively combined.

2.1.3 Financial Measures used to Evaluate the Options

A slide that states the financial measures used to evaluate the options is a second background item for the later slides on the financial results. Such a slide gives an opportunity to state the definitions of the financial measures used in the presentation and to affirm that the results will be stated in terms that the management team can use to select the best course of action. Focusing on the pre-selected set of financial measures also aids the presenter, as it limits the number of items in later slides. Different management teams select different financial measures as the key items to evaluate in making decisions; therefore, the slides in this section are dependent on the management team's preferences. The determination of those financial measures is a process that should be completed at the start of a DRM project

and is the subject of another Working Party, "The CAS Working Party on Elicitation and Elucidation of Risk Preferences."

2.1.4 Modeling Assumptions

The slide describing high-level modeling assumptions allows the presenter to describe the relative breadth and depth of the DRM study in various areas of modeling. One may state the areas the study focused on while building the model as well as areas where simplifying assumptions were used to keep the scope of the study within reasonable bounds. The list of modeling assumptions should contain only those items that the presenter can reasonably anticipate would carry significance with the management team. When modeling alternative investment options, comments on the interest rate model are appropriate. If modeling reinsurance program options, one can probably leave out comments on the interest rate generator. The modeling assumptions should be stated in non-mathematical terms. Instead of giving a formula used to drive a particular part of the model, state the behavior the formula models. Sometimes, a DRM study's results are heavily dependent on items external to the company, such as the path short term interest rates will follow. Stating the assumptions on those key external drivers is useful.

In summary, it is important to identify the "key drivers" of the model for the audience, while the inclusion of assumptions not on the "key drivers" list will depend on the project and your knowledge of the intended audience.

2.1.5 Overview of Modeling Process

Giving an overview of the modeling process is an opportunity to make the audience more familiar with the process and increase their confidence in the results to be presented by making the model less mysterious. A high level flow chart is the best route to accomplish that goal. A flow chart can illustrate that the model links different parts of company operations together

within its analysis, without losing the audience in the complexity of the DRM modeling process.

2.2 Presentation of Results

There are three questions the presenter should address in this section of the presentation, the answers to which should be related to the overall goal(s) or business purpose(s) of the project:

- What is the likely range of financial results for each option?
- How do the financial results vary over time?
- What is the risk vs. return trade-off between the options?

Graphs offer the best means to answer these questions. A large number of data points can be summarized on a well-designed graph.

The successful communication of DRM results often requires fine attention to detail in formatting the graphs and use of consistent labeling and color schemes. Formatting mistakes can distract the audience by causing them to lose focus on the information the graph is intended to convey. For example, a graph that is commonly used to display the risk and return measures of each option is the "efficient frontier" type of graph with risk plotted on the X axis and return on the Y axis. Switching the axes would create a graph with the same information, yet the presenter will likely have to take additional time to explain the graph's meaning. Retaining the convention that risk is measured on the X axis and return is measured on the Y axis saves time during the presentation and keeps the audience focused on the results.

Even with the template provided by the Working Party, selecting the best graph to display the results for a given study and adjusting the formatting of the graph can be time consuming. The project timeline for a DRM study should allow time for those activities as well as for a dry run of the

presentation to improve its flow and to catch formatting errors that can detract from a presentation.

2.3 Conclusion

In general, any presentation needs a slide that draws conclusions from the presented material. The need for a conclusion is particularly acute in a DRM presentation. After the actuary has presented the results of a dynamic risk model, the management team is left with the task of making a decision using results from a process that is probably outside the scope of their experience. It's reasonable to assume that the management team has some familiarity with accounting concepts, but it's unlikely they will have practical experience using simulation models or the probability density functions and interest rate models that are part of the driving force within a DRM model.

The speaker should do the following at the conclusion of the presentation:

- Restate the goal(s) or business purpose(s) of the study.
- Summarize the results of the study in terms of the financial measures selected.
- Offer an opinion on the best course of action given the financial measures selected.

