

Did Americans' Expectations of Nuclear War Reduce Their Savings?

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We test a rational-actor model predicting individuals' savings behavior as, in part, a result of their expectations of war. To do so we analyze the effect on savings of a newly compiled and cleaned survey time-series of the American public's expectations of nuclear war, and a previously employed measure of elite expectations from the *Bulletin of Atomic Scientists*. An econometric time-series analysis shows a significant negative impact of war expectations on savings in much of the 1948–1993 era.

Members of the public in the United States have often evidenced high levels of expectation that another world war, or a nuclear war, was likely to occur within a few years. Such fears—typically higher than in almost any other country (Russett and DeLuca, 1983:182)—have varied substantially over time, with peaks early in the Korean War in the 1950s and again, at lower peaks, in the 1980s. They have responded to the ebb and flow of tensions in the international system, and especially to the state of East–West relations. Theory and empirical analysis suggest that those fears reduced Americans' willingness to make long-term commitments, and specifically that they reduced America's notoriously low national savings rate. Analysis of changes in expectations of war has, however, been hampered by the lack of a time-series of similar or closely related questions asked by reputable national survey organizations. Here we present as complete a time-series as can be compiled for longitudinal analysis. We then use that time-series, and another that measures elites' expectations of war, to explain fluctuations in Americans' willingness to save. The analysis forms part of the

Authors' note: We thank the John D. and Catherine T. MacArthur Foundation and the National Science Foundation, Grant #SES-8921176, for support, and JoAnn Dionne for help in obtaining survey data.

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Published by Blackwell Publishers, 238 Main Street, Cambridge, MA 02142, USA, and 108 Cowley Road, Oxford OX4 1JF, UK.

retrospect on the causes and effects of the Cold War that is now becoming possible.

Fear of War and Savings Behavior

Our theoretical perspective is derived from the literature on consumer behavior; namely, that individuals' decisions about present versus future consumption depend not only on the perceived future benefits obtainable from foregoing present consumption, but also on the perceived probability of actually receiving the future benefit. That probability, in turn, is composed of both the probability that the future benefit will be available and the probability that the intended beneficiary will be alive to receive it. Thus, individuals' decisions on what part (if any) of their income to save depend at least partially on their expectations of longevity and, if bequests are intended, on the expected longevity of their heirs.

Someone who believes that a "world" or "nuclear" war is likely to occur within the next ten years would be expected to have a much higher discount rate for benefits in that time period than would someone who believes war is unlikely: the person typically does not expect to survive the war. (By 1963 a majority of Americans thought their chances of surviving a nuclear war would be poor, and that percentage continued to rise somewhat into the 1980s. See Kramer, Kalick, and Milburn, 1983.) As noted earlier, Americans' expectations of nuclear war are typically among the world's highest, so it is not unreasonable to hypothesize that those expectations might negatively affect their collective savings behavior. Those expectations remain high relative to other countries', even in the post-Cold War world¹—just as the American savings rate remains low. A bit of anecdotal evidence supports the hypothesis. The U.S. private savings rate rose sharply in the early 1960s, reaching .115 in the first half of 1962. It fell to .109 in the second half, and again in the first half of 1963. Subsequently it resumed its upward climb. October 1962, of course, marked the Cuban missile crisis and the greatest nuclear war scare of the Cold War.

It is a straightforward matter to incorporate the hypothesis into a standard, theoretically derived formal model of rational economic behavior (Slemrod, 1982; Russett and Slemrod, 1992, 1993) for a systematic test. Efforts to determine the empirical significance of this effect have been encouraging. Holding other determinants of savings constant, Slemrod (1986) used a standard economic model as a savings function for explaining changes in the aggregate U.S. private savings rate over time from 1948 to 1984. To this standard explanatory model he added two alternative measures of fear of nuclear war. One was the "doomsday clock," set monthly by the Editorial Board of the *Bulletin of Atomic Scientists* as an index of their assessment of the state of international tensions. The closer the clock is set to midnight, the more dangerous the state of tensions in the Board's assessment; thus, Slemrod's hypothesis was that fear would show a significant negative relationship with savings. It did so, at the .01 level. A second variant, using instead of "minutes to midnight" an index of periodical news attention to nuclear issues, found a similar relationship but at a lower significance level ($p < .10$).

This initial finding prompted related research. Hendershott and Peek (1985, 1987), using several alternative definitions of savings and investigating other

¹The percentage of Americans (31%) who in December 1993 thought the chances of war were at least even exceeded that in any European country (*Gallup Political and Economic Index*, Report No. 401 (January 1994):61-62).

influences, also found that increased fear tended to reduce savings in the post-World War II American economy. In more recent work (Hendershott and Peek, 1989) the authors showed evidence that the unprecedentedly high real-interest rates of the early 1980s could be explained, in part, by abnormally high expectations of war among Americans. Moreover, Slemrod (1990) reported a negative relationship between the average expectation of war as measured by survey questions and the net private savings rate in a pooled time-series analysis of nineteen industrialized countries in the 1980s. This relationship appears to hold when other influences on saving, such as social security benefits, the age structure of the population, and the labor participation rate of men 65 and older, are controlled.

