APPENDICES TO:
"HOW ECONOMISTS VIEW THE U.S. ECONOMY IN THE 21ST CENTURY

A. Environmental Pollution

Long-term series reflecting various types of environmental pollution are not available. Starting around 1970, however, the U.S. government began to collect data on a more systematic basis and several generalizations can be made:

Various emissions that act to increase air pollution seem to be slowly decreasing. From 1940 to the mid 1990s, sulfur dioxide emissions have decreased slightly, while emission of particulate matter has decreased dramatically. For water pollution, it is more difficult to generalize since no nationally weighted data are published. Nevertheless, between 1970 and 1995 PCB and DDT contamination of Lake Michigan trout has declined to a small percentage of their previous level and scattered data suggest that similar trends can be found in other water sources.

Table A-1 about here.

Table A-1 presents the answers for a question about how air and water pollution will change. The demographic variables have a considerable impact. For the near future, female members of the AEA are more pessimistic and have an average score of 0.54 lower than male members. For the far future this pessimism increases and their average score is 0.64 below that of males. In addition, this is the only question in which age of respondent makes a difference. Using both age and the square of age as variables, the regression analysis reveals that pessimism accelerates with age over the age range under consideration. In addition, AEA members not working as economists have average scores of 0.64 higher than academic economists.

On the other hand, on average changes in this variable scored relatively low as a major

Table A-1: Percentage Distribution Forecasts about Air and Water Pollution

		Period			
		2000 to 2025		2025 to 2050	
		A	B	A	B
Air and water pollution will					
1=Increase considerably		9.1%	86.7%	10.2%	75.0%
2=Increase somewhat	22.6	47.2	17.2	52.0	
3=Remain roughly the same		21.3	23.5	19.1	25.0
4=Decrease somewhat		40.9	9.5	38.9	10.7
5=Decrease considerably		6.1	22.2	14.6	14.3
Arithmetic average		3.12	0.293	3.31	0.281
Standard deviation		1.11	-	1.21	-
Number of usable replies		164	157	157	146

Note: A = percent distribution of usable replies among answers

B = percent believing that, if realized, this predicted trend have a major impact on the economic system or major institutions.

Arithmetic averages are based on the raw data, not the percentages in the table. For change in economic system (column B), 1 = major change; 0 = no major change.

influence on the economic system in both the near and far future. Nevertheless, a high percentage of those believing that such pollution will increase also believed that the impact on the system would be great.

B. Global Warming

For global warming the basic data are less ambiguous. Data on average annual temperatures in the U.S. show considerable fluctuations, a linear trend reveals a significant increase amounting to a total of 0.5 centigrade from 1900 through 1990. Estimates for the world as a whole show roughly the same increase.

Nevertheless, the meaning and interpretation of such numbers and whether this phenomenon is due to natural or human causes is subject to fierce debate. Certainly the low correlation between the carbon dioxide in the air and annual temperature changes deserves emphasis. Moreover, the observation that the increase in the mean temperature in the Northern Hemisphere just reflected the decrease in the daily temperature range. Although various estimates reveal somewhat different trends, it is also worth noting that the air temperature in the higher atmosphere has probably been cooling, even while the surface and lower atmospheric temperature has been warming. This increased atmospheric temperature gradient phenomenon may not last if heat begins to flow from the warmer lower atmosphere to the colder higher atmosphere.

Table A-2 about here.

Table A-2 presents data on the responses about global warming. In both the near and far future the average answer is about halfway between “remain roughly the same” and “increase somewhat”. For the far future, however, this represents the third greatest deviation from the trend. The demographic variables have no impact on the results. For both questions, the distribution of

Table A-2: Percentage Distribution of Forecasts about Global Warming

		Period			
		2000 to 2025		2025 to 2050	
		A	B	A	B
The average temperature in the U.S. will:					
1=Increase considerably		4.4%	71.1%	8.7%	69.2%
2=Increase somewhat	48.7	40.5	35.6	34.2	
3=Remain roughly the same		44.3	4.5	51.7	15.2
4=Decrease somewhat		2.5	25.0	4.0	37.5
5=Decrease considerably		0.0	-	0.0	-
Arithmetic average		2.45	0.258	2.51	0.275
Standard deviation		0.62	-	0.71	-
Number of usable replies		158	151	149	138

Note: A = percent distribution of usable replies among answers

B = percent believing that, if realized, this predicted trend have a major impact on the economic system or major institutions.