Referring back to the slide that stated the goal of the study is useful in summarizing the presentation and reaching a conclusion. A slide with a table summarizing the results for the selected financial measure results by option is useful. While the responsibility for the decision lies with the management team, offering an opinion on how to interpret the results may help them process the information given during the presentation.

Drawing a conclusion on the course of action to be taken involves comparing results between the options. Keeping the number of comparisons

to be made to a reasonable level is the reason the number of options is limited in defining the goal for the study.

3. WORKING PARTY PRODUCT

This section describes the end products from the project. Our goal is to provide some practical help to an actuary faced with developing and presenting the results of a DRM study.

3.1 PowerPoint Template

The goal of providing practical help led us to create Microsoft PowerPoint slides with embedded Excel charts, since we assume those are tools that are commonly available to practicing actuaries. The use of an embedded Excel chart allows both the slide and the chart to remain fully editable by their parent applications subsequent to the placement of the chart in the slide. The template is available to the public and can be downloaded from the CAS Web Site. The template offers a variety of graphs that will suit the needs of a particular DRM study. The graphs were developed by extracting and enhancing the best graphs or slides from the review of past DRM presentations. The Working Party has sought to maximize the graphs' efficiency in presenting DRM concepts and to illustrate the capabilities of commonly available software.

3.2 Design of Slides in PowerPoint Template

One member of the Working Party, Aleksey Popelyukhin, wrote a paper, "Presenting DRM Results: Helping Executives Make Sense of DRM." Designing graphs for DRM presentations is the focus of his paper. The paper describes how graphs such as those in this Working Party's template may be built and the various purposes they serve.

3.3 Guidelines for the Assembly and Presentation of DRM Concepts and Results

The PowerPoint slides provide some building blocks that can be used to assemble a DRM presentation. The outline is meant to provide a checklist that the presenter can refer to while assembling the presentation.

3.4 Sample DRM Presentations

This Working Party created sample presentations to illustrate the use of the PowerPoint template and to make our general observations on effective DRM presentations more concrete. The presentations are based on the results of DRM analyses that were also created by the Working Party, but they should only be viewed as a means to demonstrate use of the slides from the template and the type of comments that could be offered to orient the audience when viewing the results. The slides are available with speaker notes in PDF format. They may also be downloaded as PowerPoint files.

Three sample presentations were created:

- A reinsurance study generated with proprietary software.
- An investment study generated with the public access DRM model.[2]
- A mix of business study generated with the public access DRM model.

The speaker notes were included to describe why a given slide was included and the intended benefit to the audience. The sample presentations complement both the general, conceptual findings on what makes an effective DRM presentation and the PowerPoint slides in the template.

[2] The public access DRM model can be freely downloaded at www.pinnacleactuaries.com/pages/products/dynamo.asp

3.5 Caveats

The Working Party created these materials with the express intent that they be freely downloaded and used. By downloading these materials, the user recognizes that they are intended to be guidelines to assist the user and that they can be readily modified or otherwise changed. Furthermore, the user accepts all responsibility for the final slides used in their presentation and recognizes that the CAS is not responsible for any user content.

3.6 Future Additions to Power Point Template

The Working Party anticipates that as the template is used, actuaries will have suggestions for additional graphs or slides to be added to the PowerPoint template. Anyone wishing to make a contribution to the PowerPoint template should forward that suggestion to the chairperson of the Dynamic Risk Modeling Committee (DRMC) for review. A submission to change the template should include an explanation of the purpose of the slide and should follow the convention of using Excel objects with PowerPoint to develop the slides. If the DRMC decides the slide should be added to the template, the committee will modify the PowerPoint template and ask the Casualty Actuarial Society staff to post the revised template on the Web Site along with an acknowledgment to the contributor.

4. CONCLUSIONS

This report is intended to provide an actuary with the tools to assemble a presentation that will make a DRM study useful to management. In order to meet that goal, actuaries should keep the following ideas in mind while preparing their presentations.

The focus of a DRM presentation to management should be on the financial measures with which management members are familiar and which they accept as criteria for evaluating success in their company.