An earlier pooled time-series analysis by Russett and Lackey (1987), using aggregated survey data on war expectation in place of the "minutes" measure, did not find such a relationship—perhaps because their database included both fewer countries and a shorter time span. But several efforts have been more successful in identifying such a relationship at the level of individual behavior, using survey data rather than aggregate savings and war expectation data. Russett and Lackey (1987) did find a relationship in their analyses of four out of five British Gallup surveys that happened to contain questions on war expectation, savings expectations, expectations of general economic conditions, and standard demographic control variables. A similar result emerged in their analysis of National Election Survey (NES) data from 1984—data that include, besides the usual demographic controls, information on reported savings behavior (rather than expectations). Most convincingly, Russett and Slemrod (1992, 1993) for the first time specified a formal model of rational behavior and constructed a survey instrument specifically designed to include a variety of relevant controls. On testing the model in April and then again in October of 1990 they found a significant relationship between the level of individuals' expectations of nuclear war and their savings levels.

All these results suggest that expectations of war really did reduce individuals' willingness to save during the Cold War. Nevertheless, some anomalies remain, including the relatively meager findings for such a relationship in aggregate time-series analysis. To look again at this question we need to construct a new opinion data set suitable for time-series analysis.

A New Data Set

National surveys frequently ask Americans about their expectations of war—but the question often varies in ways that significantly affect results. A typical version is, "Do you expect the United States to fight in another war within the next ten years?" But the time period specified will often vary, with one, two, five, and other horizons as variants. The percentage of the population thinking a war is likely is, of course, higher the longer the period specified. Moreover, the word "war" is often qualified, for example, as "world war" or "nuclear war." Such qualifications mattered little in the 1940s, when total war was the recent experience and common expectation for war. But from the Korean War experience in the early 1950s onward, people often interpreted "war" to include limited or local wars, and thus to show a higher probability estimate than nuclear or world war (Mueller, 1979). Other differences in question wording range from those that seem innocuous to those that raise obvious and serious questions about comparability.

We need a set of questions and responses that are sufficiently comparable to permit time-series analysis of national samples over a reasonably long period.

We will therefore use only questions with similar wording, or that can be adjusted for comparability. The survey organizations for the 1946–1965 period are the American Institute for Public Opinion (AIPO) and the National Opinion Research Center (NORC); they are supplemented by others for 1976–1992.

We have drawn on compilations by others (notably Mueller, 1979; Smith, 1988; Niemi, Mueller, and Smith, 1989), supplementing them with materials from news releases and a computerized search of the files of the Roper Center at Storrs, Connecticut. Where possible, we checked printed reports of the marginals and if necessary corrected them from data sets at the Roper Center and in discussion and correspondence with Professors Mueller and Smith.² We use this systematically corrected and expanded data set to construct a new time-series for statistical analysis.

Beginning with the Korean War period, we include only questions that identify the war as world, nuclear, or “all-out war with Russia.” Tables 1 and 2 present the information in two parts: surveys in 1946–1965, and in 1976–1993. (No comparable questions were asked by national survey organizations between 1965 and 1976.) In recent years a version specifying ten years as the time horizon for expectation of war has become most common; for the earlier period three versions of the specified time period are shown: two years, five years, and ten years.

Several additional steps are required to build time-series. Efforts to construct time-series from different survey organizations or with differently worded questions always confront problems of comparability. The most serious difficulty here is that no single time horizon (ten, five, or two years) can provide a very long time-series for the 1946–1965 period. Some regularities, however, permit us to construct a reasonable approximation.

Many surveys asked respondents to declare, for example, whether they thought war was likely within ten years, and then whether it was likely within two years. Since the questions appear sequentially on the same survey instrument, we can measure the difference the time horizon makes while holding constant other possible sources of incomparability, such as question order, survey organization, and sampling method.

From April 1948 to October 1951 both ten-year and two-year filtered versions of the same question were asked in a total of thirty surveys. Up to the outbreak of the Korean War (through June 1950), short-run expectations (two years) were much less pessimistic than for the long run (ten years). The mean estimate for probable war in ten years is 42 percentage points (18 surveys) higher than the two-year estimate. After the Korean War began, estimates of world or nuclear war within two years rose more sharply than did estimates of war within ten years, thus narrowing the gap between the two estimates (mean difference = 34%, 12 surveys).

Given the differences between the two estimates, and the narrowed gap beginning in 1950, it is wise to use the ten-year questions for as long as possible, that is, until they effectively cease late in 1951. With a single not very great difference (an AIPO survey in August 1948), all use the same question wording (wording as in Table 1).

After that, an adjustment could be made to approximate the result of a ten-year question. We might assume that people’s fears of a world war within just

²For the earlier period, Mueller’s unpublished data (reported in graphical form in Mueller, 1979) are the most comprehensive—from questions asking whether war is likely in one’s lifetime to whether it is likely in the next six months—but they extend only to 1969. Data compiled by Smith (1988) and by Niemi, Mueller, and Smith (1989) are generally accurate, but miss some available data points. Moreover, all these scholars were unaware that some of the five-year filter questions for early AIPO surveys were administered improperly, and the reported marginals for those questions are inaccurate.

