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Abstract

This study examines time series properties of expectation biases using a high-frequency survey on stock price forecasts, which required participants to forecast the Nikkei 225 over three forecasting horizons: one day, one week, and one month ahead. Constructing proxies for overconfidence and optimism as the expectation biases, this study shows that overconfidence is likely to remain stable over time while optimism is not. Moreover, a relationship exists between optimism and stock price movement, demonstrating that people tend not to expect drastic changes when forecasting future stock prices. This tendency may be evidence that people have a status quo bias.

JEL: D84, E44, G17

Keywords: Overconfidence, Optimism, Expectation, Stock Price Forecast, Status Quo Bias

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1. Introduction

Many recent studies depart from a long-maintained assumption that people form their expectations rationally and instead focus on expectation biases such as overconfidence (or underconfidence) and optimism (or pessimism), which are deviations from the notion of rationality behind expectation formation. Some empirical studies have investigated whether or not people have expectation biases (Clark and Friesen, 2009; Giordani and Söderlind, 2006; Mansour et al., 2006), while others have examined the effect of expectation biases on specific economic behaviors (Kinari and Tsutsui, 2009; Mizutani et al., 2009; Niederle and Vesturland, 2007; Barber and Odean, 2001; Camerer and Lovallo, 1999). In addition, there are many theoretical works on expectation biases (Jouini and Napp, 2006; Abel, 2002; Delong et al., 1990). Although these studies have mainly focused on the negative aspects of expectation biases, some recent studies discuss positive aspects of expectation biases (Kinari et al., 2011; Anderson and Brion, 2010; Galasso and Simcoe, 2010; Hirshleifer et al., 2010).

While the number of studies on expectation biases has increased, little is discussed about the time series properties of expectation biases[1]. Specifically, it is unclear whether the degree of expectation bias changes over time. It is important to understand the time series properties of expectation biases, particularly for theoretical studies that attempt to explain various economic phenomena by incorporating departures from rational

[1] Shiller et al. (1996) examine expectation data from 1989 to 1994 in the United States and Japan to identify the cause of the crash in the Nikkei 225 Stock Price Index, and demonstrate that expectations change over time. However, they do not explicitly investigate whether expectation biases change over time.

expectations. For example, Abel (2002) demonstrates that two expectation biases—pessimism and underconfidence—might solve the equity premium puzzle proposed by Mehra and Prescott (1985). The equity premium puzzle has been observed in many countries and the degree of equity premium has been found to change over time. If expectation biases actually cause the equity premium puzzle, the degree of expectation biases would also need to change over time. On the other hand, if expectation biases do not change over time, then the theory might require some modifications. Thus, given the crucial role played by expectation in economic theories and the impact of expectation biases on them, further research focusing on the time series properties of expectation biases is needed.

The purpose of this study is to explore the time series properties of expectation biases using a high-frequency survey on stock price forecasts to confirm whether expectation biases are stable over time. Two kinds of expectation biases are discussed: overconfidence (or underconfidence) and optimism (or pessimism). The survey was conducted at four universities over nine periods. The survey participants included university students who were asked to forecast the Nikkei 225 Stock Price Index over three short forecasting horizons: one day, one week, and one month ahead. They were required to provide both their point forecasts and probability distribution forecasts. Proxies were constructed for the optimism and overconfidence biases of the student forecasts following the method of Giordani and Söderlind (2006). To confirm the stability of the expectation biases, the data were then examined to find whether expectation biases were observed in any of the horizons or periods.

This study also investigates the relationship between the expectation biases and

forecasting horizons. Giordani and Söderlind (2006) examine forecasts of GDP and consumption growth one to four quarters ahead by US professional forecasters using the Survey of Professional Forecasts (from 1982 to 2003) and Livingston Survey (from 1972 to 2003), and show evidence of pessimistic and overconfident beliefs. Furthermore, they find that the degree of pessimism becomes larger as the forecasting horizon becomes longer. Similarly, we examine the relationship between the expectation biases and forecasting horizons to confirm whether such a relationship is observed in the expectation forecasts of university students in Japan over even shorter horizons[2].

In addition, we examine gender differences in expectation biases. Many experimental studies reporting on gender differences in expectation biases have found that men are more overconfident than women (Mizutani et al., 2009; Niederle and Vesterland, 2007) and men are more optimistic than women (Mansour et al., 2006). However, Kinari et al. (2011) find an inverse relationship between gender difference and expectation biases, namely that women are more overconfident than men in maze-solving experiments. This indicates that the relationship might change according to country or experimental settings. Thus, gender differences in expectation biases remain controversial. This study investigates whether or not there are gender differences in the expectation biases of Japanese university students' stock price forecasting.

The results of this study show that on average, the participants have optimistic and

[2] Ito (1990) investigates expectation data on foreign exchange rates from 1985 to 1987 in Japan to test the rational expectation hypothesis and reports that the forecasts with long horizons showed less yen appreciation than those with short horizons. However, he does not explicitly examine the relationship between expectation biases and forecasting horizons.

overconfident beliefs. However, the participants' optimistic or pessimistic beliefs changes from period to period, while they tend to have overconfident beliefs in almost all periods. These findings indicate that overconfidence is likely to be a stable bias over time while optimism is not and disclose that the participants have more overconfident beliefs as the forecasting horizon is extended to a longer period. Finally, we find no clear evidence of gender differences in expectation biases.

Taken together, the results of this study and previous literature indicate that participants tend to have optimistic beliefs in some periods and pessimistic beliefs in others, which is an interesting feature to be considered when forecasting future stock prices. More specifically, the participants tend to be pessimistic when the Nikkei 225 goes up but optimistic when it goes down. This tendency indicates that the participants do not expect drastic changes in the Nikkei 225. The tendency of professional forecasters to have pessimistic beliefs is also shown by Giordani and Söderlind (2006) as the stock price index in the United States goes up during their sample period. A similar tendency is found in the results of Shiller et al. (1996), although they do not focus on optimism. This tendency to be pessimistic in an up market but optimistic in a down market may be evidence that people have a status quo bias when they forecast future stock prices.

