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Focus on Terminology: Baseline Scenario - Are we talking past each other?

By Max Rudolph, Dr. Jesse Bell and Steve Bowen

For those actuaries who desire to become more active in climate awareness activities, there are times when language becomes an issue. Terms that have been used for decades in each specialty are used in ways that mean something different to the other group. This column will likely be a semi-recurring feature of this newsletter, so please let us know (max.rudolph@rudolph-financial.com) if you have a term that you think actuaries, climatologists or people working in sustainability use in different ways. The format will be to introduce and define commonly used terminology used in multiple fields that need to work together. The hope is that having an awareness of vocabulary differences between these different fields will improve communications between them.

IPCC definition - Baseline scenario

In much of the literature the term is also synonymous with the term business-as-usual (BAU) *scenario*, although the term BAU has fallen out of favor because the idea of business as usual in century-long socio-economic *projections* is hard to fathom. In the context of *transformation pathways*, the term baseline scenarios refers to scenarios that are based on the assumption that no mitigation *policies* or measures will be implemented beyond those that are already in force and/or are legislated or planned to be adopted. Baseline scenarios are not intended to be predictions of the future, but rather counterfactual constructions that can serve to highlight the level of emissions that would occur without further policy effort. Typically, baseline scenarios are then compared to *mitigation scenarios* that are constructed to meet different goals for *greenhouse gas (GHG)* emissions, atmospheric concentrations or temperature change. The term baseline scenario is often used interchangeably with reference scenario and no policy scenario. See also *Emission scenario* and *Mitigation scenario*.¹

Actuarial definition – Baseline scenario

Historical assumptions are continued so, for example, a baseline interest rate scenario would hold current rates into the future. The model reacts to changes like asset rollover, but liability risks generally utilize recent data for mortality, morbidity and property claim assumptions. This can be a regulatory requirement. Stress tests may be used to unwind the yield curve or anticipate feedback loops around assumptions like drought and wildfire risk, or diet and mortality.

¹ IPCC, 2018: Annex I: Glossary [Matthews, J.B.R. (ed.)]. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press <https://www.ipcc.ch/sr15/chapter/glossary/>

From the climate scientists

For the climate scientist, a business-as-usual scenario since IPCC5 has been interpreted by the public as the RCP8.5 scenario even though that scenario is expected to overstate the future impact of climate change. It combines outdated assumptions (adoption of sustainable energy) and unexpected assumptions (that population would continue to grow and coal plants built even as temperatures got warmer) and ignores technological breakthroughs that are likely to occur over the next 80 years. The IPCC6 cycle is addressing this with additional concentrated pathway scenarios that may better represent the implications of our current path.

From the actuary

A baseline scenario, for both deterministic and stochastic purposes, developed by an actuary is often a median scenario with symmetrical assumptions set in both positive and negative directions. Deterministic claims scenarios may have two paired scenarios, one that increases the assumption by 1% and one that decreases it by the same amount. Other times stress tests are built that do not have a partner scenario. Stochastic scenarios often extend in both directions, with occasional surprises that help the modeler learn about the unique aspects of their risk exposures. The business-as-usual scenario used for climate scenarios is one of the worst scenarios, in contrast. The other scenarios often include positive actions taken to mitigate or adapt to improve conditions.

Summary

Actuaries have much to learn from climate scientists and those working in sustainability, but it's important that we not talk past each other. In this case, a baseline scenario is used for different purposes by the two groups. It is not confusing so long as efforts are made to define terms.

Max Rudolph is a principal at Rudolph Financial Consulting, LLC.

Dr. Jesse Bell is the Claire E. Hubbard Professor of Health and Environment at the University of Nebraska Medical Center.

Steve Bowen is a Meteorologist and the Head of Catastrophe Insight at Aon.