TABLE 1. Percent Expecting Nuclear War, 1946-1965

Date	Survey	Years Before War			Wording
		Ten	Five	Two	
Mar 1946	AIPO367	46			b
Nov 1946	NORC146	28			a
Apr 1947	NORC149	48			a
Apr 1947	AIPO393	49			b
Jul 1947	NORC151	49			a
Jul 1947	AIPO400	52			b
Aug 1947	AIPO402	58			b
Oct 1947	NORC152	57			a
Feb 1948	AIPO412	54			b
Mar 1948	AIPO415t&k	67	56		b,b
Mar 1948	NORC155	65			a
Apr 1948	NORC156	74		36	a,a
Jun 1948	NORC158	58		13	a,a
Aug 1948	NORC160	67		26	a,a
Aug 1948	AIPO423t&k	57			h
Oct 1948	NORC161	66		30	a,a
Dec 1948	NORC162	62		18	a,a
Feb 1949	NORC163	50		8	a,a
Mar 1949	NORC164	55		14	a,a
Apr 1949	NORC165	53		12	a,a
Jun 1949	NORC166	50		9	a,a
Jul 1949	NORC167	48		7	a,a
Aug 1949	NORC168	47		8	a,a
Sep 1949	NORC169	52		8	a,a
Oct 1949	NORC170	58		12	a,a
Nov 1949	NORC171	52		9	a,a
Jan 1950	NORC273	55		13	a,a
Mar 1950	NORC276	57		14	a,a
Mar 1950	AIPO453		38		b
Apr 1950	NORC280	67		22	a,a
May 1950	AIPO455		60		a
Jun 1950	NORC282	61		17	a,a
Aug 1950	NORC287	80		54	a,a
Sep 1950	NORC288	74		40	a,a
Oct 1950	NORC291	66		29	a,a
Oct 1950	AIPO466		63		a
Nov 1950	NORC294	79		50	a,d
Dec 1950	NORC292	79		50	a,a
Jan 1951	NORC295	83		56	a,a
Feb 1951	NORC298	74		41	a,a
Mar 1951	NORC300	64		26	a,a
Mar 1951	AIPO472		62		f
Apr 1951	NORC302	70		34	a,a
Jun 1951	NORC307	67		32	a,a
Jul 1951	AIPO477		63		a
Sep 1951	NORC312	74		33	a,a
Oct 1951	NORC313	71		32	a,a
Dec 1951	NORC314			41	b
Jan 1952	AIPO484		51		a
Jan 1952	NORC315			45	b
Mar 1952	NORC320			36	b
May 1952	NORC323			31	b
Jun 1952	NORC325			37	b

TABLE 1. Continued

<i>Date</i>	<i>Survey</i>	<i>Years Before War</i>			<i>Wording</i>
		<i>Ten</i>	<i>Five</i>	<i>Two</i>	
Jul 1952	NORC327			39	b
Sep 1952	NORC329			36	b
Oct 1952	NORC332			27	c
Nov 1952	NORC333			29	c
Dec 1952	NORC334			25	c
Dec 1952	AIPO509		52		a
Feb 1953	NORC337			29	c
Apr 1953	NORC339			24	c
Apr 1953	AIPO514		46		a
Jul 1953	NORC341			22	c
Aug 1953	NORC347			26	c
Oct 1953	AIPO521		53		a
Dec 1953	NORC349			21	c
May 1954	NORC355			29	c
Sep 1954	NORC363			27	c
Jan 1955	NORC366			28	c
Jan 1955	AIPO541		49		a
Mar 1955	NORC370			12	e
Jul 1955	NORC372			19	c
Aug 1955	NORC374			14	c
Oct 1955	NORC378			9	c
Dec 1955	NORC379			15	c
Jan 1956	AIPO558		23		d
Feb 1956	NORC382			14	c
Apr 1956	NORC386			14	c
Sep 1956	NORC393			12	c
Nov 1956	NORC399			24	c
Jan 1957	NORC401			21	c
Apr 1957	AIPO582	59	34		i,e
May 1957	NORC404			17	c
Dec 1957	AIPO592		33		c
Apr 1958	AIPO598		24		c
Jun 1959	AIPO614		23		c
Aug 1959	AIPO617		19		c
Oct 1959	AIPO619		18		c
May 1960	AIPO628		34		c
Jul 1960	AIPO631		47		c
Mar 1961	AIPO642		32		c
May 1961	AIPO644		44		c
Sep 1961	AIPO650		53		c
Mar 1962	AIPO656		22		c
Apr 1963	AIPO670		24		c
Jun 1965	AIPO713		34		c

See Appendix for exact question wording.