Arithmetic averages are based on the raw data, not the percentages in the table. For change in economic system (column B), 1 = major change; 0 = no major change.

answers is the narrowest of the 10 questions.

C. Data Appendix on Indicators of the Environment

Food prices: The wholesale price of food, as well as the prices of wheat and beef come from U.S. Department of Commerce, Census Bureau [1975], Series E54, K508, and K585, supplemented by data from various issues of U.S. Department of Agriculture [annual]. Data for the consumer price index up to 1970 come from Census Bureau [1975], Series 135; the remaining data come from U.S. Council of Economic Advisors [1997], p. 365. Data for the hourly wage of production workers in manufacturing come from: Census Bureau [1975], Series D802, supplemented by data from Employment and Earnings, January 1997, p. 46. A much more extensive study of agricultural prices, but only extending up to 1973 is by Robert Manthy [1978].

Data for farm productivity for 1948 through 1994 come from U.S. Council of Economic Advisors [1997], p. 410. I calculated quadratic trends for both farm output per unit of total factor inputs and farm outputs per unit of farm labor; the generalizations in the text are based on the calculated coefficient for the squared term in the regression calculation. In the same period, labor productivity growth alone reveals an even smaller, but statistically significant, deceleration .

Raw material and fuel prices: Chart 2-1: The BLS wholesale price index of fuels, related products, and power and also of metals and metal products for the period 1926 to 1970 come from U.S. Department of Commerce, Census Bureau [1975], Series E29 and E34. They were extrapolated from 1926 to 1900 with the aid of indices by Warren and Pearson from the same source, Series E57 and E58. They were spliced to BLS series from 1970 to 1996 from data from U.S. Council of Economic Advisors [1997] 374-5.

For the mining sector as a whole, I tried a series of regression experiments, drawing data on GDP

originating from mining from Survey of Current Business 77, 11/1997, p. 32 plus U.S. Department of Commerce, Bureau of Economic Analysis [1982]. These two series are not, unfortunately, completely comparable with each other. The labor force data come from U.S. Department of Commerce, Bureau of Economic Analysis [1992, 1993] plus various issues of Survey of Current Business.

The data on crude petroleum and copper prices come from U.S. Department of Commerce, Census Bureau [1975] series M139 and M241, supplemented for years after 1970 by data from U.S. Department of Commerce [annual, various years]. Given the heavy weighting placed on raw materials in the wholesale price index, I felt that deflating by the consumer price index was more appropriate. A much more extensive study of raw material prices, but only extending up to 1973 is by Manthy [1978].

Air and Water Pollution: Data on air pollution come from various volumes of U.S. Department of Commerce, Census Bureau [annual]. Between 1940 and 1970, however, estimates are available only every 10 years so that it is necessary to interpolate the data. Further, in recent annual volumes, the data for certain earlier years have been revised. Data on solid wastes also comes from the same source. Data on water pollution come from U.S. Council on Environmental Quality [1994].

Global warming: Data on deviation of average annual temperature come from T. R. Karl, et al. [1994-a]. They have adjusted the data to account for the "time-of-observation-bias," non- climatic biases such as changes in instrumentation or station location, and potential heat-island biases. The authors divided the country into 23 regions, averaged the data for 1221 stations according to region, and then calculated a composite value for the contiguous U.S. by weighting the regional averages by the area of the region. The data are calculated in terms of degrees centigrade deviation from the 1961 - 90 mean for each station. The global studies referred to are by: P.D. Jones, et al., H. Wilson and J. Hansen, and K. Ya. Vinnikov, et al. All three studies are presented in Boden [1994]..

Data on carbon dioxide emissions come from essays by C. D. Keeling and Marland in Boden [1994: 501- 585. The study on diurnal changes in average temperatures is by T. R. Karl [1994-b]. Various other studies in Boden [1994] present data on temperatures in the troposphere and stratosphere. The results, however, depend considerably on whether satellite or radiosonde methods are used for measurement.

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