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# Delphi Study 2000—Predictions for 2010 and 2050

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## ABSTRACT

*Futurism section members participated in this Delphi study, which had multiple choice questions on a range of life, health, economic and professional issues. This article provides background on the study and comments on the predictions of the participants for 2010 (and 2050) in light of experience to date.*

## BACKGROUND

In the spring of 1999, members of the Futurism section (renamed to Forecasting & Futurism) were invited to participate in a Delphi study<sup>1</sup> on “varied topics of interest to actuaries.” The study was part of the SOA’s 50<sup>th</sup> anniversary celebration. In the first Round, 115 responses to the 25 multiple choice questions were mailed back to Albert E. Easton, FSA, MAAA. At that time, Al was chair of the Futurism Section Council and conducted the study. Those responses were tabulated and shared with the participants for their consideration of a second response to the same questions: “Round 2” in Delphi parlance. The results were not just shared with the participants; the SOA staff worked with Easton and the council to develop a media kit to let journalists see the survey results quickly. The *Wall Street Journal* put a “Business Bulletin” item about the study on its front page, which was picked up by the Associated Press. Subsequently, dozens of articles in lay and industry press picked up on the story.

## HOW ABOUT THOSE 2010 PREDICTIONS?

First, an explanatory note is needed. Participants chose answers within ranges, and mean responses were computed, generally by using range mid-points. Because range widths varied widely, sometimes the percentage picking the correct range was more informative, and other times the mean was a better indicator. So this article refers to some of both. There were two rounds in this study, but since the second round results (when participants could see aggregate first round responses) varied little from those of the first round, only the final (second round) responses are described.



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Generally (predictably?), the actuaries who participated did best when predicting modest change or the continuation of a trend, and least well when there was substantial change or a change in direction. Here are a few of the highlights.<sup>2</sup>

## HEALTH CARE EXPENSES AND INSURANCE

Most participants’ predictions were directionally correct, if not in the precise range, for each of the four questions. Total health care expenditures as a percentage of GDP were 17.9 percent in 2010 compared to a mean prediction of 16.6 percent, an increase from the 13.6 percent in 1993-1996 that participants had as a reference. The average annual increase in cost of prescription drug benefits was 10.4 percent over 1999-2008 (the latest I could find online) against a mean prediction of 10.5 percent for 1999-2010.

## CAUSE-SPECIFIC DEATH RATES

Predictions were a mixed bag. Only 26 percent of participants correctly predicted that the death rate from heart disease would fall below 200 per 100,000 in 2010. The rate per 100,000 in 1995 had been 271, and it fell to 194 in 2010. On the other hand, 68 percent correctly predicted a drop in the death rate from cancer below 200 per 100,000; it was 201 in 1995 and 186 in 2010.

## EMPLOYMENT AND RESIDENCE OF SOA MEMBERS

In 1997, 39.9 percent of employed SOA members worked for consulting firms. Only 6 percent of participants correctly predicted that that percentage would not be at least 40 percent in 2010, when it was 37.9 percent. In 1997, 8.6 percent of SOA members lived outside the United States and Canada; 66 percent correctly predicted that that percentage would be at least 10 percent by 2010, when it was 12 percent.

## BEST PREDICTIONS

Fourth best: In May 1998 there were 437 electricity producing nuclear reactors in operation worldwide. The actual number on 12/31/2010 was 441. This compares to a mean prediction of 438. But wait, that was arrived at by weighting the percentages of answers in two very wide bands, 100-500 (predicted by 68 percent) and 500-1,000. So I downgraded this to fourth best.

Third best: The percentage of the labor force in 1990 who were women was 45.3 percent. Eighty-five percent predicted the correct range for 2010, 45-50 percent, and the mean prediction of 47.6 percent was close to the actual, 47.2 percent.

Second best: The expectation of life at birth in 1997 was 76.5 years. Eighty-two percent predicted the correct rather tight range of 77-79 years for 2010, when the actual was 78.7. The mean prediction was 79 years.

Best: In 1997, the total life insurance in force in the United States was \$13 trillion. Only 68 percent predicted the correct range (\$15-20 trillion) for 2010. But the “best” moniker goes here because the actual amount was \$18.43 trillion and the mean prediction was identical at \$18.43 trillion!

### WORST PREDICTIONS

Fourth worst: Participants were informed that the greatest ever one-day percentage loss in the DJIA was 22.6 percent on 10/18/87. Only 6 percent of participants predicted that the correct range for the worst one-day percentage loss between 2000 and 2010 would be “less than 10 percent.” The actual greatest one-day loss in that period was only 7.9 percent, on 10/15/08.

Third worst: The average net investment income rate on the general account assets of U.S. life insurance companies in 1996 was 7.75 percent. Only 4 percent of participants predicted the correct range (less than 6 percent) for the actual 2010 value of 5.37 percent.

Second worst: The unemployment rate in the United States in 1997 was 4.9 percent. Only 3 percent of participants predicted the correct range (greater than 7 percent) for the value in 2010, which was 9.6 percent.

Worst: The death rate from AIDS in the United States in 1995 was 13 per 100,000 population. Only 2 percent of participants predicted the correct range (less than 5 per 100,000) for the value in 2010. The actual value was only three per 100,000.

### AND WHAT ABOUT THE PREDICTIONS FOR 2050?

Of course, we do not know how accurate the predictions will be ... but here are three of them on which there was broad consensus:

- 83 percent of participants predicted that the average annual increase in the U.S. Consumer Price Index from 1999-2050 will be between 2 percent and 5 percent. (The average increase from 1999-2010 was 2.5 percent.)
- 96 percent of participants predicted that the expectation of life at birth would be 80 or greater in 2050, and a majority of those predicted 82 or greater.
- 83 percent of participants predicted that in 2050, 15 percent or more of employed SOA members would work outside insurance companies or consulting firms. In 2010, 10.75 percent did. ▼

### ENDNOTES

<sup>1</sup> For background on the Delphi technique, readers can access the article “The Delphi Method” by Scott McInturff in the September 2009 issue of the Forecasting and Futurism newsletter by entering “The Delphi Method” in the Quick Search field of the SOA website home page. The first result of the search is a link to a pdf copy of the article.

<sup>2</sup> For a copy of the full questions, answers and actual 2010 results, please contact the author of this article.