TABLE 2. Percent Expecting Nuclear War within the Next Ten Years, 1976-1993

<i>Date</i>	<i>Survey</i>	<i>Percent</i>	<i>Wording</i>
Apr 1976	NORC/GSS	43	a
Nov 1980	ORC	35	k
Jun 1981	GALLUP	47	c
Jun 1981	CBS/NYT	47	c
Nov 1981	GALLUP	53	g
Dec 1981	ROPER	39	j
May 1982	GALLUP	48	c
May 1982	CBS/NYT	43	c
Nov 1982	GALLUP	49	f
May 1983	GALLUP	34	c
Oct 1983	CBS/NYT	44	c
Nov 1983	ROPER	43	j
Nov 1983	GALLUP	40	c
Dec 1983	GALLUP	52	f
Mar 1984	NORC/GSS	43	l
May 1984	PAF	35	e
Dec 1984	GALLUP	47	f
Jan 1985	CBS/NYT	28	c
Apr 1985	NORC/GSS	43	a
Sep 1985	M AND K	31	d
Nov 1985	GALLUP	42	f
Apr 1986	NORC/GSS	46	a
Oct 1986	GALLUP	49	f
Oct 1987	M AND K	30	d
Dec 1987	GALLUP	37	f
Apr 1988	NORC/GSS	40	a
Dec 1988	GALLUP	33	m
Apr 1989	NORC/GSS	31	a
May 1989	CBS/NYT	23	c
Nov 1989	CBS/NYT	22	c
Dec 1989	GALLUP	29	m
Jan I 1990	CBS/NYT	19	c
Apr 1990	NORC/GSS	27	a
May 1990	CBS/NYT	18	c
May 1990	GALLUP	21	c
Dec 1990	GALLUP	49	m
Apr 1991	NORC/GSS	45	a
Aug 1991	CBS/NYT	28	c
Oct 1991	GALLUP	28	c
Oct 1991	NYT/CBS	27	c
Dec 1991	GALLUP	46	m
Dec 1992	GALLUP	28	m
Apr 1993	NORC/GSS	47	a
Dec 1993	GALLUP	31	m

Sources: CBS News/New York Times Poll (CBS/NYT); The Gallup Organization (Gallup); Marttila and Kiley (M and K); National Opinion Research Center/General Social Survey (NORC/GSS); Opinion Research Corporation (ORC); The Public Agenda Foundation (PAF). See Appendix for exact question wording.

a two-year horizon faded after the Chinese advance was reversed and the front stabilized for the long war of attrition following the spring of 1951. On that basis we extend the "ten-year" series by adding 42 percentage points to the two-year estimates from January 1952 onward. This procedure is consistent with the fact that, for the last two measurements we have (September and October 1951), the gap widened again to 41% and 39%. The adjusted series in Table 3 is produced on this assumption, but we will use a more sophisticated procedure in our subsequent statistical analysis. From 1951 onward all questions use similar wording (wordings a, b, or c), save for March 1955 (wording e) which we drop.

The period from summer 1957 onward presents a somewhat different problem, as surveys asked only for estimates on a five-year horizon. We must therefore convert the five-year estimates first into two-year estimates, and then into ten-year ones. Furthermore, we must estimate the difference in five- and two-year estimates from different surveys, and fluctuations between months can be substantial. To minimize the problems we compare only surveys in the same or, if necessary, immediately adjacent months. Doing so over the period December 1951 through May 1957 produces a mean difference of 16 percentage points (9 comparisons). During this period all two-year questions are by NORC and all five-year questions are by AIPO, so no bias is introduced by different survey houses' practices within either series.

If we impute a 42-point gap between ten- and two-year estimates, attributing 16 points to the two-to-five-year gap would leave us adding 26 points to the five-year figures to construct our full "ten-year" series. Table 3 continues with this illustration.³

Finally, most time-series regression analyses require a series of data points with uniform time intervals. These surveys were conducted irregularly. We can, however, produce two continuous time-series, in semi-annual intervals, from the first half of 1946 through the beginning of 1962 and from late 1980 through 1993. Most semi-annual intervals contain two or more surveys, in which we average the survey results. Only three intervals contain no surveys at all: the second half of 1958 and the first half of 1987 and of 1992. Interpolating these three data points from those on either side provides a complete series.⁴ The constructed series is displayed in Table 3. Figure 1 graphs the Table 3 opinion series and the "minutes-to-midnight" series.⁵ Figure 2 shows the national savings rate.

Some New Analyses

With these two sets of time-series data we can test the hypothesis that expectations of war reduced savings in the United States during the Cold War era. Accordingly, we compute equations using Slemrod's (1986) model with the "minutes-to-midnight" measure he used and, where possible, our new survey series. The survey-based measure of privately held opinion by the mass public—those whose savings behavior we are trying to explain—may very well give

³This assumption is consistent with the one instance of two time-estimates being posed in the same survey in this period—the April 1957 result which shows a gap of 25 points between the ten-year and five-year estimates.

⁴One could interpolate an estimate for the second half of 1962 and so extend the earlier series into the beginning of 1963. But the Cuban missile crisis makes such interpolation hazardous, not worth adding only 2 data points.

⁵We subtract the "minutes from midnight" to conform with the direction of the opinion data; i.e., the less negative the number (the fewer the minutes before midnight) the greater the expectation of war. Scaling levels for the opinion and minutes measures are not comparable; i.e., mass expectations of war are not necessarily lower than elites'.