The remainder of this paper is organized as follows. Section 2 explains the questionnaire survey and its features. Section 3 presents the results and Section 4 discusses the results of this study together with those of previous research. Section 5 concludes.

2. Survey

2-1. Survey characteristics

The survey was conducted at four universities over nine periods during lectures from 2008 to 2011. The participants were all undergraduate students who were asked to forecast the Nikkei 225 over three short forecasting horizons: one day, one week, and one month ahead. They were required to provide their point forecasts and probability distribution forecasts.

Table 1 presents the survey contents and characteristics. From Period 1 to Period 4, the survey was conducted at the Nagoya University of Commerce and Business (NUCB). It was conducted at Kobe University and Osaka University in only two periods, Period 5 and Period 8, respectively. At Kyushu University, the survey was conducted in Periods 6, 7, and 9. During all periods, the survey asked the participants for their point forecasts of the Nikkei 225, while the distribution forecasts were not requested in Period 1.

Table 2 shows survey dates by survey periods. Each period consists of 6 to 15 series. The survey was conducted every week in principle, except Period 5 in which it was conducted every two weeks[3]. The maximum number of series is 15 in Periods 6 and 9, and the minimum number of series is 6 in Period 5. Figure 1 illustrates the movement of the Nikkei 225 during the survey. The survey covers a variety of economic environments. Period 2 is a downturn period and Period 3 is a recovery period. In the other periods, the Nikkei 225 moves gradually.

[3] Due to national and university holidays, sometimes the survey was not conducted every week or every two weeks during the periods.

Table 3 provides the number of observations and respondents by survey period. In each period, the same students who take the courses listed in Table 1 respond to the survey. However, the number of observations does not equal the number of series multiplied by the number of respondents, because some students were either absent from classes or had dropped out of the course. The total number of observations is 6,468 and that of respondents is 840. No student answered the survey for more than one period.

2-2. Questionnaire about stock price forecasts

First, the movement of the Nikkei 225 for the past week, the past month, and the past year was presented to the participants to disseminate recent movements of the Nikkei 225 and to decrease the number of unrealistic forecasts. Then, they were asked to forecast the Nikkei 225 over three short forecasting horizons: one day, one week, and one month ahead. The participants were required to provide their point forecasts and probability distribution forecasts. In the point forecasts, the following questions were asked about the respondents' forecasts for the Nikkei 225.

- How much do you think the Nikkei 225 Stock Price Index will be tomorrow (a week later, a month later)?
  - Answer:_____yen

Except for Period 1, the survey also asked for the participants' probability distribution forecasts as follows.

- What do you think the Nikkei 225 Stock Price Index will be tomorrow (a week later, a month later)?

Less than 8,000 yen	_____% in this range
8,000 yen to 8,500 yen	_____% in this range
・・・・・・	_____% in this range
12,500 yen to 13,000 yen	_____% in this range
More than 13,000 yen	_____% in this range

The number of price ranges and the width of the ranges were 12 and 500 yen, respectively, which were fixed in all periods. However, the minimum and maximum ranges are different for each period to prevent deviation of the Nikkei 225 from minimum or the maximum ranges during each period. The minimum ranges are "Less than 10,000 yen" in Period 2, "Less than 6,000 yen" in Period 3, "Less than 8,000 yen" in Periods 4 and 5, "Less than 9,000 yen" in Period 6, and "Less than 7,000 yen" in Period 7 to Period 9.

3. Results

3-1. Optimism or pessimism

The purpose of this study is to explore time series properties of expectation biases focusing on two kinds of expectation biases: overconfidence (or underconfidence) and optimism (or pessimism). The degree of optimism is measured as the forecast error of the participant's point forecast minus the realized value of the Nikkei 225[4]. Positive (negative) values of the optimism measure indicate that the participants have optimistic

[4] If the stock market is closed at the date, the next available prices are used as the realized values of the Nikkei 225.

(pessimistic) beliefs[5].

Table 4 presents means of the optimism measure by forecasting horizons and its gender differences. All signs of the optimism measure are positive and many of them are significant at the 1% level, thus indicating that the participants have optimistic beliefs on average in all forecasting horizons. The degree of the optimism measure becomes larger as the forecasting horizon grows longer. These tendencies are observed in both females and males. However, there is no clear evidence of the gender difference in the optimism measure. Males are more optimistic than females in the one-day forecasting horizon, while in the one-week and one-month forecasting horizons, females are more optimistic than males, although all the gender differences were insignificant.

Although Table 4 provides no information about the time series properties of optimism, Figures 2 to 4, showing the means of the optimism measure period by period, show evidence that optimism is not a stable bias. The means and 95% confidence intervals of the optimism measure for one-day, one-week, and one-month forecasting horizons are depicted in Figures 2, 3, and 4, respectively. The horizontal and vertical axes represent survey periods and the degree of the optimism measure, respectively. The figures show that the degree of optimism measure varies considerably period by period. The optimism measure is significantly positive in some periods and significantly negative (i.e., pessimism) in other periods[6]. Interestingly, these figures have almost the

[5] This study excludes the sample from the analyses if the participants' forecasts are more than 20,000 yen or less than 2,000 yen because such forecasts seem to be unrealistic. The number excluded from the sample is 12 in the one-day, 21 in the one-week, and 13 in the one-month forecasting horizons. However, the results of this study are not greatly affected if the sample size is not restricted.

[6] The same tendency is also observed when investigating whether or not optimism is stable within

same pattern of optimism except for the degree. These results indicate that the degree itself becomes larger as the forecasting horizon becomes longer, although whether the participants have optimistic or pessimistic beliefs varies from one period to the other.

