MEASURING BUBBLE EXPECTATIONS AND INVESTOR CONFIDENCE

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Robert J. Shiller

This paper presents evidence on two types of investor attitudes that change in important ways through time, with important consequences for speculative markets. The paper explores changes in bubble expectations and investor confidence among institutional investors in the U.S. stock market at six-month intervals for the period 1989 to 1998 and for individual investors at the start and end of this period.

Based on the results of the questionnaires administered during the period, the author develops specific time-series indicators for each of the following: a speculative bubble (an unstable situation with expectations for a increase in the short term only), a negative speculative bubble (an unstable situation with expectations for a downturn in the short term only), and investor confidence (a feeling that nothing can go wrong).

Using the indicators, the author produces indexes indicating the average percentage of the population at a given time with bubble expectations, negative bubble expectations, and investor confidence, respectively.

The paper examines the behavior of indicators and indexes through time and compares the indexes with our economic variables. Notable findings include a degree of high-frequency fluctuations in the indexes, a substantial co-movement among the indicators, and substantial linkages with historical events.

Observers of speculative markets frequently remark on certain investor attitudes that change in important ways through time, with important consequences for the markets. Two attitudes in particular share these characteristics. One is "bubble expectations," which is the perception of a temporary uptrend by an investor, which prompts him or her to speculate on the uptrend before the "bubble" bursts. The second attitude – and a very different one – is investor "confidence," which is the feeling that nothing can go wrong with an investment, that the investor can sleep well because there is nothing to worry about.

Unfortunately, little quantitative evidence is available on these attitudes. Those who wish to study changes in bubble expectations or investor confidence through time, therefore, must rely mostly on their own observations. Most data on investor sentiment refers to simple expectations for price change or to indicators of these expectations. Though these data are useful, they may not capture essential elements of investor thinking. Katona [1975], for instance, has argued that most people do not have precise expectations for future changes over specific horizons and, when asked for numerical values, simply invent them to please the interviewer. In survey research, it is best to study issues people think about and to study these issues in terms that are natural to the people. This paper does just that. It assumes that bubble expectations and investor confidence are important mental constructs whose population frequency through time should be studied. The paper explores changes in these attitudes among both institutional and individual investors in the U.S. market.

To capture data on institutional investors, I collaborated with Yoshiro Tsutsui of Osaka University and Fumiko Kon-Ya on the Japan Securities Research Institute to develop and administer questionnaires focusing on stock market outlook. Between 1989 and 1998, I distributed the questionnaires on 19 occasions (roughly every 6 months), each time to a random sampling of 400 institutional investors in the U.S., for a total of 7,600 first mailings.[1] During the same period, my colleagues in Japan were administering similar questionnaires to institutional investors in that country.[2] In the U.S., the average institutional mailing produced 128 responses (32% of the 400 mailings). An institution's failure to respond may be due to a number of factors such as an inaccurate or incomplete mailing address or personnel changes such as retirement or reassignment of the individual who normally would respond to such an inquiry. My observation, however, is that more often than not, the respondent either lacked the time to attend to the questionnaire or felt that he or she lacked the appropriate knowledge to respond adequately.

In addition to the institutional surveys, I distributed similar questionnaires on two occasions to a random sampling of individual investors in the U.S.[3]

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The questions included on all surveys were virtually the same, thus permitting comparisons through time as well as across nations.[4] Details of the survey design are given in Shiller, Kon-Ya and Tsutsui [1995]. Because our questionnaires focused the respondent's attention on the stock market outlook exclusively, in contrast to other surveys that cover many issues, we believe the instruments elicited more meaningful answers. We improved the validity of our indexes by asking a number of questions that relate to our basic concepts of bubble expectations or investor confidence and improved their reliability by averaging over a number of questions for each respondent, thus reducing the impact of erratic answers.

Method and Construction of the Bubble Expectation Indicators and Bubble Expectations Index

Following are the seven questions on which the bubble expectation indicators and the bubble indexes are created based:

1. Stock prices in the United States, when compared with measures of true fundamental value or sensible investment value, are:

[CIRCLE ONE NUMBER]

1. Too low. 2. Too high. 3. About right. 4. Do not know.

4. How much of a change in percentage terms do you expect in the following (+ before your number to indicate an expected increase, a - to indicate an expected decrease, leave blanks where you do not know):

[FILL IN ONE NUMBER FOR EACH]

	In 1 month	In 3 months	In 6 months
Dow Jones Industrial Average	_____%	_____%	_____%
Nikkei Dow (Japan)	_____%	_____%	_____%

	In 1 year	In 10 years
Dow Jones Industrial Average	_____%	_____%
Nikkei Dow (Japan)	_____%	_____%

5. "Although I expect a substantial drop in stock prices in the U.S. ultimately, I advise being relatively heavily invested in stocks for the time being because I think that prices are likely to rise for a while."

[CIRCLE ONE NUMBER; IF YOU CIRCLE 1. ALSO INDICATE DATE]

1. True. Your best guess for the date of peak: ____/_____/ _____ month/ day / year
2. False.
3. No opinion.

6. "Although I expect a substantial rise in stock prices in the U.S. ultimately, I advise being less invested in stocks for the time being because I think that prices are likely to drop for a while."