TABLE 3. Semi-Annual Data for Expectation of Nuclear War, 1946-1993

<i>Date</i>	<i>Ten</i>	<i>Five</i>	<i>Two</i>	<i>Adjusted</i>
1946.1	46			46
1946.2	28			28
1947.1	49			49
1947.2	54			54
1948.1	64		25	64
1948.2	63		25	63
1949.1	52		11	52
1949.2	51		9	51
1950.1	60	49	16	60
1950.2	76	63	45	76
1951.1	72	62	38	72
1951.2	73	63	35	73
1952.1		51	37	79
1952.2		52	31	73
1953.1		46	27	69
1953.2		53	23	65
1954.1			29	71
1954.2			27	69
1955.1		49	28	70
1955.2			14	56
1956.1		23	14	56
1956.2			18	60
1957.1		34	19	61
1957.2		33		59
1958.1		24		50
1958.2				50
1959.1		23		49
1959.2		19		45
1960.1		34		60
1960.2		47		73
1961.1		38		64
1961.2		53		79
1962.1		22		48
1980.2	35			35
1981.1	47			47
1981.2	46			46
1982.1	46			46
1982.2	49			49
1983.1	34			34
1983.2	45			45
1984.1	39			39
1984.2	47			47
1985.1	36			36
1985.2	37			37
1986.1	46			46
1986.2	49			49
1987.1				42
1987.2	34			34
1988.1	40			40
1988.2	33			33
1989.1	27			27
1989.2	26			26
1990.1	21			21
1990.2	49			49
1991.1	45			45
1991.2	32			32
1992.1				30
1992.2	28			28
1993.1	47			47
1993.2	31			31

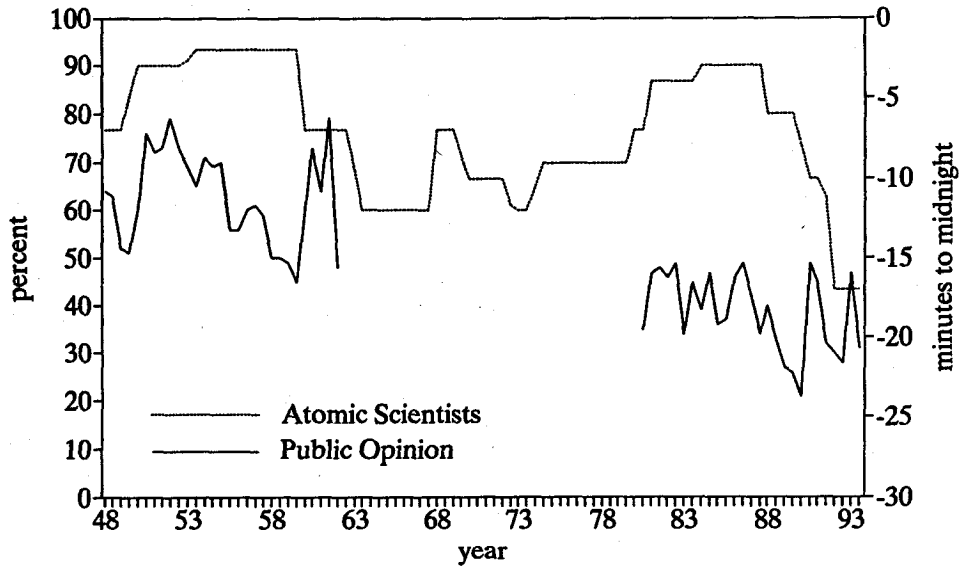


FIG. 1. Two Measures of Fear of War, 1948-1993

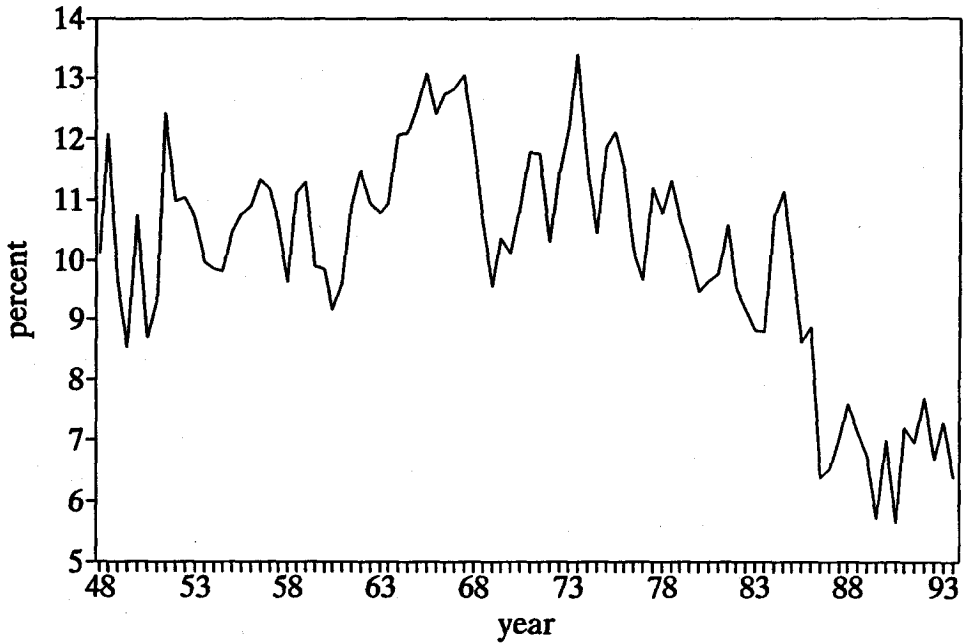


FIG. 2. U.S. Private Savings Rate, 1948-1993

different results from the "minutes" index, which is derived from the publicly expressed opinions of a particular elite group (*Bulletin* Editors).

