



SOCIETY OF ACTUARIES

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than the number of combinations that they are capable of forming, in a theater from which all the people we know and might have expected to find are absent, there turns up one whom we never imagined that we should see again and who appears so opportunely that the coincidence seems to us providential, although, no doubt, some other coincidence would have occurred in its stead had we not been in that place but in some other, where other desires would have been born and another old acquaintance forthcoming to help us satisfy them. (*The Guermantes Way, Cities of the Plain*, Volume 2 of translation of Marcel Proust's *Remembrance of Things Past* [New York: Vintage Books, 1982], p. 178.)

Investment Research

Investment research involves exactly the same statistics and the same issues of perspective. The typical investment data mining example involves *t*-statistics gathered from backtesting strategies. The

narrow perspective says, "After 19 false starts, this 20th investment strategy finally works. It has a *t*-statistic of 2."

But the broad perspective on this situation is quite different. In fact, given 20 information-less strategies, the probability of finding at least one with a *t*-statistic of 2 is 64%. The narrow perspective substantially inflates our confidence in the results. When viewed from the proper perspective, confidence in the results lowers accordingly.

Four Guidelines for Backtesting Integrity

Given that data mining is easy, how can we safeguard against it? Here are four guidelines for data mining integrity:

- Intuition
- Restraint
- Sensibility
- Out-of-sample testing.

The *intuition* guideline demands that researchers investigate only those strategies with some *ex ante* expectation of success. Investment research should never involve free-ranging searches for patterns without regard for intuition.

The *restraint* guideline attempts to minimize the number of strategies investigated—that is, to keep the broad and narrow focus similar. In the best case, researchers decide *ex ante* exactly which strategies and variants they will investigate, run their tests, and look at the answers. They do not go back and continually refine their investigations.

The *sensibility* guideline deletes results that seem improbably successful. Observed, *t*-statistics that are too large may signal database errors or an improper methodology rather than a new strategy.

The fourth guideline, *out-of-sample testing*, is the statistician's answer to the curse of data mining. Coincidences observed over one dataset are quite unlikely to reoccur in another independent dataset.

Conclusions

Many backtesting results are not foolproof demonstrations of strategy value but merely coincidence. Four backtesting guidelines can help avoid data mining.

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Integrated Approaches to Risk Management in the Financial Services Industry—A Seminar

December 8–9, 1997
Atlanta, Georgia

Anna Rappaport

This program, held at Georgia State University, was very significant in helping us to advance the work of risk measurement. All present gained by having dialogue with a diverse group of professionals, both in and outside the actuarial profession. We reviewed value at risk as well as other approaches for risk measurement.

The program planning arose out of our discussion of "gap analysis." In the 1996–97 Strategic Planning Committee, we focused on what needed to be done to make the mission and vision of the

actuarial profession become a reality. The discussion of that issue, applied to the area of finance and investment, led to a discussion of value at risk. Planning Committee members Cindy Forbes and Irwin Vanderhoof then determined how to work on closing the gap, leading to a call for papers and then the seminar.

This program was truly a team effort sponsored by the Finance Practice Area and the Investment Section with leadership from Cindy Forbes, who heads our Finance and Investment Practice Area, and Irwin Vanderhoof. Other members of the Project Oversight Group

were John Aquino, Harry Panjer, Bill Panning, and Jim Tolliver. Sheri Abel, Jackie Bitowt and Zain Mohey-Deen provided staff support.

As the financial services industry changes, the work of actuaries changes. Key changes include new approaches to the handling and management of risk on both the asset and liability sides of the balance sheet. The traditional disciplines of actuaries and other financial

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Integrated Approaches

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managers are coming together to build new ideas and develop new tools so all can do a better job.

The program was significant in that:

- There is much new development in this area. A number of people who were at the conference are involved in research on different aspects of the topic. Papers, in the aggregate, are a nice addition to our knowledge base. This was a chance to exchange ideas.
- Value at risk measures, as applied in banks, are essentially one-day or 10-day horizon measures; they are not long term. We did not get into any of the issues of which horizon is appropriate or whether it matters. Perhaps this is an area we need to investigate further.
- Value at risk focuses on the largest amount that can be lost, in all but a very low probability, over the time period in a portfolio context. One use is to help set minimum capital requirements or to maintain risk exposures within existing capital resources.
- The idea of value at risk can be applied well to insurance companies, but on a much longer term basis. This is another way to look at risk theory. Many of the papers investigated issues involved in applying value at risk to life and casualty insurance and some companies are attempting to implement it.
- The ideas provide some different ways to look at portfolios and to integrate the asset and liability sides of insurance. The ideas also provide a way to look at insurance and other financial products in a unified way.

- There are several different methodologies for doing calculations; none are perfect. Ongoing work focuses on practical methodologies, the theory supporting the calculations, and also the difficulties inherent in developing models, collecting data, and implementing them. The papers spanned all these issues.
- A diverse group of people, including actuaries and others working in risk measurement and management, participated. There was a healthy mix of academics and representatives of insurance companies, investment houses, and other financial institutions. The conference attracted a few participants from Europe and Australia.
- The ideas and contacts will be very helpful to those who are continuing to do work in this area. This should also expand our pool of topics and speakers for SOA meetings.
- The exchange of information enhanced the visibility of actuaries within the financial community.

Overall, the papers were very interesting. The papers and tapes will be available for purchase through the SOA. Selected papers in edited form will appear in a special issue of the *North American Actuarial Journal*. Below is a list of papers that were presented.

- “An Overview of Value-at-Risk,” by Peter Zangari and William Mason, J.P. Morgan Securities, Inc.
- “The Strategic Uses of Value at Risk” by William H. Panning, Willis Corroon
- “Applying VAR Analytics to the Investment Cycle of an Insurer,” by Thomas S.Y. Ho, Ph.D., Global Advanced Technology

“A VAR Model of the Operational Risk of an Investment Cycle,” by Thomas S.Y. Ho, Ph.D., Global Advanced Technology

“Cash-Flow Valuation and Value at Risk,” by Allan Brender, Ph.D., William M. Mercer Ltd.

“Enterprise Risk and Return Management for Financial Institutions,” by Mark Griffin and Rick Boomgaart, Goldman Sachs & Co.

“A Bridge Too VAR,” by Colin McKee, Bank for International Settlements

“New SEC Market Risk Disclosure Rules,” by Thomas J. Linsmeier, University of Illinois

“Coherent Capital Requirements,” by Philippe Artzner, Universite Louis Pasteur

“Extreme Value Theory as a Risk Management Tool,” by Paul Embrechts, Sidney Resnick, and Gennady Samorodnitsky, ETHZ

“Evaluating the Risks of Modeling Assumptions Used in Risk Measurement,” by Teri L. Geske, Capital Management Sciences

“A Value at Risk Calculation of Required Reserves for Credit Risk in Corporate Lending Portfolios,” by Ronan O’Connor, University College Dublin, and James Golden and Robert Reck, Irish National Treasury Management Agency

“Raising Value at Risk,” by Julia Lynn Wirch, University of Waterloo

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