Unlike previous research, this study finds no clear evidence of the gender difference in optimism. Table 5 presents the gender difference in the optimism measure by survey period, and shows that the gender difference in optimism varies with periods and forecasting horizons. Only in 4 of 27 cases, females are significantly more pessimistic than males. However, in the other cases, females sometimes become more optimistic than males, although the gender difference is not significant[7]. This finding indicates that the gender difference in optimism is unstable similar to optimism itself as.

3-2. Overconfidence or underconfidence

The survey asked for the participants' probability distribution forecasts from Period 2 to Period 9. The probability distribution forecasts enable us to estimate 95% confidence intervals for each response and investigate whether the realized value of the Nikkei 225 falls within the confidence intervals[8]. This study measures overconfidence

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periods. The mean optimism varies considerably across the series in each period.

[7] The same tendency is also observed when investigating whether the gender difference in optimism is stable within periods. The gender difference in optimism varies considerably across series in each period.

[8] This study computes the mean and variance of the forecasted distribution by using the median of each price range and the probability provided by the participants. This method assigns zero variance to the participants who answer 100% in one price range. The overconfidence analyses of this study exclude the sample with zero variance. The number excluded from the sample is 377 in the one-day, 263 in the one-week, and 229 in the one-month forecasting horizons. This study also excludes the sample from the

as a fraction indicating the extent to which the realized value of the Nikkei 225 falls within the 95% confidence intervals. If the overconfidence measure is smaller (larger) than 0.950, the participants have overconfident (underconfident) beliefs.

Table 6 provides the overconfidence measure by forecasting horizons and their gender differences. In all forecasting horizons and in both males and females, the overconfidence measure is significantly smaller than 0.950, indicating that both males and females have overconfident beliefs across all forecasting horizons. In addition, in both males and females, the degree of overconfidence measure is larger as the forecasting horizon becomes longer. However, there is no clear evidence of a gender difference in overconfidence. Females are significantly more overconfident than males in the one-month forecasting horizon, while the gender differences in the overconfidence measure are not significant in the one-day and the one-week forecasting horizons.

Figures 5 to 7 illustrate the overconfidence measure period by period. The overconfidence measures and the 95% confidence intervals for one-day, one-week, and one-month forecasting horizons are depicted in Figures 5, 6, and 7, respectively. The horizontal and vertical axes represent survey periods and the overconfidence measures, respectively. The figures show that the overconfidence measure, similar to the optimism measure, varies considerably period by period. In the one-day forecasting horizon, the participants have significantly overconfident beliefs from Period 2 to Period 4, while they have significantly underconfident beliefs in Period 7. However, they come to have

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analyses if the total number the participant fill in the price ranges is not 100. The number excluded from the sample is 607 in the one-day, 625 in the one-week, and 746 in the one-month forecasting horizons.

more overconfident beliefs as the forecasting horizon becomes longer. In the one-week forecasting horizon, they have significantly overconfident beliefs in 6 of 8 periods, while in the one-month forecasting horizon, they always have significantly overconfident beliefs. These results indicate that overconfidence is likely to be a stable bias compared with optimism as long as the forecasting horizon is sufficiently long.

Although previous literature finds gender difference in overconfidence, this study finds no clear evidence of gender difference in overconfidence or optimism. Table 7 presents the gender difference in the overconfidence measure period by period, and shows that the gender difference in the overconfidence measure varies across periods and forecasting horizons. Males tend to be more overconfident than females in some periods while an opposite tendency can be found in other periods. In addition, we find no relationship between gender differences in the overconfidence measure and the forecasting horizon, thereby indicating that both males and females become more overconfident to the same degree as the forecasting horizon becomes longer.

The results of this study are fairly robust. The overconfident measures are extremely low and the optimism measures are extremely high in Period 2 compared with the other periods, most likely because the stock price fluctuated greatly due to the subprime crisis, which led to the credit crisis and the Lehman bankruptcy in September 2008. However, the results of this study are retained when excluding the sample of Period 2 from the analysis. Moreover, results are unchanged when overconfidence is measured by 90%, 80%, and 70%, instead of the 95%, confidence intervals. Furthermore, the results remain unchanged even if the sample is restricted to the participants who answered in all the series of each period.

4. Discussion: Optimism, overconfidence, and the status quo bias

This study concludes that neither optimism nor pessimism is a stable bias because the direction of the optimism measure is not stable. As reported in the previous section, the results show that people sometimes become optimistic and other times pessimistic. However, together with the results of the previous literature and those of this study, an interesting relationship between optimism and the movement of the Nikkei 225 is observed.

Table 8 presents information on the return of the Nikkei 225 with the direction of the expectation biases. In the downturn period of economic activity, i.e., in Periods 2 and 6, the participants have optimistic beliefs, while they have pessimistic beliefs in the upturn periods—Period 3, Period 7, and Period 8. This tendency is also observed in the relationship between the optimism measure and average rate of return or cumulative rate of return of the Nikkei 225 during each period. The participants have optimistic beliefs when the rates of return are low and pessimistic beliefs when the rates of return are high. This tendency indicates that the participants do not expect drastic changes in the Nikkei 225. They become optimistic (pessimistic) because they underestimate the decline (rising) of the Nikkei 225.

A similar tendency is shown in the results of previous studies. The findings of Giordani and Söderlind (2006) that professional forecasters have pessimistic beliefs also show this tendency, because stock price indexes in the United States go up during their sample period. Similarly, Shiller et al. (1996) examine expectation data from 1989 to 1994 in the United States and Japan. They do not compare the forecasts and the realized

value of stock price indexes. However, if the forecasts are compared with the realized value, we find that Japanese forecasters have optimistic beliefs while the US forecasters have pessimistic beliefs. This is consistent with the tendency found in the period studied, during which stock price indexes declined in Japan and increased in the United States.