[CIRCLE ONE NUMBER; IF YOU CIRCLE 1. ALSO INDICATE DATE]

1. True. Your best guess for the date of bottom:____/_____/ _____ month/ day / year
2. False.
3. No opinion.

11. "Many people are showing a great deal of excitement and optimism about the prospects for the stock market in the United States, and I must be careful not to be influenced by them."

1. True. 2. False. 3. No opinion.

12. (question introduced 1994-II) "Many people are showing a great deal of pessimism about the prospects for the stock market in the United States, and I must be careful not to be influenced by them."

1. True. 2. False. 3. No opinion.

13. What do you think is the probability of a catastrophic stock market crash in the U.S., like that of October 28, 1929, or October 19, 1987, in the next six months, including the case that a crash occurred in the other countries and spreads to the U. S.? (An answer of 0% means that it cannot happen, an answer of 100% means it is sure to happen.)[5]

14. Probability in U. S.:_____%

The following five indicators were defined. Each represents evidence of a bubble, and has a relatively simple and uncomplicated interpretation:

TOOHIGH&UP (B1) is the percentage choosing response #2 in question 1 (too high) and expecting an increase in stock prices in the shortest horizon in question 4 for which they gave an answer. Percentage is of those who answered question 1 (including those answering "do not know") and gave at least one U.S. expectation in question 4.

UPDOWN (B3) is the percentage who predict an increase for the U.S. in the shortest horizon (up to six months) for which they gave an expectation for the U.S. in question 4 and then a decrease over any longer horizon (up to one year). Percentage is of those giving an answer for the U.S. in question 4 for the one-, three- or six-month horizon and those giving an answer for at least two horizons up to one year.

RISEFORWHILE (B5) is the percentage selecting response #1 to question 5 (think stocks will rise for a while and advise staying in only for short run). Percentage is of those answering question 5 (including those answering "no opinion").

SEEOPTIMISM (B7) is the percentage selecting response #1 to question 11 (who see optimism and feel they must be careful not to be in-

fluenced by it). Percentage is of those answering question 11.

UP&CRASH (B9) is the percentage who expect an increase in stock prices in question 4 over the shortest time horizon for which they gave an expectation and who also think the probability of a stock market crash, question 13, is greater than 10%. Percentage is of those answering questions 13 and giving expectations in question 4 for the U.S. for at least one horizon.

The bubble expectations index is derived by multiplying the average of the five indicators variables by 100 to convert to percent. Since all indicators are proportions of respondents (in percent) who have, by some interpretation, bubble expectations, the index may be thought of loosely as an estimate of the percentage of the population with bubble expectations.

The negative bubble index is created using the following four indicators:

TOOLOW&DOWN (B2) is the percentage choosing response #1 in question 1 (too low) and expecting a decrease in stock prices in the shortest horizon in question 4 for which they gave an answer. Percentage is of those who answered question 1 (including those answering "do not know") and gave at least one U.S. expectation in question 4. (enters negatively in index).

DOWNUP (B4) is the percentage who predict a decrease for the U.S. in the shortest horizon (up to six months) for which they gave an answer and then an increase over any longer horizon (up to one year). Percentage is of those giving an answer for the US in question 4 for the one-, three- or six-month horizon and those giving an answer for at least two horizons up to one year.

FALLFORWHILE (B6) is the percentage selecting response #1 to question 6 (think stocks will fall for a while and advise staying out only for short run). Percentage is of those answering question 6 (including those answering "no opinion").

SEEPESSIMISM (B8) is the percentage selecting resposne #1 to question 12 (who see pessimism and think they must be careful not to be influenced by it). Percentage is of those answering question 12 (including those answering "no opinion") (enters negatively).

As with the bubble index, the negative bubble index is just an average of the indicators. It also has the interpretation as the average percentage of the population with negative bubble expectations.

Method and Construction of the Index of Investor Confidence

The index of investor confidence is based on questions 4 and 13 shown above and on two more questions:

14. "If the Dow dropped 3% tomorrow, I would guess that the day after tomorrow the Dow would:"
1. Increase. Give percent:_____
2. Decrease. Give percent:_____
3. Stay the same.
4. No opinion.

15. (question introduced 1994-II) "If the Dow dropped 25% over the next six months, I would guess that the succeeding six months the Dow would:"
1. Increase. Give percent:_____
2. Decrease. Give percent:_____
3. Stay the same.
4. No opinion.

The following four confidence indicators were constructed:

ONEDAYUP (C1) is the percentage of those choosing response #1 (increase) in question 14. Percentage is of all answering question, including those responding "no opinion."

SIXMONTHUP (C2) is the percentage of those choosing response #1 (increase) in question 15. Percentage is of all answering question, including those responding "no opinion."

CRASHSAFE (C3) is 100 minus the average probability (in percent) of a stock market crash from question 13.

ONLYUP (C4) is the percentage of respondents indicating expectations for price increases at the one-, three-, six- and twelve-month horizons in question 4. Percentage is of all who gave expectations for all four horizons. (In earlier questionnaires, the one-month horizon was omitted.)

The first two of these four indicators were chosen on the observation that the form that investor confidence often seems to take is a feeling that, while stock market corrections are sure to come from time to time, they are always soon reversed. The investor confidence index was computed as the average of the four indicators, except that, since before 1994-II the question on which C2 is based was not yet asked, for those dates it was replaced its mean 1994-II to 1998-II.