Featured Research Project – Research to determine extra cost of hot days on emergency room visits

By Max J. Rudolph, FSA CFA CERA MAAA

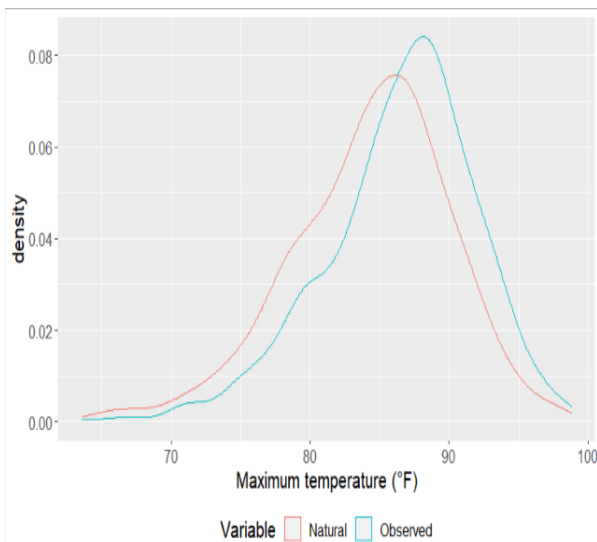
Chair, Climate and Environmental Sustainability Research Committee (CESRC)

The Society of Actuaries recently published a report *Determining the Role of Anthropogenic Climate Change on Human Health Outcomes: A Case Study on Heat Related Illness Attribution*. This looks at the number of emergency room visits on days of extreme heat where the daily maximum temperature was above 95° F. The distribution of such days over a recent period was then compared to what would have been expected under natural cycles that did not involve extracting fossil fuels beginning in 1750 (anthropogenic climate change).

This allows an extreme event attribution analysis to occur where a dollar cost is placed on a specific risk in a specific area. As actuaries enter the climate discussion, often as interpreters between scientists, financial experts and politicians, taking this type of research and determining its implications under financial constraints is possible. While the outcome as described and data limitations discovered are important points, the research highlights a template and the process followed that leads to knowledge gained and better decisions being made.

The process includes determining how to define extreme heat. Some earlier work looked at multiple days of high temperatures, and the researchers also looked at a total of 28 different heatwave definitions. Understanding this part of the process makes the reader that much more aware of ways to think about climate research for future projects.

In the accompanying chart the distribution of maximum temperature is shown for the region of interest over a recent period and the modeled natural cycle. The probability of temperatures higher than the threshold are compared and the difference is used to drive additional emergency room visits. We have data on those expenses, so a level of excess cost can be calculated. This is a process that can be utilized for many risks and locations for future analysis and trending.



The research team, led by Dr. Jesse Bell at the University of Nebraska Medical Center, was tasked with this research project. Rebecca Owen, FSA FCA MAAA was an especially helpful member of the project oversight group due to her experience with both health and research topics. For those interested in reading the entire report, it can be found at the SOA landing page for climate research, <https://www.soa.org/resources/research-reports/2021/determining-role-climate-change/>.

Environmental Risk Paper Series

In the ongoing Environmental risk series two more interesting papers were added:

New Fire Hazard Risk from Policy Responses to Climate Change

The unprecedented losses associated with recent wildfires are yet another call to insurers to understand how climate change is impacting the landscape of fire hazards. In this report, to further advance understanding of relationship between fire hazard and climate change, for both academic and practitioner communities, we review emerging evidence showing that policies surrounding tree planting are increasingly important for fire hazard insurance. Furthermore, we discuss relevant risk factors and potential mechanisms when accounting for these policies.

<https://www.soa.org/globalassets/resources/research-report/2021/fire-hazard-risk.pdf>

Climate system - A primer for actuaries

This paper provides a high-level review of climate models for the actuary and shows they are not impenetrable, intriguing the reader enough to seek out additional resources.

<https://www.soa.org/globalassets/resources/research-report/2021/climate-system-primer-actuaries.pdf>

In the News

By Priya Rohatgi

Here are some recent events that are at the intersection of Climate change, the evolving environmental risks and policy initiatives and regulatory framework to mitigate its impact. As you click through the articles below, we invite you to consider how these events may impact actuarial applications, and to note any associations to economic and insured losses.

1) Ambitious Climate agenda of Biden Administration

<https://www.nationalgeographic.com/biden-wants-to-cut-us-climate-pollution-in-half-heres-how>

President Biden has set the goal to reduce emissions by at least 50% compared with 2005 levels. The US is currently the second biggest carbon emitter annually after China with emissions of 6.6 billion metric tons in 2019. Some of the key initiatives include - \$2 trillion dollar infrastructure investment, creating jobs, establishing federal clean electricity standards, extending federal clean energy tax credits used for commercial and residential solar projects and setting up a new 'Grid Deployment Authority', incentives to electric vehicles manufacturers and investments in basic research to help the agricultural sector to cut its emissions.