Slemrod's basic equation includes his best measure of war expectations ("minutes to midnight"), current and one-period lagged real per capita disposable income, lagged real per capita nonhuman wealth, and the unemployment rate of prime-age white males. We essentially reproduce that equation, sometimes substituting our opinion measure. Time-series data for nonhuman wealth exist only for the earlier period, and then only annualized. (Slemrod used a specially compiled series extended from Hayashi, 1982.) Although relevant theoretically (savings depend on accumulated wealth as well as on income), that variable made little contribution in Slemrod's analysis. We can, however, substitute the composite index of the value of shares on the New York Stock Exchange. Stocks represent the major element of wealth held, either directly or in pension funds, by individuals in the upper income strata (who contribute most to the total of private savings).⁶ In Slemrod's analysis of the long period, all his economic variables except wealth were statistically highly significant (at the .001 level and beyond), and his "minutes-to-midnight" index was significant at the .01 level (one-tailed tests for signed hypotheses).

Table 4 first shows the regression coefficients, and under them, in parentheses, absolute values of the t-statistics. In the first column are Slemrod's results, and in the subsequent lettered columns are ours. Column A merely replicates Slemrod's analysis for the longer period for which we now have data, but substituting our stock market index for his measure of nonhuman wealth. These first results are very similar to his. The coefficients for all his economic variables remain generally consistent from his equation to ours—and remain so in our subsequent equations, sometimes with higher t-statistics. The minutes measure remains statistically significant in column A, if with a smaller coefficient and t-value.⁷

Column B repeats the previous equation over the full time span, with one additional control. We add the Index of Consumer Expectations compiled by the University of Michigan's Survey Research Center in its *Survey of Consumer Attitudes and Behavior*. These data are available beginning in 1953. Savings may reflect the generalized public "mood," or, more narrowly, citizens' levels of confidence in the economy.⁸ If the index is tapping the public mood, it is probably not totally independent of estimates of the likelihood of war. We would expect a positive sign on the coefficient for consumer expectations in that case. If, on the other hand, the index taps more specific expectations about future business

⁶For full definitions and sources see Slemrod (1986). His data series begins in 1948. He analyzed data on annual aggregates; our data are semi-annual, compiled by averaging quarterly figures. Our unemployment series differs slightly, for all males over age 20 rather than just white males. The NYSE index (12/31/65 = 50) is compiled from quarterly averages. All our economic series, and the Index of Consumer Expectations, are derived from Citibase Macroeconomic Database (Citicorp Database Services). Data for gross private savings and corporate profits—both used to compute the private savings rate—were available only through the third quarter of 1993 at the time of our analysis. We use these third-quarter figures to estimate the savings rate for the second half of 1993.

⁷Given the few degrees of freedom, a .10 threshold for significance is reasonable. Specifications further from Slemrod's produce weaker results; e.g., adding war expectation at t-1 shows no effect for the lagged measure. The OLS residuals in some models showed evidence of first-order autocorrelation, so those estimates are obtained by using an iterative procedure (Cochrane-Orcutt) and noted as such. We confirmed convergence to the global minimum by re-estimating these equations using a grid search (Hildreth-Lu). Estimates for Durbin-Watson and ρ appear in the table.

⁸The index is based on answers to three questions: about personal (family) financial prospects in the next year; about business conditions in the country in the next year; and about business conditions in the country for the next five years. Higher numbers indicate more favorable consumer expectations. Stimson (1991) presents data on "mood," primarily along liberal-conservative lines, but his estimates are annualized and cover only the years 1956-1989.

TABLE 4. Explaining Time-series of Saving Rates

	1948-84 Slemrod	1948-93 A	1953-93 B	1948-62 C	1980-93 D
Minutes	-0.0017 (3.53)	-0.0007 (1.35)	-0.0006 (1.29)	0.0007 (0.78)	-0.0027 (2.30)
Opinion				-0.0002 (1.43)	0.0003 (1.19)
Expectations			-0.0001 (0.48)		-0.0002 (0.65)
Income _t	0.150 (2.57)	0.328 (7.52)	0.304 (5.85)	0.131 (1.30)	0.309 (1.43)
Income _{t-1}	-0.140 (2.87)	-0.270 (6.16)	-0.248 (4.36)	-0.375 (3.59)	-0.387 (2.25)
Wealth _{t-1}	-0.014 (0.63)				
Stocks _{t-1}		-0.029 (3.45)	-0.035 (4.62)	0.056 (1.79)	-0.052 (2.29)
Unemployment	-0.013 (3.19)	-0.017 (3.67)	-0.018 (3.76)	-0.014 (2.30)	-0.044 (2.04)
Constant	0.115 (2.74)	0.105 (2.79)	0.143 (3.33)	0.431 (2.21)	0.555 (2.03)
2-year dummy				-0.013 (1.63)	
5-year dummy				-0.012 (1.22)	
d.f.	31	84	73	20	17
R ²	0.64	0.85	0.89	0.59	0.84
Durbin-Watson	1.26	1.76	1.81	1.75	1.71
ρ		0.77	0.72		0.42

Figures in parentheses are t-statistics (absolute values). Except for the dependent variable and *Minutes*, *Opinion*, and *Expectations*, all series are natural logarithms. Models A, B, and D are corrected for first-order autocorrelation; the first observation is omitted in order to estimate ρ . We have changed the sign on Slemrod's *Minutes* coefficient for purposes of comparison.

conditions, we would expect a negative sign: as consumer confidence decreases, people take fewer risks with their money, preferring the safety of fixed yield deposits. Our results weakly support the latter interpretation, but the consumer expectations index is not statistically significant. *Minutes*, however, is again significant at the .05 level.