The Results

This section presents the components of the bubble expectations index and the index itself (Table 1), the

Table 1. *Indicators of Bubble Expectations and Bubble Expectations Index, in Percent of Respondents (as Plotted in Figure 1)*

	TOOHIGH&UP	UPDOWN	RISEFORWHILE	SEEOPTIMISM	UP&CRASH	INDEX
1989–II	6.97	21.13	34.43	53.66	19.08	27.05
1990–I	6.72	6.25	5.97	41.17	10.92	14.20
1990–II	7.20	5.51	11.11	43.47	18.25	17.11
1991–I	10.52	12.62	26.35	54.81	20.68	25.00
1991–II	11.88	4.58	16.64	44.07	15.60	18.75
1992–I	24.20	13.01	19.18	48.25	27.45	26.42
1992–II	8.84	6.79	12.29	45.90	19.46	18.66
1993–I	15.74	13.91	27.48	54.13	22.04	26.66
1993–II	16.96	21.87	30.70	45.23	26.08	28.17
1994–I	6.48	8.79	19.16	50.81	13.88	19.82
1994–II	8.33	10.00	12.79	54.54	18.30	20.79
1995–I	7.59	12.69	20.93	51.72	17.72	22.13
1995–II	6.97	7.04	25.26	61.22	10.46	22.19
1996–I	13.43	17.30	32.53	63.85	24.24	30.27
1996–II	16.66	14.03	20.21	67.02	16.66	26.92
1997–I	6.18	5.10	23.33	65.28	7.14	21.41
1997–II	29.68	6.15	16.21	68.42	20.31	28.15
1998–I	25.86	4.16	33.60	62.01	28.44	30.81
1998–II	17.52	9.41	18.62	64.22	29.16	27.79
Mean	13.04	10.54	21.46	54.72	19.26	23.80
Stddev	7.02	5.25	7.84	8.51	5.97	4.62
Individual Investors						
1989–I	12.90	23.33	43.58	50.42	27.36	31.52
1996–II	34.86	25.49	56.92	65.18	32.07	42.90

negative bubble expectations index and the index itself (Table 2), and the components of the investor confidence index and the index itself (Table 3). The data in these tables are plotted in figures 1 through 3. Standard errors for the components and the indexes are shown in tables 4 through 6.

The indexes show a lot of short-term oscillations. The first thought one may have is that these oscillations might be measurement error, but there is evidence that this is not the case. First, the standard errors are sufficiently small that we may rely on much of the fluctuations as valid. Second, there is substantial co-movement across these indicators. And third, there are substantial linkages with historical events.

The average correlation coefficient for the ten-pairs of bubble index indicators is 0.30; for the six pairs of negative bubble index indicators, 0.47; and for the six pairs of confidence index indicators, 0.13. In 1990-1, when the 1990 recession was becoming apparent, all five of the bubble index indicators were below their means then.[6] One year later, in 1991-2, with the recession over, all five of the indicators had increased substantially. Note also that the oscillations in the negative bubble expectations index tend to move opposite those in the bubble expectations index, and that the trends in the two indexes are in opposite directions.

In short, the variations through time are often significant, but not enormous. Though certain of the indicators show striking movements –as, for example, the increase in the percentage of institutional investors who think the stock market will fall for a while (FALLFORWHILE) from 24% to 70% between 1989-II and 1990-I – these dramatic changes are not strongly confirmed by other indicators. The percentage of institutional respondents showing bubble expectations, as defined here, has remained in a relatively narrow range, with the bubble expectation index for institutional investors ranging from 14% to 31% over the entire sample.

The indicators show an apparent relation to the lagged change in stock prices. Figure 4 shows the bubble expectations index along with the percentage change of the Dow Jones Industrial Average over a six-month period ending ten days after the first mailing of the questionnaire (thus around the time that respondents filled out the questionnaire). In this figure, five of the six peaks in the bubble expectations index correspond to peaks in the percentage change in the Dow Jones Industrial Average. The correlation between the two series is 0.39, and the t statistic is 1.76.

There is little evidence of a dominant trend or other low-frequency component to the indexes for institutional investors. The bubble expectations index and the investor confidence index were both very low in the recession of 1990. This fact suggests a trend on the plots. If we exclude the recession from our sample, however, the investor confidence has remained very flat. The appearance of an uptrend in the bubble expectations index since the recession is due primarily to only one indicator: that investors see excessive optimism on the part of other investors (SEEOPTIMISM). Though price-earnings ratios and price-dividend ratios overall are at record high levels at the end of the sample here, the institutional investor indicators here are little dif-

ferent from earlier times. Moreover, the negative bubble expectations index often exceeds the bubble expectations index, even near the end of the sample.

The observations for individual investors (Table 1) show a much greater increase in bubble expectations between 1989-II and 1996-II than was found for institutional investors over any time interval starting in 1989-II. Moreover, the spread between the bubble expectations index and the available negative bubble index indicators was much higher in 1996-II for individual investors than it was for institutional investors. But, these observations on two point of time do not in-

