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Deciding What to Research: How to Spot and Avoid Bias

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Our profession provides advice for the most visible and important public programs and insurance products, including health insurance, life insurance, and pensions. With significant policy changes occurring in these fields, our advice has the potential to have an even more meaningful impact on the long-term sustainability of these programs. This environment has given our profession the unique opportunity to work on a wide variety of research topics that have a profound impact on people's lives—whether the research involves the changes brought about by the Affordable Care Act or policies regarding the funding of pension liabilities.

Beyond our familiarity with the technical features of insurance products and regulation, we have an opportunity to contribute to improving policies because of our reputation for providing impartial advice based on facts and reliable data. As we consid-

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er our broader role in informing public policy, I also think it's important to carefully choose our research focus—particularly with the wide range of opportunities available to our profession.

In picking our spots, we need to be very careful in performing research in topical areas that are the most likely to result in biased research, including the exclusion of inconvenient data, conclusions drawn from only a subset of results, and extrapolation to a desired result. Even if our own research is conducted without bias, the results have the greatest potential to be dismissed along with much of the other research in a topical area, as simply confirming an already held political position.

This article will focus on characteristics that are most likely to lead to a biased research study—or a perception of such bias—and offer two case studies where an impartial analysis with meaningful results would be difficult if not impossible to accomplish.

HOW TO SPOT A RESEARCH TOPIC WITH THE GREATEST POTENTIAL FOR BIAS

As we consider research areas that could produce a biased analysis, several characteristics should raise concern about our involvement. Although any individual characteristic may not inherently lead to a biased research study, in many cases, a combination of these factors is much more likely to become the foundation for a biased study.

Disparate data sources with an inconsistent data collection process: Because accurate data will ultimately provide the foundation of any objective analysis, we should be careful to insist on meaningful and accurate data before going to the next step of analyzing this information.

Limited data: In addition to accurate data, a sufficient amount of information needs to be available to draw robust conclusions. With insufficient information, an analysis is little more than a guess with little actual value. In addition, a lack of information is much more likely to lead a researcher to substitute preconceived opinions to fill in the gaps of missing data.

Attempts to explain the expected outcome of a complex system over an extended period of time: To the extent a system has multiple causal variables that can affect the broader system and other causal variables, we should be very careful about assessing future events in these research areas. In these cases, a detailed analytic review will provide little additional insight into explaining the system and could provide unwarranted confidence in predicting the underlying system—particularly if the estimates are presented as a single-point estimate rather than a range of potential outcomes.

A politically charged question where a definitive answer to the research will not ever be known with any degree of accuracy: These research questions are best suited for those who have an interest in the outcome of the research question and not for unbiased truth-seekers. In addition, the lack of a definitive policy conclusion makes research in this area much less meaningful.

The challenge, of course, is that we often encounter gray areas where an analysis may have aspects that are far less than ideal, including imperfect data or the necessity to make projections of a very complex underlying model. In highlighting these limitations, I'm not suggesting that we never conduct an analysis that has some of these limitations, but rather that these limitations be weighed holistically as we consider whether a project warrants an actuarial review.



The above criteria are also very much consistent with the Society of Actuaries Public Policy Research and Analysis Statement and the goals of the Project Oversight Groups that help guide the research by the Society of Actuaries. The attached sidebar includes an excerpt from this statement that highlight the goals of SOA research.

HEALTH SYSTEM COMPARISONS ACROSS COUNTRIES

To better highlight the problem, the following discussion highlights an area of research that best exemplifies this problem with biased analysis—comparisons of country-specific health systems based on health outcomes. This research has long interested economists and other researchers who seek to explain differences in health outcomes among different countries.

While the data and methods vary, the research usually involves comparing an outcome (infant mortality, for example) over several countries with several variables that could explain the outcome without assuming a specific treatment that could be driving the result. In much of this research, the results will highlight the United States as an outlier with greater expenditure (as a percentage of GDP) and worse results (higher infant mortality, for example) and then suggest various policy solutions to help improve its position.

This research is instructive because it highlights all four elements of a research study that should be avoided:

- The data often comes from disparate sources with an inconsistent data collection process: As highlighted in many research studies, the data collection methods, the definition of specific outcomes, and the measurement of such outcomes can vary widely among different countries. Instead of using data reported by health care professionals with strict definitions in a consistent manner, some countries use surveys and family-reported data with definitions that are not uniformly applied across all countries. The data can be further affected by the extent of the medical treatment, with those countries with aggressive medical practices for costly conditions reporting results differently than other countries.
- Limited data: The research is often focused on a limited number of actual data points to perform the actual analysis. In many cases, the research focus is largely dependent on outcomes from the United States using fewer than 50 data points.
- Attempts to explain the expected outcome of a complex system over an extended period of time: The causal factors contributing to a health outcome could include diet, lifestyle choices, genetic factors, income, education, culture, and the

SOCIETY OF ACTUARIES PUBLIC POLICY RESEARCH AND ANALYSIS STATEMENT (APPENDIX 1)

The following excerpt highlights the Society of Actuaries stated goal regarding research:

The SOA has a history of working with public policymakers and regulators in developing historical experience studies and projection techniques as well as individual reports on health care, retirement and other topics. The SOA's research is intended to aid the work of policymakers and regulators and follow certain core principles:

Objectivity: The SOA's research informs and provides analysis that can be relied upon by other individuals or organizations involved in public policy discussions. The SOA avoids taking advocacy positions or lobbying specific policy proposals. (This objectivity is emphasized in the selection of the Project Oversight Group participants.)