On the other hand, the relationship is not observed between the movement of the Nikkei 225 and the overconfidence measure. The participants are likely to have overconfident beliefs irrespective of the economic environment. They are overconfident regardless of whether the rate of return is high or low. Furthermore, they are overconfident regardless of whether the variance of the rate of return is high or low.

These tendencies of the optimism and overconfidence measures might be evidence that people have a status quo bias when they forecast future stock prices. If people have a status quo bias, then they would not expect drastic changes in future outcomes. In fact, the results of this study and previous studies imply that people do not expect drastic changes in stock price indexes. They underestimate the movement of stock price indexes, and therefore, they become optimistic (pessimistic) when stock price indexes decline (rise). Similarly, because they underestimate the movement of stock price indexes, they are always overconfident. The time series properties of optimism and overconfidence uncovered in this study may indicate that these two expectation biases come from a status quo bias.

5. Conclusion

Using a high-frequency survey on stock price forecasts, this study explores time series properties of the following two expectation biases: overconfidence (or

underconfidence) and optimism (or pessimism). The survey asked participants to forecast the Nikkei 225 Stock Price Index over three forecasting horizons: one day, one week, and one month ahead. Constructing proxies for overconfidence and optimism, this study shows that the participants have optimistic and overconfident beliefs on average. Although the participants' optimistic or pessimistic beliefs change from period to period, they tend to have overconfident beliefs in almost all periods. These results indicate that overconfidence is likely to be a stable bias while optimism is not. The results also disclose that the participants have more overconfident beliefs as the forecasting horizon becomes longer. Finally, we find no clear evidence of gender differences in the expectation biases, although previous studies report it.

Considering the results of this study together with those of previous studies, this study finds a relationship between the optimism measure and the movement of stock price indexes. People tend to have optimistic (pessimistic) beliefs when the indexes decline (rise). On the other hand, this relationship is not observed in the overconfidence measure; that is, people have overconfident beliefs irrespective of the movement of indexes. These findings about the optimism and overconfidence measures may be evidence that people have a status quo bias when they forecast future stock prices.

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Table 1. Survey contents by survey periods

Period	University	Year	Term	Course title	Point forecasts	Distribution forecasts
Period 1	NUCB	2008	1	Behavioral Finance	Yes	No
Period 2	NUCB	2008	2	Behavioral Finance	Yes	Yes
Period 3	NUCB	2009	1	Behavioral Finance	Yes	Yes
Period 4	NUCB	2009	2	Behavioral Finance	Yes	Yes
Period 5	KOBE	2009	2	Financial Institutions	Yes	Yes
Period 6	KYUSHU	2010	1	Monetary Economics	Yes	Yes
Period 7	KYUSHU	2010	2	Introductory Behavioral Economics	Yes	Yes
Period 8	OSAKA	2010	2	Introduction to Statistical Method for Policy Analysis	Yes	Yes
Period 9	KYUSHU	2011	1	Introductory Economics	Yes	Yes

Notes: This table shows the survey contents and characteristics. NUCB, KOBE, KYUSHU, and OSAKA stand for Nagoya University of Commerce and Business, Kobe University, Kyushu University, and Osaka University, respectively. All courses are for undergraduate students. Distribution forecasts are not asked in Period 1.

Table 2. Survey dates of each survey period

Series	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8	Period 9
1	4/8/2008	9/16/2008	4/13/2009	9/14/2009	10/13/2009	4/12/2010	10/12/2010	10/13/2010	4/14/2011
2	4/15/2008	9/23/2008	4/20/2009	9/28/2009	10/27/2009	4/19/2010	10/19/2010	10/20/2010	4/21/2011
3	4/22/2008	9/30/2008	4/27/2009	10/5/2009	11/17/2009	4/26/2010	10/26/2010	10/27/2010	4/28/2011
4	5/13/2008	10/7/2008	5/11/2009	10/12/2009	12/1/2009	5/10/2010	11/9/2010	11/10/2010	5/12/2011
5	5/20/2008	10/14/2008	5/18/2009	10/19/2009	12/22/2009	5/17/2010	11/16/2010	11/17/2010	5/19/2011
6	5/27/2008	10/21/2008	5/25/2009	10/26/2009	1/12/2010	5/24/2010	11/30/2010	11/24/2010	5/26/2011
7	6/3/2008	10/28/2008	6/8/2009	11/9/2009		5/31/2010	12/7/2010	12/1/2010	6/2/2011
8	6/10/2008	11/11/2008	6/15/2009	11/16/2009		6/7/2010	12/14/2010	12/8/2010	6/9/2011
9	6/17/2008	11/18/2008	6/22/2009	11/23/2009		6/14/2010	12/21/2010	12/15/2010	6/16/2011
10		11/25/2008	6/29/2009	11/30/2009		6/21/2010	1/11/2011	12/22/2010	6/23/2011
11		12/2/2008	7/6/2009	12/7/2009		6/28/2010	1/18/2011	1/12/2011	6/30/2011
12		12/9/2008		12/14/2009		7/5/2010	1/25/2011	1/19/2011	7/7/2011
13				12/21/2009		7/12/2010	2/1/2011	1/26/2011	7/14/2011
14						7/16/2010			7/21/2011
15						7/26/2010			7/28/2011

Notes: This table shows the survey dates of each survey period. Each period consists of 6 to 15 series. The survey was conducted every week in principle except in Period 5.