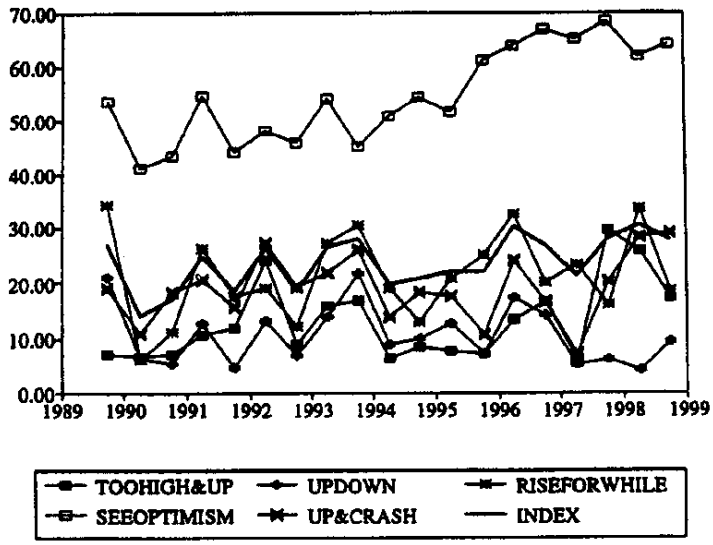
Table 2. *Indicators of Negative Bubble Expectations and Negative Bubble Expectations Index, in Percent of Respondents (as Plotted in Figure 2)*

	TOOLOW&DOWN	DOWNUP	FALLFORWHILE	SEEPESSIMISM	INDEX
1989–II	2.32	17.88	24.65	49.65	23.63
1990–I	7.56	23.21	70.37	49.65	37.70
1990–II	2.40	18.11	53.67	49.65	30.96
1991–I	2.63	20.38	34.42	49.65	26.77
1991–II	0.00	28.24	38.41	49.65	29.07
1992–I	0.00	16.43	32.33	49.65	24.60
1992–II	0.00	20.38	44.91	49.65	28.74
1993–I	2.36	16.52	32.81	49.65	25.33
1993–II	0.00	11.45	21.95	49.65	20.76
1994–I	2.77	26.37	42.73	49.65	30.38
1994–II	2.77	26.66	36.47	60.22	31.53
1995–I	1.26	19.04	26.43	45.34	23.02
1995–II	0.00	21.12	25.00	45.36	22.87
1996–I	0.00	13.46	22.78	48.14	21.09
1996–II	0.00	15.78	21.97	50.52	22.07
1997–I	1.03	19.38	43.10	48.33	27.96
1997–II	0.00	15.38	22.53	48.68	21.65
1998–I	0.00	3.85	19.00	42.63	16.37
1998–II	2.06	18.82	46.15	57.65	31.17
Mean	1.43	18.55	34.72	49.65	26.09
Stddev	1.83	5.50	12.88	3.75	4.94
Individual Investors					
1989–II	0.00	7.77	24.34		
1996–II	0.00	4.90	22.40		

Table 3. *Indicators of Investor Confidence Index and Investor Confidence Index In Percent (as Plotted in Figure 3)*

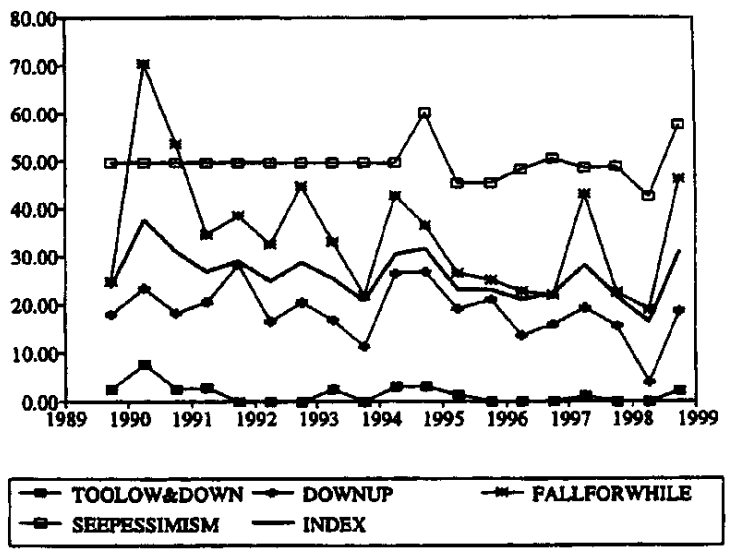
	ONEDAYUP	SIXMONTHUP	CRASHSAFE	ONLYUP	INDEX
1989–II	33.33	71.73	83.23	40.17	57.12
1990–I	34.78	71.73	77.32	12.24	49.02
1990–II	18.57	71.73	75.68	21.97	46.99
1991–I	22.90	71.73	81.66	51.25	56.88
1991–II	36.18	71.73	84.61	55.67	62.05
1992–I	37.86	71.73	79.19	53.57	60.59
1992–II	31.40	71.73	78.83	33.73	53.92
1993–I	29.45	71.73	77.96	34.44	53.39
1993–II	37.00	71.73	78.18	38.82	56.43
1994–I	33.61	71.73	82.60	25.30	53.31
1994–II	22.61	81.39	81.36	48.14	58.38
1995–I	39.53	79.54	83.57	38.46	60.27
1995–II	37.23	75.26	84.59	48.48	61.39
1996–I	32.53	62.19	79.18	42.55	54.11
1996–II	36.95	70.52	84.52	51.61	60.90
1997–I	37.39	73.27	83.07	20.00	53.43
1997–II	39.72	74.32	84.45	41.46	59.99
1998–I	46.45	54.33	79.15	35.44	53.84
1998–II	40.95	74.76	75.71	45.45	59.22
Mean	34.13	71.73	80.78	38.88	56.38
Steddev	6.67	5.52	97.00	11.81	4.12
Individual Investors					
1989–II	35.34	81.84	51.21		
1996–II	46.21	82.03	47.36		

FIGURE 1
Indicators of Bubble Expectations and the Bubble Expectations Index



Note: Each indicator represents percentage of population showing a form of bubble expectations as described in text. The index is the average of the indicators.