[Biden wants to cut U.S. climate pollution in half—here's how](https://www.nationalgeographic.com/biden-wants-to-cut-us-climate-pollution-in-half-heres-how)

After a four-year hiatus, the United States is officially taking climate change seriously again.

www.nationalgeographic.com

2) **Carbon pricing – to be or not to be?**

<https://www.forbes.com/president-bidens-monumental-climate-policy-mistake-about-carbon-pricing-will-be-very-costly>

Despite President Biden's gargantuan spending proposal for addressing climate change, his plan sidesteps putting in place a policy that would price carbon at its social cost.

[President Biden's Policy Mistake About Carbon Pricing Will Be Monumental](https://www.forbes.com/president-bidens-monumental-climate-policy-mistake-about-carbon-pricing-will-be-very-costly)

The odds that his overall program will succeed, without carbon being priced at something near its social cost, are low.

www.forbes.com

3) **It's the other greenhouse gas – carbon dioxide is not the only cause of global warming**

<https://www.economist.com/those-who-worry-about-co2-should-worry-about-methane-too>

The governments around the world have caught on to the idea of reducing Methane emissions. The Intergovernmental Panel on Climate Change envisages a 35% drop in methane emissions below 2010 levels by 2050.

[Those who worry about CO2 should worry about methane, too](https://www.economist.com/those-who-worry-about-co2-should-worry-about-methane-too)

Technological change that shifts economies away from using fossil fuels as their principal energy sources may be able to achieve this in the long term.

www.economist.com

4) **Secondary perils in the spotlight, but don't forget about primary-peril risks.**

<https://www.swissre.com/institute/research/sigma-research/sigma-2021-01.html>

Global insured losses from natural catastrophes were USD 81 billion in 2020; man-made disasters resulted in USD 8 billion insured losses.

[sigma 1/2021 - Natural catastrophes in 2020](https://www.swissre.com/institute/research/sigma-research/sigma-2021-01.html)

From the industry perspective, insured losses from all of last year's disaster events around the world were USD 89 billion, the fifth highest on sigma records.

www.swissre.com

5) Flood risk - rising to the challenge

<https://www.mynewmarkets.com/the-flood-insurance-industry>

Significant advances with respect to technology, analytics - [Risk Rating 2.0](#) and regulations were made in the Flood insurance industry over the last year. The goal is to provide more visibility into industry trends and to equip insurers and their stakeholders with better flood risk intelligence.

[How 2020 Challenged, Strengthened the Flood Insurance Industry](#)

Last year despite of the unforeseen difficulties, the flood insurance industry made major headway in protecting individuals and properties from a growing flood risk.

www.mynewmarkets.com

6) Leading by examples

A few global names that have been actively taking steps to curb carbon emissions in line with the Paris agreement and targeting their own internal operations, underwriting and their investment portfolios. [Swiss Re](#) updated their 2018 thermal coal policy. [Zurich Insurance Group](#) has already abstained from investing in companies and now plans not to underwrite companies that have more than a 30 percent revenue/electricity mix from thermal coal, oil shales and oil sands.

[Swiss Re Announces Net-Zero Climate Targets in Underwriting, Investments](#)

[Zurich Insurance Deepens Climate Change Strategy](#)

www.insurancejournal.com

7) Parkinson's – do we have a smoking gun?

<https://www.theguardian.com/rates-of-parkinsons-disease-are-exploding>

Rates of Parkinson's disease are exploding. The numbers in the US have increased 35% over the last 10 years. Most cases of Parkinson's disease are considered idiopathic - where the cause is unknown. Researchers increasingly believe that one factor is environmental exposure to trichloroethylene (TCE), a chemical compound used in industrial degreasing, dry cleaning and household products such as shoe polishes and carpet cleaners.

[Rates of Parkinson's disease are exploding. A common chemical may be to blame](#)

Asked about the future of Parkinson's disease in the US, Dr Ray Dorsey says, "We're on the tip of a very, very large iceberg."

www.theguardian.com

8) Unexpected allies of zoonotic viruses

<https://www.theguardian.com/disease-outbreaks-more-likely-in-deforestation-areas>

A recent paper published in the journal *Frontiers in Veterinary Science* shows that the land use change is a significant factor in the emergence of zoonotic viruses such as Covid-19 and vector-borne ailments such as malaria. It further examines the correlation between tree-planting and increased health risks to local human populations if it focuses too narrowly on a small number of species, as is often the case in commercial forests.