Quality: The SOA aspires to the highest ethical and quality standards in all of its research and analysis. Our research is overseen by experienced actuaries and non-actuaries from a range of industry sectors and organizations. A rigorous peer review process ensures the quality and integrity of our work.

Relevance: The SOA provides timely research on public policy issues. Our research advances actuarial knowledge while providing critical insights on key policy issues, and thereby proving value to stakeholders and decision makers.

Quantification: The SOA leverages the diverse skill sets of actuaries to provide research and findings that are driven by the best available data and methods. Actuaries use detailed modeling to analyze financial risk and provide distinct insight and quantification. Further, actuarial standards require transparency and the disclosure of assumptions and analytic approach underlying the work.

country's health system and financing. Although some of these factors can be controlled for in the research, it remains extremely difficult to reliably control for these factors over several countries and account for all the factors that could contribute to a particular outcome.

- A politically charged question where a definitive answer to the research will not ever be known with any degree of accuracy: Because an experiment cannot be developed to directly compare one health care system with a population from an-

other country, a true definitive answer to the research is simply not possible. Without a clear, definitive conclusion, this research has limited use and it is much more likely to lead the researcher to develop a conclusion consistent with his or her political beliefs or a preconceived expectation.

And finally, in this macro-level research, we are less likely to have the opportunity to use our knowledge of the regulatory systems or health system specific information to make an evaluation of the differences.

While this research focus—comparing health outcomes across various national systems—may not be appropriate for our profession, I am confident that many in the actuarial profession would find the topic interesting. The differences in how care is delivered and financed and how it impacts outcomes can make for an interesting philosophical discussion. However, this philosophical interest should not lead our profession to engage in research that has the potential to impact our reputation and has little policy importance.

CLIMATE CHANGE

Similar to the cross-country comparative research, the climate change debate has many attributes that have the potential to ultimately lead to a biased analysis or less-than-meaningful results.

- The data used are collected from disparate sources and are subject to significant error. The historical temperature record has been obtained from a wide variety of sources with differing data quality, including Victorian-era sailors dragging thermometers behind their ships, ocean buoys, readings on land with readings between different sites taken at different intervals in different times of the day, and satellites measuring surface and lower troposphere temperatures.
- The data is limited, particularly in unpopulated and pre-development sections of the globe. As a result, much of the record prior to widespread distribution of the thermometer is based on proxy determinations, such as tree rings. Even in the more recent historical era, the raw data is then extensively modified in an attempt to homogenize it, such as filling in gaps for missed readings, adjusting results to estimate the effect of different recording processes, and estimating the effect of urban heat islands.
- The underlying system explaining global warming is very complex and dependent on many causal variables that could impact global temperature, and excludes many causal variables that likely affect global temperatures but are too complex to model, such as the effect of clouds. This complexity ultimately makes any modeling effort subject to significant error and leads to widely divergent expected results among researchers.

- The extent of global warming will not likely have a definitive conclusion for a long period of time, and the expected impact differs widely among researchers. Similarly, the attribution of any effects of the changing climate between natural versus manmade sources will not be known—nor are these effects reliably predictable—making it difficult to provide objective advice to policymakers.

And importantly, much of the research is already being performed by scientists and those with the expertise in climate change who are much better positioned to answer this question than actuaries.

In saying this, I'm not advocating a position, suggesting that this topic is not important, or that actuaries should not make some consideration of the potential for climate change or variability in our future estimates using studies from other disciplines. Instead, I believe the characteristics of the climate change question naturally lend themselves to areas of expertise outside the actuarial profession, and any conclusions and recommendations made by actuaries will not benefit our profession—particularly as we attempt to expand our influence in other areas of research that are more closely linked to our expertise.


CONCLUSION

Our profession has built a reputation as unbiased truth-seekers focused on questions that are important to the financial security of individuals, companies and governments. In building this reputation, we have focused on the aspects of our experience that are most important in developing a well-reasoned policy decision, including our technical skills, knowledge of detailed regulatory rules, and our access to important real-time information. As we look to expand our influence in a wide range of research areas with growing importance, I also believe we need to proceed carefully in areas that have historically produced biased analysis and are unlikely to produce meaningful results.

Instead of benefiting our profession, these research areas have the potential to lead us away from the work that built our reputation and toward advocacy positions that have done little to expand the influence of other professions. ■



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