FIGURE 2
Indicators of Negative Bubble Expectations and Negative Bubble Expectations Index



Note: Each indicator represents percentage showing a form of negative bubble expectations as described in text. The index is the average of the indicators.

form us much about the trend or other time pattern of individual investor opinions.

For institutional investors, instead of substantial trend or predominantly low-frequency variation, we find we find that indicators and indexes more nearly resemble white noise from semester to semester. The serial correlation coefficient for the bubble expectations index is only 0.11; for the negative bubble expectations index, only 0.08; and for the investor confidence index, only 0.13.

As shown in Figure 4, the bubble expectations index shows substantially similar high-frequency movements as does the return on the stock market over the previous six months, a return which, by the random walk theory, approximates white noise. These data suggest that levels of bubble expectations for institu-

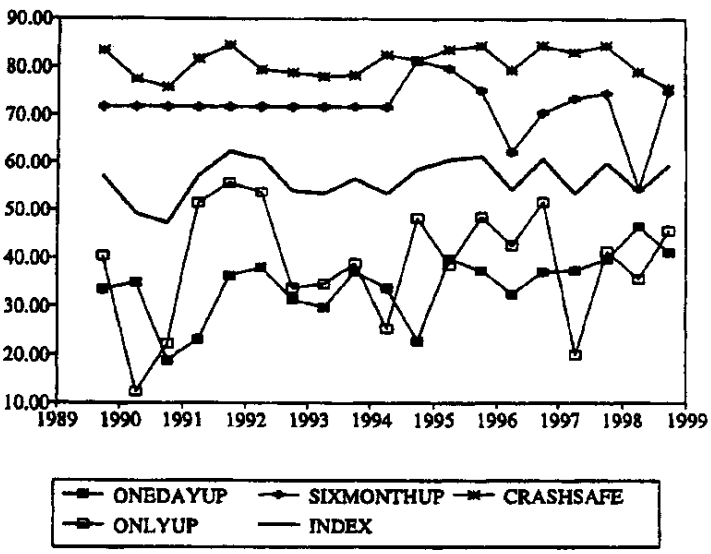
tional investors may be substantially driven by lagged price changes over this time interval - price increases tending at all times to produce some increase in the fraction of the population with bubble expectations.

Comparison With Existing Sentiment Indicators Related to the Stock Market

There are two basic kinds of market sentiment indexes: those that are derived from prices or quantities in markets under a theory relating them to sentiments, and those that are based on polling of investors.

Figure 5 shows a few examples of the first kind of sentiment indexes for dates corresponding to our survey dates. The put/call ratio is the ratio of puts to calls. A high ratio is supposed by some to indicate negative market sentiment, but whether it does so is very much open to question. Though it is true that people who think the market will go down might be inclined to buy puts, the prices of puts and calls, and the price of the market itself, are not constant when the number of people thinking the market will go down changes. The short interest ratio —the number of trading days at average volume required to cover total short interest —is

FIGURE 3
Indicators of Investor Confidence and Investor Confidence Index



Note: Indicators are described in text. The index is average of indicators shown.

Table 4. *Standard Errors Bubble Expectations Indicators and Index (in Percentage Points to Be Added or Subtracted From Values in Table 1)*

	TOOHIGHUP	UPDOWN	RISEFORWHILE	SEEOPTIMISM	UP&CRASH	INDEX
1989–II	2.24	3.68	3.86	4.05	3.32	1.75
1990–I	2.29	2.28	2.04	4.22	2.85	1.44
1990–II	2.31	2.24	2.70	4.21	3.44	1.55
1991–I	2.87	3.27	3.87	4.28	3.87	1.87
1991–II	2.70	1.82	3.08	4.02	3.35	1.56
1992–I	3.41	2.78	3.00	3.81	3.81	1.78
1992–II	2.67	2.47	2.97	4.51	4.31	1.77
1993–I	3.23	3.22	3.90	4.32	3.76	1.91
1993–II	3.54	4.21	4.09	4.43	4.38	2.16
1994–I	2.36	2.96	3.59	4.52	3.41	1.72
1994–II	3.25	3.87	3.60	5.30	4.95	2.19
1995–I	2.98	4.19	4.38	5.35	4.62	2.21
1995–II	2.74	3.03	4.45	4.92	3.86	1.94
1996–I	4.16	5.24	5.14	5.27	5.57	2.65
1996–II	4.21	4.60	4.14	4.84	4.39	2.34
1997–I	2.44	2.67	3.86	4.32	2.60	1.63
1997–II	5.71	3.83	4.28	5.33	5.02	2.60
1998–I	4.06	4.16	4.27	4.27	4.18	2.21
1998–II	3.86	3.16	3.85	4.59	4.63	2.11

Table 5. *Standard Errors Negative Bubble Expectations Indicators and Index (in Percentage Points to Be Added or Subtracted From Values in Table 2)*