[Disease outbreaks more likely in deforestation areas, study finds](#)

“I was surprised by how clear the pattern was,” said one of the authors, Serge Morand, of the French National Centre for Scientific Research. “We must give more consideration to the role of the forest in human health, animal health and environmental health. The message from this study is ‘don’t forget the forest’.”

www.theguardian.com

9) Very Fast Death Factor

<https://gizmodo.com/a-dangerous-toxin-from-pond-scum-can-go-airborne-study>

There were already studies indicating that the [toxic algae blooms really have become intense](#). But now a [recent study](#) has heightened concerns around a potent toxin, anatoxin-a (ATX), also known by its edgier name, “Very Fast Death Factor”, that has the potential to become airborne. ATX is known to have killed birds, dogs, and other animals since its discovery in the 1960s; it’s also suspected of having poisoned people. The study authors wrote “This study is the first to report ATX captured on glass fiber filters adjacent to a waterbody experiencing a [harmful algae bloom],”.

[Toxin from blue-green algae can go airborne](#)

In what’s said to be a first, the study found traces of the toxin in the air near pond water in Massachusetts. Though it’s unclear whether this and similar toxins are harmful to people and animals when airborne, the scientists warn that the discovery is definitely worrying.

www.gizmodo.com

10) Toxic pools – bursting at the seams

<https://www.nytimes.com/climate/florida-ponds-toxic-waste.html>

Thousands of open-air waste pools - the wastewater pits that hold the hazardous byproducts of coal, radioactive materials, pig excrement - near power plants, mines and industrial farms can pose safety risks from poor management and increasingly the change precipitation due to climate change.

[Florida Crisis Highlights a Nationwide Risk from Toxic Ponds](#)

They're just an irresponsible way to store very dangerous waste," said Daniel Estrin, general counsel at the Waterkeeper Alliance, a clean water nonprofit group. "And with climate change, we're going to see more frequent and stronger storms that are going to impact these sites."

www.nytimes.com

11) Return to haunt

<https://wildlife.org/toxic-chemicals-linked-to-sea-lion-cancer>

An aggressive cancer affecting California sea lions has been linked to DDTs and PCBs dumped into the Pacific Ocean decades ago.

[Toxic chemicals linked to sea lion cancer](#)

They're predisposed to cancer by these high levels of legacy compounds that are still in the environment — and we are also exposed to these chemicals," University of California Davis research associate Frances Gulland told the Los Angeles Times. www.wildlife.org

12) Situation in Mead, Nebraska – Who's responsible?

<https://www.theguardian.com/mead-nebraska-ethanol-plant-pollution-danger>

Situation in Mead, Nebraska, where AltEn has been processing seed coated with fungicides and insecticides, is a warning sign, experts say.

[There's a red flag here': how an ethanol plant is dangerously polluting a US village](#)

For the residents of Mead, [Nebraska](#), the first sign of something amiss was the stench, the smell of something rotting. People reported eye and throat irritation and nosebleeds. Then colonies of bees started dying, birds and butterflies appeared disoriented and pet dogs grew ill, staggering about with dilated pupils.

www.theguardian.com

13) It is not what you think – carbon footprint misconception

<https://www.ft.com/content/c5e0cdf2-aaef-4812-9d8e-f47dbcded55c>

An international survey of 21,000 people across almost 30 countries shows that people are familiar with the issues posed by the environmental crisis but have misconceptions about what actions are the most effective at limiting an individual's carbon footprint. Recycling was the most selected, but it turns out that reducing personal waste and eliminating plastic pollution are far more effective in limiting emissions. Many of the questions in the survey highlighted the generational knowledge divide indicating that younger people were more aware of the environmental impact of having fewer children, benefits of a plant-based diet and not owning a car.

[Clothes dryer vs the car: carbon footprint misconceptions](#)

Most people fail to identify the best ways to reduce their carbon footprint.

www.ft.com

Studies/Research Published Outside the SOA

By Priya Rohatgi

In this section we try to direct our readers to some of the work done by fellow actuarial societies and other professional associations/institutions in the US and around the world. Given that the risks related to climate instability and loss of biodiversity are not only global in scale but are long term, uncertain and highly complex. Therefore, we need to collaborate, share knowledge and tap into the research and developments that are happening around the world and across disciplines.

Institute and Faculty of Actuaries

There's a growing recognition that the loss of biodiversity and healthy ecosystems has a significant impact on the economy. Hence there is an urgent need for us to identify and understand these risks and to be able to quantify them.