Column C uses our first opinion series, for 1948-1962. The consumer expectations data begin in 1953, so we must exclude that control to avoid drastically reducing our degrees of freedom. We must nonetheless allow for the effect of different time horizons, as discussed earlier—for the three periods before January 1952, from then through spring 1957, and thereafter. Instead of adding some percentage as in the Table 3 illustration, we include in the equation two dummy variables, one for times when the two-year question was posed and one for the five-year question. The opinion measure is now statistically significant ($p < .10$), as hypothesized. The coefficient's magnitude is not enormous, indicating a reduction of .02% in the savings rate for every 1% rise in the population expecting war in the subsequent ten years. But with a range of over 50 percentage points in war expectation at that time, its substantive contribution is not trivial.⁹ *Minutes*, however, proves not significant (even, trivially, in the wrong

⁹Coefficients for war expectation cannot be directly compared with the others, which are from logged variables.

direction) for the early period. The different results for opinion and minutes are not surprising given our initial cautions about their empirical referents. They measure different phenomena—as we discuss below—and are virtually uncorrelated in this period (bivariate $R^2 = .02$).

Finally, column D shows the results for the years 1980–1993. Here the results are substantially different. The opinion measure coefficient is in the opposite of the expected direction, but not significantly so. But for this analysis, extending beyond the initial period analyzed by Slemrod, the minutes measure is quite significant ($p < .02$) in the predicted direction, even when consumer expectations are included as a control. In this period of higher total savings (current dollars), that indicates a change in national savings of more than half a billion dollars associated with each change of a minute in the clock's setting.

These replications support the basic hypothesis that individuals' expectations of war can and do suppress savings. The fact that our opinion measure is significant as predicted in the early period but not the later one, however, requires attention. Three possible explanations for the failure of the opinion measure to behave as expected in the 1980s are:

1. The greater variety in question wording, from more survey houses, might produce more noise in the later opinion series. But the wording differences are not as great as they may appear, clustering as they do into three groups.¹⁰
2. The equation might be misspecified, with some important variable omitted. But the coefficients for the economic variables are not very different from those in the other equations, the R^2 is high, and the minutes coefficient is as predicted.
3. The data series is short, lacking sufficient data from the end of the Cold War and from the reduction of nuclear war fears to show a strong effect. Visual examination of Figures 1 and 2 shows fluctuation in the recent opinion measure as well as in the savings rate. This suggests that a major stable decline in fear of nuclear war among the general public has yet to appear, and thus has not yet had a chance to make much impact on savings. It should be examined again after a few years have passed.

None of these explanations, however, satisfactorily accounts for why different measures of the expectation of war (minutes and opinion) evince different effects on the savings rate at different periods of time (roughly, the 1950s vs. the 1980s). To do that, one must remember that minutes and opinion are measuring two different phenomena; minutes taps an elite pool, and opinion covers the entire populace. Since elites are more attentive to international relations, the two measures need not be highly correlated with each other—and indeed they are not. It is also relevant that elites (high-income groups) have a disproportionate effect on aggregate savings in the economy. These facts help point to the following interpretation:

- In the 1950s, the proportion of the *whole population* that feared war was greater than in the 1980s (see Figure 1), and that proportion varied substantially over time (variance = 97.9). Thus, changes in that proportion had

¹⁰Differences between a; c,d,e,j,k,l; and f,g,m are nonetheless substantial. Equations using dummy variables to identify these differences did not produce different results.

a significant effect on savings.¹¹ In the 1980s, by contrast, the proportion of the general populace that feared war was lower than before, and that proportion varied less over time (variance = 69.9), the Gulf War "blip" notwithstanding. Thus, the changes in expectation of war that did occur had little impact on savings, relative to the effect of other variables in the model.¹²

- In the 1950s, *elite* fears of war were rather high throughout most of the era, and the measure of elite expectations was very stable (variance = 4.7). Thus, the small changes that occurred did not affect the economy's total savings very much. In the 1980s, however, elite fears of war as manifested in the *Bulletin* ran at a high level during the Reagan administration, and then dropped substantially (variance = 23.9 for the whole period). Thus, that drop significantly affected savings, especially because elites do most of the saving.¹³

To conclude, in this analysis we show evidence that Americans' expectations of nuclear war affected their behavior, in a manner predicted by a model of rational choice. Politics—especially the Cold War—may not have been such a sideshow to everyday life (Stouffer, 1955) as has been imagined. Ironically, the Cold War was fought in the name of preserving or achieving a better society for future generations. Yet a cost of the Cold War and its culture of nuclear confrontation may well have been fears of total destruction that led people, consciously or otherwise, to discount the future and to be less willing to sacrifice for it. If so, the possibility emerges for a special kind of "peace dividend" should post-Cold War assessments of nuclear risk become stable at a low level.