	TOOLOWDOWN	DOWNUP	FALLFORWHILE	SEEPESSIMIS	INDEX
1989–II	1.32	3.45	3.56	0.00	1.71
1990–I	2.42	3.98	3.92	0.00	2.03
1990–II	1.36	3.75	4.27	0.00	1.95
1991–I	1.49	3.96	4.30	0.00	2.01
1991–II	0.00	3.93	3.95	0.00	1.86
1992–I	0.00	3.06	3.61	0.00	1.58
1992–II	0.00	3.96	4.57	0.00	2.02
1993–I	1.34	3.46	4.15	0.00	1.85
1993–II	0.00	3.25	3.73	0.00	1.64
1994–I	1.58	4.61	4.57	0.00	2.22
1994–II	1.93	5.70	5.22	5.21	3.37
1995–I	1.25	4.94	4.72	5.36	3.12
1995–II	0.00	4.84	4.41	5.05	2.94
1996–I	0.00	4.73	4.71	5.55	3.09
1996–II	0.00	4.82	4.34	5.12	2.95
1997–I	1.02	4.70	4.59	4.56	2.86
1997–II	0.00	5.65	4.95	5.73	3.37
1998–I	0.00	3.85	3.56	4.35	2.43
1998–II	1.44	4.23	4.88	4.68	2.86

Table 6. *Standard Errors, Investor Confidence Indicators and Index (in Percentage Points to Be Added or Subtracted From Values in Table 3)*

	ONEDAYUP	SIXMONTHUP	CRASHSAFE	ONLYUP	INDEX
1989–II	3.8	0.00	1.23	4.51	1.57
1990–I	4.05	0.00	1.98	3.31	1.47
1990–II	3.28	0.00	2.03	4.34	1.54
1991–I	3.67	0.00	1.75	5.58	1.81
1991–II	3.89	0.00	1.43	5.04	1.70
1992–I	3.73	0.00	1.73	4.71	1.64
1992–II	4.21	0.00	1.85	5.18	1.81
1993–I	4.01	0.00	1.89	5.00	1.75
1993–II	4.28	0.00	1.93	5.28	1.85
1994–I	4.33	0.00	1.75	4.77	1.74
1994–II	4.56	4.19	1.75	6.79	1.74
1995–I	5.27	4.29	1.67	6.74	2.60
1995–II	4.98	4.47	1.76	6.15	2.49
1996–I	5.14	5.35	2.18	7.21	2.85
1996–II	5.03	4.67	1.82	8.97	3.04
1997–I	4.51	4.10	1.64	4.78	2.14
1997–II	5.72	5.07	1.72	7.69	2.93
1998–I	4.42	4.42	1.62	5.38	2.26
1998–II	4.79	4.19	2.20	5.67	2.39

interpreted by some in the same way as the put/call ratio, but it has much the same potential shortcomings. Another indicator is the ratio of the high grade bond price to intermediate grade bond price, one version of which is called the Barron's Confidence Index. This index is supposed to indicate general faith in corporations by showing concern with default on their debt, but there is no reason to think it is tightly tied to people's expectations for the stock market price.

De Long and Shleifer [1991] and Lee Shleifer and Thaler [1991] have claimed to infer an indicator of market sentiment from data on discounts on closed end mutual funds. They see an advantage in inferring sentiment in this way since the sentiment can be inferred from market data, does not require a questionnaire survey with the risk of sample selection biases, and allows construction of a time series very far back. A disadvantage of their indicator, stressed by Chan, Kan and Miller [1993], is that it is not entirely clear that closed-end mutual fund discounts really do measure market sentiment. They might reflect only confidence in closed-end mutual funds.

As can be seen from Figure 5, these varying indicators do not closely resemble each other. Nor do they closely resemble the bubble expectations index. The indicator that most closely resembles the bubble expectations index appears to be the New York Stock Exchange put-call ratio, which tends to show short-run movements opposite those of the bubble expectations index. But, even here, the resemblance is not close. Note also that none of these indicators shows a pronounced uptrend through time, and so none resembles the dramatic uptrend in the market over this time interval.

Figure 6 shows, for dates corresponding to our survey dates, some examples of market sentiment indexes obtained by polling people's expectations. The American Association of Individual Investors has a weekly poll of its members, reporting percent bullish. The University of Michigan Consumer Sentiment Index is

FIGURE 4
Percentage Change in Dow Jones Industrial Average Over Six Months (Up to Date of Survey) and the Bubble Expectations Index

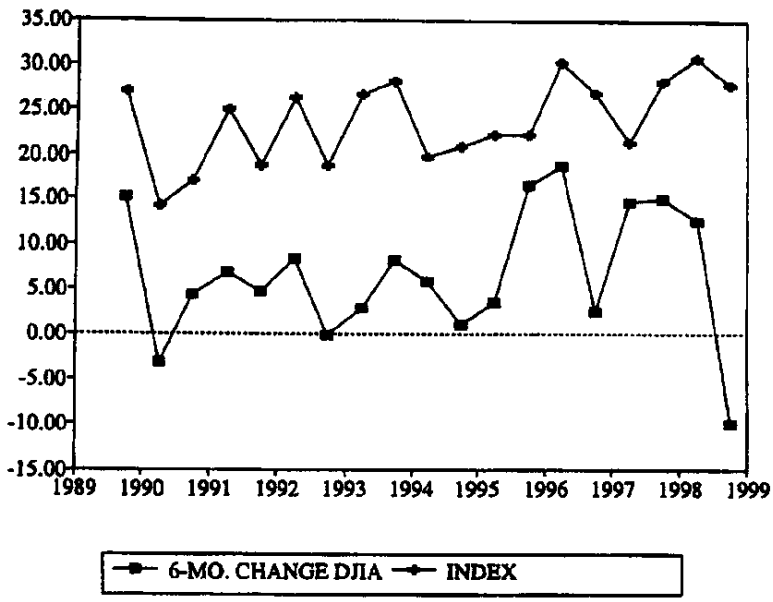


FIGURE 5
Indicators Related to Investor Sentiment (on Survey Dates) and Bubble Expectations Index