Table 3. The number of observations and respondents by period

Period	Number of series	Number of observations (female)	Number of respondents (female)	Avg. number of responses	Max. number of responses	Min. number of responses
Period 1	9	279 (67)	38 (9)	7.342	9	1
Period 2	12	249 (68)	25 (6)	9.960	12	1
Period 3	11	850 (111)	106 (13)	8.019	11	1
Period 4	13	1035 (193)	112 (19)	9.159	13	1
Period 5	6	371 (102)	133 (37)	2.789	6	1
Period 6	15	1225 (403)	146 (46)	8.390	15	1
Period 7	13	733 (136)	80 (15)	9.163	13	1
Period 8	13	441 (270)	76 (35)	5.803	13	1
Period 9	15	1285 (195)	124 (17)	10.363	15	1
Total number of observations (female) = 6468 (1545)						
Total number of respondents (female) = 840 (197)						

Notes: This table shows the number of observations and respondents by period. The numbers in parentheses are the number of female observations and respondents.

Table 4. The optimism measure and its gender difference

	1 day			1 week			1 month		
	Number of observations	Mean (S.E.)		Number of observations	Mean (S.E.)		Number of observations	Mean (S.E.)	
Total	6413	13.689	***	6397	68.391	***	6283	246.076	***
		(4.814)			(7.073)			(11.978)	
Female	1531	9.770		1530	76.361	***	1510	261.163	***
		(10.710)			(13.411)			(24.337)	
Male	4882	14.918	***	4867	65.886	***	4773	241.303	***
		(5.358)			(8.286)			(13.761)	
Gender difference		−5.148			10.476			19.860	
		(11.292)			(16.582)			(28.034)	

Notes: This table shows the number of observations and mean of the optimism measure by forecasting horizon using a full sample. Standard errors are in parentheses. *** measures are significant at 1%.

Table 5. Gender difference in the optimism measure by survey period

Period	Gender difference in the optimism measure					
	1 day		1 week		1 month	
Period 1	−2.934		−124.439	**	−189.978	
	(33.483)		(62.774)		(134.586)	
Period 2	79.243		174.085		328.360	
	(96.670)		(140.676)		(228.193)	
Period 3	−106.124	**	−56.125		119.800	
	(51.859)		(70.022)		(95.060)	
Period 4	30.542		74.156		19.413	
	(33.806)		(51.661)		(74.383)	
Period 5	−53.845		−27.593		75.226	
	(45.259)		(71.288)		(122.130)	
Period 6	−34.998	*	-47.636		−140.589	***
	(18.968)		(30.035)		(41.527)	
Period 7	−10.307		−26.193		−0.151	
	(24.645)		(47.333)		(46.580)	
Period 8	32.028		0.118		−10.045	
	(42.119)		(38.879)		(59.985)	
Period 9	18.013		−28.545		–67.187	
	(22.970)		(26.586)		(57.569)	

Notes: This table shows gender difference in the optimism measure (the mean of the optimism measure for females minus that for males) by survey period. Positive (Negative) values mean that females are more optimistic (pessimistic) than males. Standard errors are in parentheses. ***, **, and * measures are significant at 1%, 5%, and 10%, respectively.

Table 6. The overconfidence measure and its gender difference

	1 day		1 week		1 month	
	Number of observations	Overconfidence	Number of observations	Overconfidence	Number of observations	Overconfidence
Total	5484	0.930 ***	5580	0.872 ***	5493	0.703 ***
		(0.003)		(0.004)		(0.006)
Female	1350	0.927 ***	1359	0.874 ***	1339	0.669 ***
		(0.007)		(0.009)		(0.013)
Male	4134	0.931 ***	4221	0.872 ***	4154	0.714 ***
		(0.004)		(0.005)		(0.007)
Gender difference		−0.004		0.002		−0.045 ***
		(0.008)		(0.010)		(0.014)

Notes: This table shows the number of observations and the overconfidence measure with the standard errors by forecasting horizon using a full sample. Standard errors are in parentheses. ***, **, and * measures are significant at 1%, 5%, and 10%, respectively, against the null hypothesis that the overconfidence measure equals 0.950.

Table 7. Gender difference in the overconfidence measure by survey period

Period	Gender difference in the overconfidence measure					
	1 day		1 week		1 month	
Period 2	−0.216	***	−0.072		−0.110	**
	(0.082)		(0.076)		(0.042)	
Period 3	−0.053	*	−0.089	**	−0.012	
	(0.028)		(0.038)		(0.048)	
Period 4	−0.001		0.011		−0.093	**
	(0.025)		(0.035)		(0.040)	
Period 5	−0.005		0.021		−0.112	*
	(0.024)		(0.043)		(0.058)	
Period 6	0.017		−0.016		−0.059	*
	(0.014)		(0.019)		(0.030)	
Period 7	−0.001		0.028		0.065	**
	(0.014)		(0.020)		(0.029)	
Period 8	−0.012		−0.023		−0.071	*
	(0.020)		(0.017)		(0.042)	
Period 9	0.048	***	0.034	*	0.018	
	(0.018)		(0.020)		(0.035)	

Notes: This table shows gender difference in the overconfidence measure (the mean of the overconfidence measure for females minus those for males) by survey period. Positive (Negative) values mean that females are more underconfident (overconfident) than males. Standard errors are in parentheses. ***, **, and * measures are significant at 1%, 5%, and 10%, respectively.

Table 8. The movement of the Nikkei 225 Stock Price Index and the expectation biases

Period	Movement of NIKKEI 225	Avg. rate of return	Cumulative rate of return	Variance of rate of return	Optimism or Pessimism			Overconfidence or Underconfidence		
					1 day	1 week	1 month	1 day	1 week	1 month
Period 1	Up and down	0.159	7.452	2.180	-	-	Opt.	×	×	×
Period 2	Crash	−0.706	−39.512	25.690	Opt.	Opt.	Opt.	Over.	Over.	Over.
Period 3	Up	0.133	7.441	2.500	-	Pes.	Pes.	Over.	Over.	Over.
Period 4	Down and up	−0.012	−0.758	1.827	Pes.	-	-	Over.	Over.	Over.
Period 5	Down and up	0.122	7.204	1.561	-	-	Opt.	-	Over.	Over.
Period 6	Down	−0.254	−17.793	2.577	Opt.	Opt.	Opt.	-	Over.	Over.
Period 7	Up	0.117	8.677	0.913	Pes.	-	Pes.	Under.	Under.	Over.
Period 8	Up	0.142	9.768	0.924	Pes.	-	Pes.	-	Under.	Over.
Period 9	Down and up	0.032	2.215	0.913	-	Opt.	Opt.	-	Over.	Over.