The presenter should avoid including detailed, technical information on the slides. In general, however, the presenter should be able to answer detailed, probing questions related to the functioning of the model or to the modeling assumptions.

To use a common analogy, our assumption is that your audience really only wants to know what time it is, not the details of how the watch was built. The audience needs some information about your results, though. Continuing with the time analogy, they need to know if you are giving them the time on Eastern Daylight Savings time or Pacific Coast standard time. They would like some assurance that you have recently checked your watch against some other reliable source. In the context of a DRM presentation, the audience needs to be sure your answer really matches the question they have on their minds. They want some assurance that a well-defined process was used to produce the results you are presenting, and that it captures the behavior of key items in a manner that can be reviewed for reasonability.

Supplementary Material

Index of hyperlinks to related Working Party documents
PowerPoint Template
Design of Slides in PowerPoint Template
Sample Reinsurance Study
Sample Investment Study
Sample Mix of Business Study
Guidelines for the Assembly and Presentation of DRM Concepts and Results

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[7] Stricker, Markus. Using Dynamic Financial Analysis to Structure Reinsurance. 2001 CAS Special Interest Seminar on Dynamic Financial Analysis.
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Abbreviations and notations

DFA – Dynamic Financial Analysis	WP – Working Party
DRM – Dynamic Risk Modeling	

Biographies of Working Party Members

Nathan J. Babcock is an Assistant Vice President within the Insurance Advisory group of Conning Asset Management, where he is responsible for developing analytical software for Conning's asset-liability and integrated risk management advisory services to insurance companies. Prior to joining Conning, Mr. Babcock was a Senior ALM Analyst within Swiss Re Investors' asset-liability management unit. He has been involved in the Property/Casualty insurance field since 1990. He is a graduate of the University of Maryland with a BS in Mathematics, and is an Associate of the CAS. Mr. Babcock participates on the CAS Dynamic Risk Modeling Committee, and is a co-chairperson of the CAS Working Party on Executive Level Decision Making Using DRM.

Raju Bohra currently serves as a Vice President and Client Reinsurance Modeling Analyst within the Client Analysis & Advisory team of American Re-Insurance and provides dynamic financial analysis (DFA), reinsurance modeling, and financial planning advisory services to AmRe's direct clients as well as business prospects with related issues. Mr. Bohra functions as AmRe's central expert on the development, implementation, and use of DFA and reinsurance models. Mr. Bohra received a BA in Economics from the Johns Hopkins University in Baltimore, MD. Also, he has attained his FCAS designation from the Casualty Actuarial Society. He has published papers concerning the practical use of DFA modeling and communicating DFA results to non-technical audiences. He also holds an ARe designation from the AICPCU.

Patrick J. Crowe is currently Vice President, Market Research and Actuary for Kentucky Farm Bureau Insurance Companies. Patrick is a Fellow of the Casualty Actuarial Society, a Member of the American Academy of Actuaries, and an Associate of Risk Management. During his career he has been a member of the CAS examination, continuing education, Call Paper Review and Dynamic Risk Modeling committees. He has served as Chairperson of the 1995 DFA seminar and the American Academy of Actuaries Automobile Insurance Subcommittee. He has also been a speaker at CAS conventions, ratemaking and loss reserve seminars. Patrick graduated from Northern Illinois University with a B.S. degree in Mathematics and Physics.

Michael R. Larsen works in the Personal Lines Actuarial Department at The Hartford where he functions as an internal consultant adapting modeling techniques like those in the 2004 Call Paper program – Adapting Generalized Linear Models to Personal Lines ratemaking problems. Mike is a Member of the American Academy of Actuaries and became a Fellow of the Casualty Actuarial Society in 1982. He has served on the Examination Committees, the Dynamic Risk Modeling Committee and has spoken at Loss Reserve Seminars. He is is a co-chairperson of the CAS Working Party on Executive Level Decision Making Using DRM. Mike has a Masters in Actuarial Science from The Graduate

School of Business at The University of Michigan.