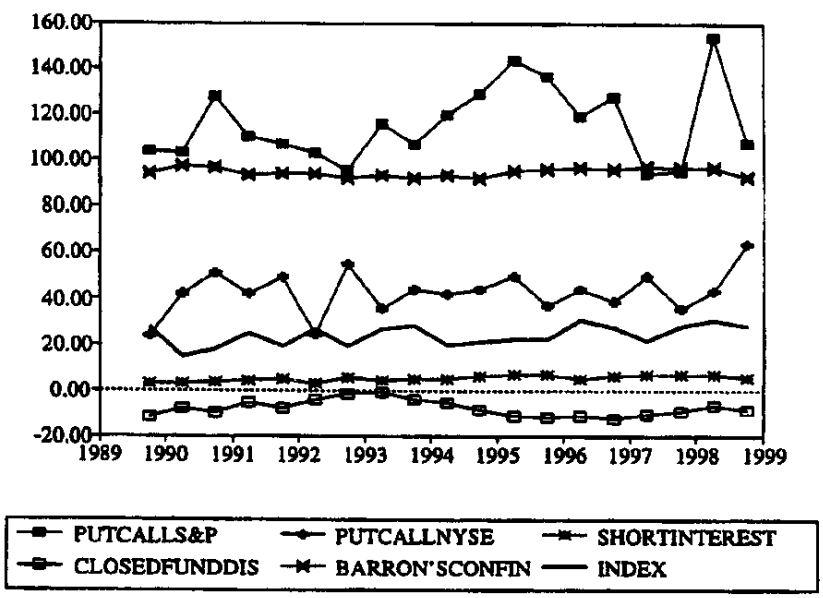
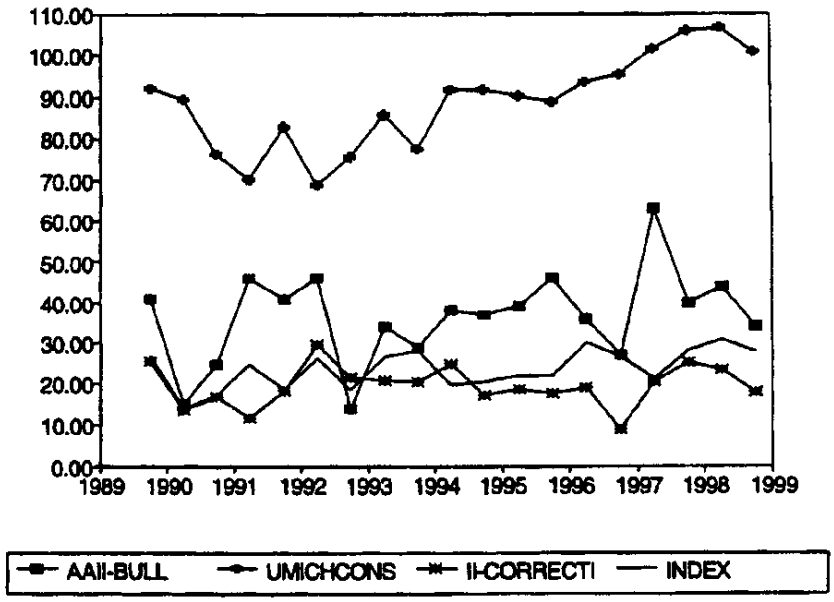


FIGURE 6
Market Sentiment Indicators (on Survey Dates) and Bubble Expectations Index



an index of overall confidence. Investors' Intelligence of New Rochelle New York has been computing for 35 years a tally of investors' advisory newsletters, categorizing the newsletters into bullish, bearish or neutral categories. Investors Intelligence also tallies the percent of newsletters predicting a "correction," which is shown in Figure 6. Although the meaning of the term "correction" is ambiguous, it is possibly the closest available indicator to the bubble expectations described here, and it is the indicator that shows the closest resemblance to the bubble expectations index.

There are still other investor sentiment indexes, not shown in the figure. Mark Hulbert, a Forbes columnist, edits a newsletter, *Hulbert Financial Digest,* which reports the recommended fraction of stocks versus T-bills in portfolios of 101 investment newsletters.[7] Marketvane of Pasadena, California, has a weekly index, a percent bullish on stock index futures prices in commodity trading newsletters, hotlines and e-mails. Their bullish consensus time series goes back to 1981.[8] A similar index is available from Consensus Inc., Kansas City, Missouri.

None of these indicators really attempts to capture the notion of a bubble. They are merely indicators of expectations for the market. The bubble index here appears to be the first of its kind.

There is one index of investor confidence, in the United Kingdom. It is created by Gallup for Pearl Unit Trusts. The index is based on answers to two questions, on whether the UK stock market is "likely" or "very likely" to go up in six months or one year. Gallup's concept of confidence appears to be a little different than that used here, which stresses more the absence of risk of major or sustained loss. I think that my definition is a little closer to what we mean by "confidence," the absence of major risks.