Notes: This table shows the average and cumulative rates of return on the Nikkei 225 Stock Price Index during each survey period and the direction of the expectation biases. The optimism (or pessimism) and the overconfidence (or the underconfidence) measures are presented only when they are statistically significant at more than the 10% level.

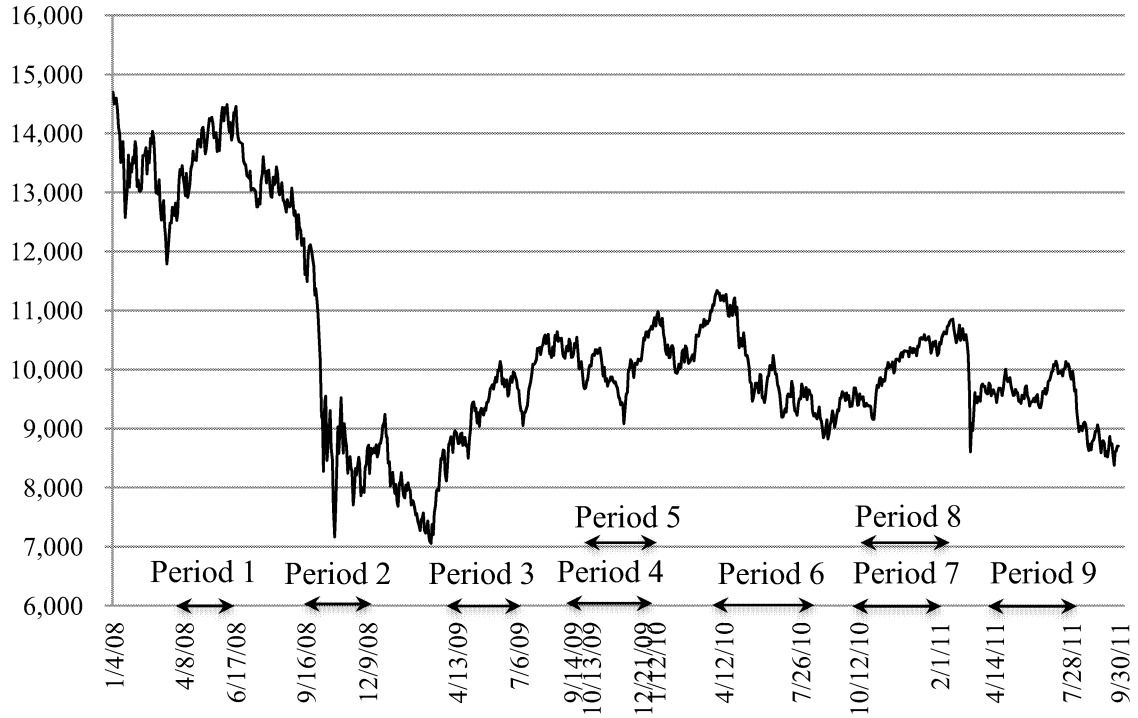

Figure 1. Movement of the Nikkei 225 Stock Price Index in the survey periods

Notes: Figure 1 shows the movement of the Nikkei 225 Stock Price Index from /1/4/2008 to 9/30/2011 and the survey periods. The horizontal and vertical axes represent the survey periods and the value of the Nikkei 225 Stock Price Index, respectively.

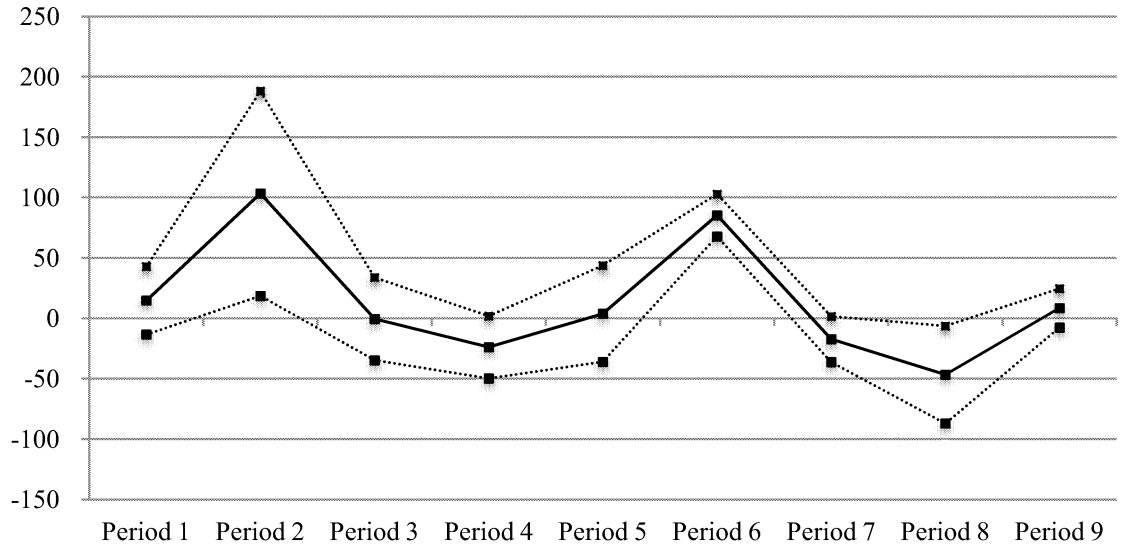

Figure 2. Change in the optimism measure for the one-day forecasting horizon by survey periods

Notes: Figure 2 shows the means and 95% confidence intervals of the optimism measure for the one-day forecasting horizon by survey periods. The horizontal and vertical axes represent survey periods and the degree of the optimism measure, respectively.