The Sustainability Practice at the IFOA has various working research parties exploring diverse topics. One of them is the Biodiversity & Natural Capital Working Party which has four subgroups focusing on different biodiversity issues - Zoonotic disease / Covid-19, natural capital, valuation metrics and justice. They all just published papers on April 26th highlighting the urgent need for actuaries to take into account the importance, perils and impacts of global biodiversity risks. [The Importance of Biodiversity Risk for Actuaries](#) ; [Biodiversity & Justice](#); [Link to Zoonotic Diseases](#); [Natural Capital an actuarial perspective](#) and [Introduction to biodiversity valuation tools](#)

The Sustainability practice has also commissioned a series of working parties preparing [Practical Guides](#) to support actuaries working in different areas of practices such as Life Insurance, General insurance and Pensions.

Introduction to climate-related scenarios – International Actuarial Association (IAA)

[Introduction to Climate-Related Scenarios](#) is the second paper in the series published by the Climate Risk Task Force of the IAA. This paper builds up and is recommended to be read in conjunction to the first [The Importance of Climate-Related Risks for Actuaries](#).

It is a great resource for those who are less familiar with climate research as it lists some reliable public sources and provides a separate glossary of terms to help actuaries to get versed with the vocabulary of climate science. In addition to increasing the awareness, the key focus of the paper is to help actuaries and risk managers involved with the development and use of climate related scenarios. The paper provides a snapshot of the IPCC pathways and their associated Representative Concentration Pathway RCP 2.6, RCP 4.5, RCP 6.0 and RCP 8.5. After a quick overview of the climate-related risks and opportunities resulting from mitigation or adaptation efforts, the paper discusses the process of developing the criteria and analysis of scenarios. It reviews the requirements for good scenario analysis, components from which scenarios can be assembled and considers some of the tools available to actuaries.

COVID-19 Lockdowns temporarily raised global temperatures

The paper [Climate Impacts of COVID 19 Induced Emission Changes](#), points out that when emissions of aerosols dropped last spring, more of the Sun's warmth reached the planet, especially in heavily industrialized nations, such as the United States and Russia, that normally pump high amounts of aerosols into the atmosphere. This counterintuitive finding highlights the influence of airborne particles, or aerosols specifically black carbon and sulfate, that block incoming sunlight. It's an interesting read and is recommended by *Cindy Bruyere, National Center for Atmospheric Research and the member our Catastrophe & Climate Steering Committee*.



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Book review - How to Avoid a Climate Disaster by Bill Gates (2021, Alfred A. Knopf)

By Max J. Rudolph, FSA CFA CERA MAAA

Even if climate change doesn't rank as an existential threat to humanity, it will make most people worse off, and it will make the poorest even poorer.

Bill Gates, like most successful entrepreneurs, tends to be divisive for readers and his book on climate change challenges and solutions is no different. He has put his money where his mouth is, investing in clean energy and improved nuclear reactor designs. Not surprisingly, climate deniers don't like it, but even people who would normally stand up and applaud the attention such a book generates have problems with it. These range from ignoring their favorite solutions to those who think the private citizen with the world's largest carbon footprint has no right to talk about sustainability.

Challenges and Solutions

Some of the arguments he makes are obvious – but that doesn't mean I had thought of them before. For example, there are solutions that will show progress against carbon over the next 10 years but do little beyond that. Prioritizing them over solutions that take longer to develop but deliver greater benefits actually does harm.

Because carbon stays in the atmosphere for so long (up to 1,000 years), it is hard to change course quickly from our recent steady buildup. The world will need to achieve net zero carbon to stop the pain while solutions are developed to put back historical carbon extraction. We currently spend a lot of time and effort measuring carbon and convincing people that reducing it matters. While necessary to get everyone on board it is taking valuable resources, including time, that may allow feedback loops to reach a tipping point from which we can't recover. The current RCP8.5 scenario, thought by many scientists to be a near worst case scenario and not business as usual (as it is often described) would lead to temperatures that in the past allowed crocodiles to live above the Arctic Circle. This would be an especially difficult adjustment for the lowest socioeconomic groups around the world.