Conclusion

This paper presents evidence that bubble expectations and investor confidence, as defined here for institutional investors, do vary through time, but shows that, although these variations are often significant, they are not enormous. This is not to say that there are not other indicators of important changes in investor attitudes since 1989 (see Shiller [2000]).

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Notes

1. For institutional investors in the U.S., I obtained, each year, a random sample geographically dispersed across the United States from the investment managers section of the *Money Market Directory of Pension Funds and Their Investment Managers*. First mailing dates for the institutional surveys in the U.S. were:

July 5, 1989	January 17, 1990
July 27, 1990	January 31, 1991
August 20, 1991	January 31, 1992
August 20, 1992	February 12, 1993
August 6, 1993	February 28, 1994
September 8, 1994	March 4, 1995
September 1, 1995	March 1, 1996
July 30, 1996	March 17, 1997
September 5, 1997	March 2, 1998
September 9, 1998	

2. Individual question responses are tabulated on my web site http://www.econ.yal.edu/shiller/-investor.
3. To select the random sample of individual investors in the U.S., I used a list from W.S. Ponton, Inc., titled "High-Grade Multi-Investors" (net worth generally over $250,000). The individual surveys were distributed July 5, 1989, and September 9, 1998. Each person who did not respond received a second mailing several weeks later, with a new letter of explanation and another copy of the questionnaire.
4. Various additional questions were appended to some questionnaires to reflect current situations, but the content of the questionnaires themselves remained virtually the same for all surveys. See appendix.
5. The wording of this question was slightly different in the first questionnaire: "What do you think is the probability of a catastrophic stock market crash, like that of October 28, 1929, or October 19, 1987, in the next six months? (An answer of 0% means that it cannot happen, an answer of 100% means it is sure to happen.)"
6. According to the NBER reference cycle dating, the recession of 1990-1991 began at a peak in July 1990 (just before the 1990-II responses) and ended with a trough at March 1991 (at around the time of the 1991-I responses).
7. Graham and Harvey [1996], studying these data, find no evidence that these data have an ability to predict the actual future course of the market.
8. http://home.earthlink.net/~marketvane/index.html/bullish.htm

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Appendix
Changes in Order of Questions and Changes in Wordings of Questions

A. Changes in Order of Questions

Questions 1 through 6 were all asked unchanged and in the same order at the beginning of the questionnaire. The only change in this part of the questionnaire was the addition, in the 1994-II survey, of a new question 2: "What do you think would be a sensible level for the Dow Jones Industrial Average based on your assessment of U.S. corporate strength (fundamentals)?" The order of other questions was changed somewhat, as indicated by Table A-1, which shows numbers of the questions (numbering shown in bold at top is for latest questionnaires).

B. Changes in Wording of Questions

Question 4 was expanded in 1990-I to add the ten-year horizon, and, in 1993-II, to add one more investor horizon, (1 month). The wording of question 13, about the probability of a crash, was changed twice, starting with questionnaire 1993-II.

Initial wording of question:

> 13. What do you think is the probability of a catastrophic stock market crash, like that of October 28, 1929 or October 19, 1987, in the next six months? (An answer of 0% means that it cannot happen, an answer of 100% means it is sure to happen.)
>
> Probability:_____%

Wording of question, starting with questionnaire 1993-II:

> 13a. What do you think is the probability of a catastrophic stock market crash in the U.S., like that of October 28, 1929, or October 19, 1987, in the next six months? (An answer of 0% means that it cannot happen, an answer of 100% means it is sure to happen.)
>
> Probability:_____%
>
> (13b was added to ask the same about the Japanese stock market)

Wording of question, starting with questionnaire 1994-II:

> 13. What do you think is the probability of a catastrophic stock market crash in the U.S., like that of October 28, 1929, or October 19, 1987, in the next six months, including the case that a crash occurred in the other countries and spreads to the U.S.? (An answer of 0% means that it cannot happen, an answer of 100% means it is sure to happen.)
>
> Probability in U. S.:_____%

Table A-1. *Revised Order of Questions on the Questionnaire*

Institutional	1	4	5	6	11	12	13	14	15
1989–II	1	3	4	5	10	—	11	8	—
1990–I	1	3	4	5	10	—	11	8	—
1990–II	1	3	4	5	10	—	11	8	—
1991–I	1	3	4	5	10	—	11	8	—
1991–II	1	3	4	5	10	—	11	8	—
1992–I	1	3	4	5	10	—	11	8	—
1992–II	1	3	4	5	10	—	11	8	—
1993–I	1	3	4	5	10	—	11	8	—
1993–II	1	3	4	5	10	—	11a	8	—
1994–I	1	3	4	5	10	—	11a	8	—
1994–II	1	3	4	6	12	13	14	18	20
1995–I	1	3	4	6	12	13	14	18	20
1995–II	1	3	4	6	12	13	14	18	20
1996–I	1	3	4	6	12	13	14	18	20
1996–II	1	3	4	6	12	13	14	18	20
1997–I	1	3	4	6	12	13	14	18	20
1997–II	1	3	4	6	12	13	14	18	20
1998–I	1	3	4	6	12	13	13	14	15
1998–II	1	3	4	6	12	13	13	14	15
Individual Investors, question numbering									
1989–II	1	3	4	5	10	—	11	8	—
1996–II	1	3	4	5	10	—	11	8	—