Aleksey Popelyukhin is a Senior Vice-President of Technology with the Sam Sebe LLC and a Vice-President of Information Systems with the 2 Wings Risk Services in Stamford, Connecticut. He holds a Ph.D. in Mathematics and Mathematical Physics from Moscow University (1989). Aleksey is presently developing an integrated pricing/reserving/DFA computer system for reinsurance and also an action/adventure computer game tentatively called "Actuarial Judgment." Dr. Popelyukhin is an active member of several scientific societies and an author of almost 20 scientific publications. His article "The Big Picture: Actuarial Process from the Data Management point of view" (1996) won the prize for the Data Management Discussion Call Paper Program in 1997.

Nathan Schwartz is a Senior Vice President of Benfield, Inc., and is currently the head of the financial modeling department. His primary function is to illustrate and optimize the benefits of traditional and non-traditional reinsurance structures. He does this using dynamic financial analysis and Benfield's proprietary software product ReMetrica(tm). In addition, Nathan provides client consultation on non-reinsurance strategic analysis and is involved with modeling capability enhancements. Before joining the company in 1999, he spent three years with The St. Paul Cos., in the medical malpractice division and reserving divisions. Nathan received his bachelor's degree in mathematics and computer science from Carleton College and a master's degree in mathematics from Northwestern University. Nathan obtained his Fellowship in the Casualty Actuarial Society in 1999 and is a Member of the American Academy of Actuaries.

Scott Sobel works at the NCCI in Workers Compensation ratemaking and overall industry analysis. Scott obtained his Fellowship in the Casualty Actuarial Society in 2003, is a Member of the American Academy of Actuaries, and has about thirteen years of actuarial experience. He holds a BS in Statistics from the University of Florida.

Robert J. Walling III is a Principal and Consultant with Pinnacle Actuarial Resources, Inc., in the Bloomington, Illinois, office. He holds a Bachelor of Science degree in secondary mathematics education from Miami University. He has worked in the insurance industry since 1989. Mr. Walling is a Fellow of the Casualty Actuarial Society and a member of the American Academy of Actuaries. He has served the CAS as Chairman of the Ratemaking Seminar Committee, Chairman of the Risk and Capital Management Seminar Committee, Chairman of the New Fellows Committee, and faculty member of the Limited Attendance Seminar on Dynamic Financial Analysis (DFA). Mr. Walling is a frequent speaker at industry meetings on topics related to commercial lines pricing, DFA, and generalized linear modeling (GLM). Prior to joining Pinnacle, Mr. Walling was employed for five years by Anthem Casualty Insurance Group where he was responsible for the pricing and product monitoring functions of the Commercial Lines and Managed Care Workers Compensation Divisions. He also has work experience at Providence Washington Insurance Company and Great American Insurance Group. His experience includes, personal and commercial lines ratemaking and product development, funding and reserving studies for self-insureds, personal and commercial lines reserving, rate filings and regulatory compliance, dynamic financial analysis of insurance companies, and legislative review and costing. His published articles include "Using the Public Access DFA Model: A Case Study,"CAS Forum, Summer, 1998, "A Dynamic Approach to Modeling Free Tail Coverage," CAS Forum, Fall, 1999, "Customizing the Public Access Model Using Publicly Available Data," CAS Forum, Summer, 1999, "Are You Ready to Unlock the Power Hidden in Your BOP Application," Pinnacle Actuarial Resources Monograph Program, July 2003, and "The Case of the Medical Malpractice Crisis: A Classic Who Dunnit," CAS Forum, Summer, 2004.

Sponsorship

The Working Party was sponsored by the CAS Dynamic Risk Modeling Committee (DRMC) who oversaw the project and peer reviewed the final products. The Working Party would like to thank the members of DRMC for their ongoing support of the project:

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Peter Burchett	Glenn Meyers
Thomas Conway	Timothy Pratt
Patrick J. Crowe	James E. Rech
Karl Goring	Chester Szezepanski
Richard W. Gorvett	Run Yan