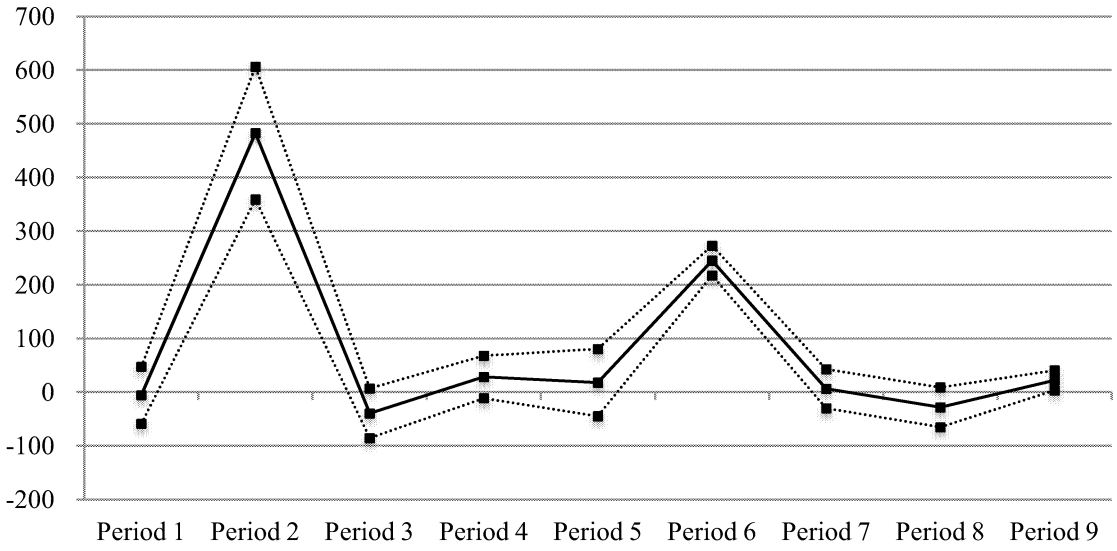

Figure 3. Change in the optimism measure for the one-week forecasting horizon by survey periods

Notes: Figure 3 shows the means and 95% confidence intervals of the optimism measure for the one-week forecasting horizon by survey periods. The horizontal and vertical axes represent survey periods and the degree of the optimism measure, respectively.

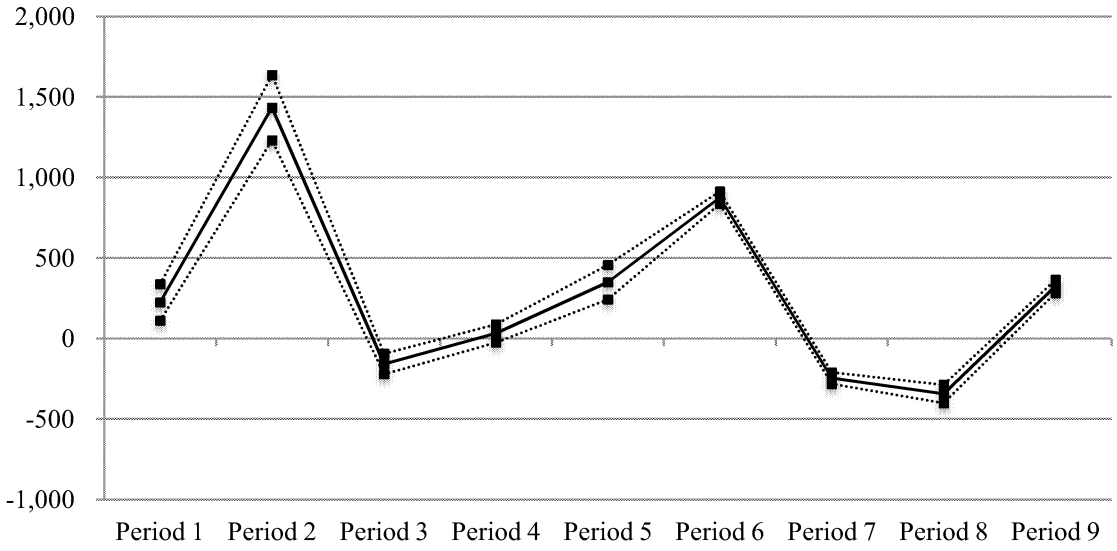

Figure 4. Change in the optimism measure for the one-month forecasting horizon by survey periods

Notes: Figure 4 shows the means and 95% confidence intervals of the optimism measure for the one-month forecasting horizon by survey periods. The horizontal and vertical axes represent survey periods and the degree of the optimism measure, respectively.