Climate models are uncertain and don't produce perfect forecasts. They are extensions of models that forecast weather, which don't have great track records, so this should not be surprising. They are getting better all the time, and each cycle the IPCC coordinates (we expect results from the sixth in 2022) refines the models through faster computer speeds and better representation of the science. Current improvements tend to involve ice and clouds and how they interact with everything else in our complex adaptive system (see my paper in the Environmental Risk Paper series).²

To me the primary issue isn't that the climate is changing. It's the rate of change that is

²<https://www.soa.org/globalassets/assets/files/resources/research-report/2021/climate-system-primer-actuarial.pdf>

Rudolph, Max. 2021. Climate System: A Primer for Actuaries.

happening too fast for plants and animals to adapt. They can migrate toward the poles and higher altitudes, but that opportunity is limited. How we manage the interaction between zero-carbon electricity and creating that power in an environmentally friendly way that is efficient in all seasons and 24/7 will drive results. Building a cohesive national electrical grid and finding efficient alternatives to the cement process (infrastructure uses lots of cement) are key to reducing what Gates calls the Green Premium (additional cost to be net zero carbon).

Gates considers various techniques for adaptation (reduce the risk, prepare/respond to emergencies, recovery) and mitigation (an earlier newsletter covered the varying definitions for these terms between climate scientists and actuaries³), with the book mostly focused on ways to reduce greenhouse gases from the ecosystem. His primary solutions convert everything that runs on fossil fuels today to run on electricity, and for the sources of electricity to transition from fossil fuels to clean energy sources like wind and solar.

Conclusion

I wish Gates had talked about the feedback loops from each greenhouse gas individually and not just at their carbon equivalents. He mentions that each gas stays in the atmosphere for unique lengths of time and specific carbon equivalent potency, but time is a key component in this complex analysis. Population is another component of the ecosystem that he does not discuss. Benjamin Franklin influenced Thomas Malthus with his arguments that population growth needs to be balanced with agricultural growth⁴. Fewer people would reduce the strain on resources, including carbon.

The key point in this book is the need to be proactive, setting goals (and funding them) using a long time horizon (government subsidies and international cooperation are essential). The need today is for engineers to develop solutions that reduce the carbon signature of everyday life. We need to look at carbon capture, carbon taxes and leaving carbon in the ground. Otherwise, regions will become unlivable and biodiversity will be reduced. Resources will drive conflict and force migration patterns. It would be better if countries had been fiscally prudent in the past since it would be easier to throw money at the problem, but tough decisions will need to be made.

Going forward we can't leave policy decisions to any one group. Climate scientists, engineers and politicians all have biases and pet projects. Actuaries can act as interpreters between these groups, much as we do for insurance and pension constituencies. There are not many professions who are used to talking about both sides of the balance sheet, and we should seek out this role as the world transitions to net zero carbon. Bill Gates' book is a welcome addition to this discussion.

³<https://www.soa.org/globalassets/assets/files/resources/research-report/2020/2020-10-cat-climate-newsletter.pdf>

Steve Bowen, Jesse Bell and Max Rudolph. 2020. Focus on Terminology: Mitigation and adaptation – are we talking past each other?

⁴<https://www.soa.org/globalassets/assets/files/static-pages/research/opportunities/environmental-essays.pdf>

Rudolph, Max. 2017. Was Malthus right, but early?

About The Society of Actuaries

With roots dating back to 1889, the [Society of Actuaries](#) (SOA) is the world's largest actuarial professional organizations with more than 31,000 members. Through research and education, the SOA's mission is to advance actuarial knowledge and to enhance the ability of actuaries to provide expert advice and relevant solutions for financial, business and societal challenges. The SOA's vision is for actuaries to be the leading professionals in the measurement and management of risk.

The SOA supports actuaries and advances knowledge through research and education. As part of its work, the SOA seeks to inform public policy development and public understanding through research. The SOA aspires to be a trusted source of objective, data-driven research and analysis with an actuarial perspective for its members, industry, policymakers and the public. This distinct perspective comes from the SOA as an association of actuaries, who have a rigorous formal education and direct experience as practitioners as they perform applied research. The SOA also welcomes the opportunity to partner with other organizations in our work where appropriate.

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 does not take advocacy positions or lobby specific policy proposals.

Quality: The SOA aspires to the highest ethical and quality standards in all of its research and analysis. Our research process is overseen by experienced actuaries and nonactuaries 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 provides 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 the assumptions and analytic approach underlying the work.

Society of Actuaries
475 N. Martingale Road, Suite 600
Schaumburg, Illinois 60173
www.SOA.org