Appendix: Survey Question Wording

Ten-Year Questions:

- a Do you expect the United States to fight in another world war within the next ten years?
- b Do you think the United States will find itself in another war within, say, the next ten years? (This question was asked before the Korean War when "war" implied "world war.")
- c How likely do you think we are to get into a nuclear war within the next ten years—very likely, fairly likely, fairly unlikely, or very unlikely? (The percentages in the tables combine "very likely" with "fairly likely.")

¹¹Schuman, Ludwig, and Krosnick (1986) argue that nuclear war was never really a salient concern to most Americans. We contest this because (1) our measure of effect (savings) is a nonobtrusive one measuring actual behavior, rather than attitudes that may not be overtly expressed in a survey because of their threatening nature; (2) they show a low *mean* level of war expectation, whereas we address the effect of *variance* in that expectation; and (3) their question asks for "the most important *national* problem facing the *country today*?" (our emphasis). That wording maximizes concern with immediate problems or risks, but nuclear war is basically a long-run risk. The number of people who expect war within ten years is typically more than twice the number expecting it in two years. Their wording also emphasizes country and national rather than global. Use of the word "mankind" rather than "you" regarding nuclear war heightens concern (Dyal and Morris, 1987, cited by Schatz and Fiske, 1992).

¹²Even when war fears are relatively low, the relationship between war fear and savings at the individual level (Russett and Slemrod, 1992, 1993) reduces aggregate savings below that of a country where fears were still lower, or below what they would be if those fears were lifted.

¹³The difference between variances for the opinion measure ($F = 1.40$) is not statistically significant, but that for the elite minutes measure ($F = 5.09$) is highly so.

d Thinking about nuclear war, how likely do you feel we are to get into a nuclear war within the next ten years—very likely, fairly likely, fairly unlikely, or very unlikely? (The percentages in the tables combine “very likely” with “fairly likely.”)

e How likely are we to get into a nuclear war within the next ten years—very likely, fairly likely, fairly unlikely, or very unlikely? (The percentages in the tables combine “very likely” with “fairly likely.”)

f I'd like your opinion of the chances of a world war breaking out in the next ten years. If ten means it is absolutely certain that a world war will break out and zero means that there is no chance of a world war breaking out, where on this scale of ten to zero would you rate the chances of a world war breaking out in ten years? (The percentages in the tables include 5 to 10.)

g With the help of this card, please tell me what you think the chances are of a world war breaking out in the next ten years. (The card shows a scale of 0 to 100.) The more likely you think the chances are, the higher the number you would pick. The less likely, the lower the number. Please read off the number. (The percentages in the tables include the numbers 50 and greater.)

h Do you think there will be another big war within, say, the next ten years? (This question was asked before the Korean War when “big war” implied “world war.”)

i Everybody hopes there will not be another war, but what is your best guess—do you think there will be another world war in the next five years? (If no or don't know) How about ten years?

j How likely do you think it is that the United States and Russia will become involved in a nuclear war sometime in the next five to ten years—very likely, fairly likely, or very unlikely? (The percentages in the tables combine “very likely” with “fairly likely.”)

k How likely is it that the United States will become involved in a nuclear war in the next decade—very likely, somewhat likely, not too likely, not at all likely? (The percentages in the tables combine “very likely” with “somewhat likely.”)

l I'm going to read you some possible military situations the U.S. might face in the next ten years. Some people feel these situations are certain to happen (think of these as point 7 on the scale), others think these situations won't happen at all (think of these as point 1 on the scale). And, of course, some people have opinions somewhere in between. For each of these possible military situations, please give me your best guess as to how likely it is to happen. For example, an all-out atomic war. Where would you put the likelihood of an all-out atomic war during the next ten years? (The percentages in the tables include 4 to 7.)

m Here is a sort of a scale. Would you, with the help of this card, tell me how you assess the chances of world war breaking out in the next ten years? (The percentages in the tables include 50% and greater. Note that this wording is from the Gallup international End-of-Year poll. Most likely this poll was conducted in November and used the same question wording as in item f.)

Five-Year Questions:

a Do you think the United States will find itself in another (world) war within, say, the next year? (If no) How about the next five years?

- b** Do you think the United States will find itself in another (world) war within, say, the next five years?
- c** Do you think we are likely to get into another world war in the next five years?
- d** Do you think we are likely to get into another world war in your lifetime? (If yes) Do you think we are likely to get into another world war in the next five years?
- e** Everybody hopes there will not be another war, but what is your best guess—do you think there will be another world war in the next five years?
- f** Do you think the United States will find itself in another world war within, say, the next six months? (If no) How about within the next year? (If no) How about within the next five years?

Two-Year Questions:

- a** Do you expect the United States to fight in another war within the next ten years? (If yes) Do you expect us to fight a war within the next year or two, or not until after that? (This question was asked before the Korean War when "war" implied "world war.")
- b** Do you expect the United States to fight in another world war within the next two years?
- c** Do you expect the United States to get into (to fight) an all-out war with Russia during (within) the next two years?
- d** Do you expect the United States to fight in another world war within the next ten years? (If yes) Do you expect us to fight a world war within the next six months to two years, or not until after that?
- e** Do you expect any hydrogen bombs to be dropped on this country within the next two years?

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