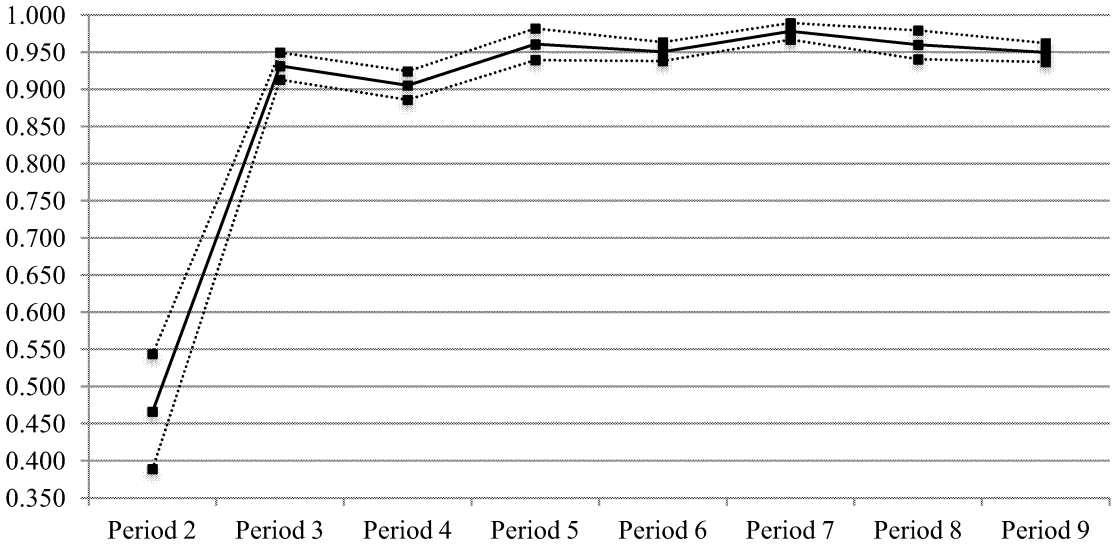

Figure 5. Change in the overconfidence measure for the one-day forecasting horizon by survey periods

Notes: Figure 5 shows the overconfidence measure and 95% confidence intervals for the one-day forecasting horizon by survey periods. The horizontal and vertical axes represent survey periods and the overconfidence measure, respectively.

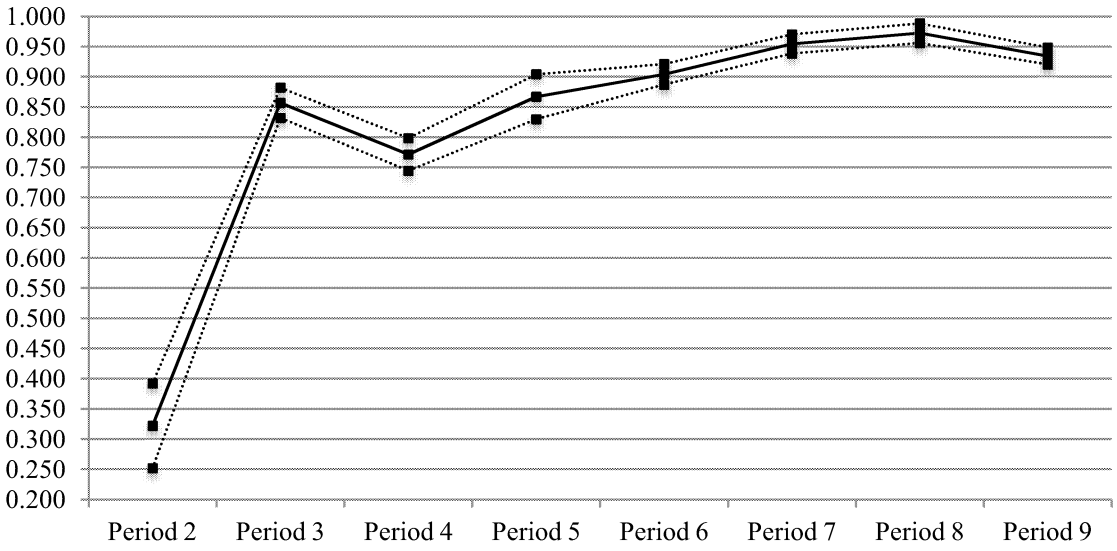

Figure 6. Change in the overconfidence measure for the one-week forecasting horizon by survey periods

Notes: Figure 6 shows the overconfidence measure and 95% confidence intervals for the one-week forecasting horizon by survey periods. The horizontal and vertical axes represent survey periods and the overconfidence measure, respectively.

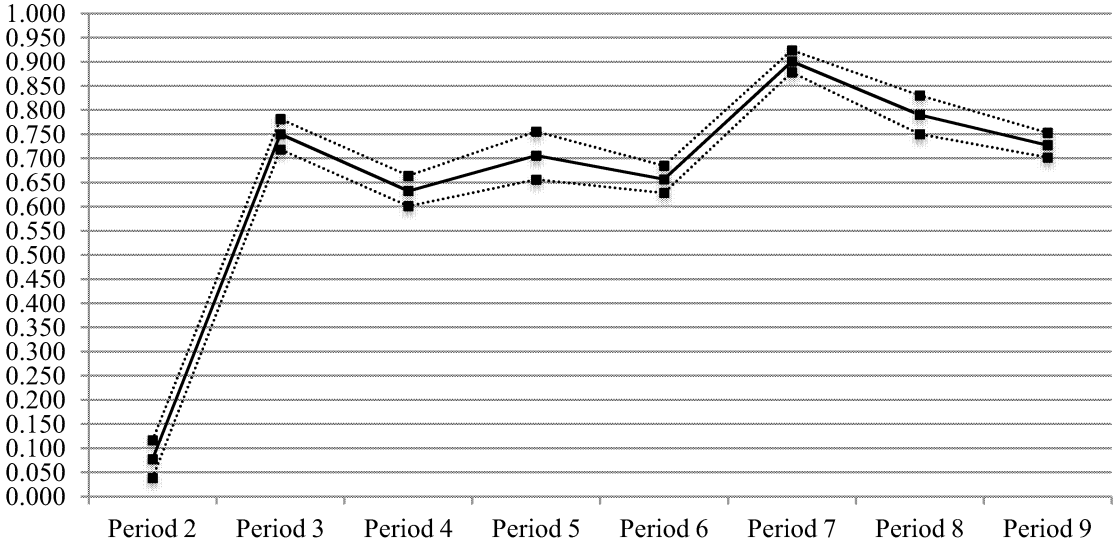

Figure 7. Change in the overconfidence measure for the one-month forecasting horizon by survey periods

Notes: Figure 7 shows the overconfidence measure and 95% confidence intervals for the one-month forecasting horizon by survey periods. The horizontal and vertical axes represent survey periods and the overconfidence measure, respectively.

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