Investing Amid Uncertainty: A Test of the Domain Specific Anchoring Hypothesis

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Abstract

The current study examined reactions to the precision of earnings' forecasts in hypothetical investment decisions. In a forced choice task, participants were found to be indifferent between point (e.g., $2) or range (e.g., $1.70-$2.30) forecast formats when both outcomes were favorable (i.e., above market expectation). When the outcomes were *un*favorable (below expectation), participants' preferences were significantly biased towards range estimates. When faced with options which mixed forecast formats and favorability, participants almost always opted for forecasts with a favorable outlook regardless of format. These results are inconsistent with domain specific ambiguity reactions found previously (Du, 2009) and also offer no support for the domain specific anchoring hypothesis (e.g. Du, 2009; Du & Budescu, 2005). These findings raise some doubts about the generality of domain specific reactions to uncertainty and suggest that such effects might be dependent, in part, on the (financial) sophistication of participants.

Keywords: Point; Range; Uncertainty; Ambiguity; Communication; Precision format; Domain specific

Investors often rely on management earnings forecasts when making their investment decisions. However, these forecasts are rarely precise. For example, there is uncertainty surrounding the reliability and credibility of the forecasts, the forecasters might be unsure about the current economic outlook, the market might be too volatile for an accurate forecast to be made and so on. This growing uncertainty that the investors, inevitably, have to face has generated a heated discussion on how best to communicate uncertainty to financial decision makers (Christensen, Glover, Omer, & Shelley, 2012).

Extant literature has found that managers often communicate uncertainty by incorporating imprecision into their management earnings forecasts (Christensen et al., 2012; Du, 2009; Du & Budescu, 2005; Du, Budescu, Shelley, & Omer, 2011). Instead of providing a precise point forecast (e.g. $1.00), managers issue earnings forecasts in the form of a range estimate (e.g. $0.60-$1.40).

These findings are further evidenced in the National Investor Relations Institute survey results (NIRI, 2003). They found that the majority (78%) of corporate members provided earnings forecasts information regularly and among them, 75% use range estimates, whereas only 11% choose the precise point formats. In addition, the authors found that, by the end of 2001, 55% of the firms reported their earnings in a range format while only 23% issued the earnings forecasts in the form of point estimate (Cotter, Tuna, & Wysocki, 2006).

Reactions to Range Forecasts

Despite the fact that range forecasts are widely used in earnings forecasts, investors' reactions to this format are rather mixed. On one hand, some literature has found that being open about uncertainty by choosing a range disclosure format could not only increase perceived credibility, trustworthiness (Hirst, Koonce, & Venkataraman, 2008), and investors' confidence in the company (Habicht, 1992) but also reduce the company's legal liability (Hirst et al., 2008).

On the other hand, evidence of range formats not being well-received has also been obtained. Prior research has shown that using the range format has led to reduced investors' confidence (Hirst, Koonce, & Miller, 1999), heightened risk perception (Han et al., 2009; Kuhn & Budescu, 1996), negative affective reactions such as worry or distress related to choice outcomes and avoidance of decision making in choice situations (Camerer & Weber, 1992; Han, Moser, & Klein, 2006).

Mixed reactions towards range forecasts were also highlighted in participants' comments that, although they felt that range forecasts were more trustworthy and informative than precise point format, the range format has led them to question the company's competence and ability in estimating the uncertainty and risk involved (Dieckmann, Mauro, & Slovic, 2010; Johnson & Slovic, 1995).

In terms of people's understanding of the information conveyed in the range format, past studies reported that participants felt that range forecasts were more complicated and harder to understand (Han et al., 2009; Johnson & Slovic, 1995), even for highly educated and professional participants (Sheridan & Pignone, 2002).

Domain Specific Ambiguity Reactions

Driven by the mixed findings between the reactions to point and range earnings forecasts, Du (2009) conducted a study to clarify how investors react to forecasts in different presentation formats and with different outcome favorability. In Du's study, MBA students were asked to evaluate four different investment options based on the brief company background information provided and also their respective CEO's forecasts of next year's earnings presented either in a point or a range form. Specifically, the participants were given prediction of the Earnings Per Share (EPS) for next year.

Furthermore, participants received information about the performance of the company relative to a benchmark.

Participants were told whether the forecasts were higher (indicating positive/favorable performance) or lower (negative/unfavorable performance) than market expectation. Having read the descriptions and forecasts information, the participants made a series of judgments, including earnings prediction, confidence, investment, risk and likelihood of investment decisions.

Drawing evidence from the literature on decision making under ambiguity (e.g. Camerer & Weber, 1992; Du & Budescu, 2005; Ellsberg, 1961), Du predicted that investors would display ambiguity attitudes which were domain specific. In other words, in the domain of favorable outcomes, participants would seek ambiguity and react positively to range forecasts whereas in the domain of unfavorable outcomes, participants would avoid ambiguity and react negatively to range forecasts.

Du (2009) found that precision format had no effect on investors' earnings predictions, confidence and risk judgments. However, partial support for the domain specific hypothesis was found in that when the outcomes were favorable (i.e. the forecasts were higher than market expectation), participants preferred ambiguity and invested more when the forecasts were presented in a range rather than in a point format. However, no such finding was found when the outcomes presented were unfavorable (investment was equally low in both range and point formats).

Du's (2009) findings are consistent with Viscusi and Chesson's (1999) findings that participants' reactions to ambiguity was driven by the "hope and fear" effects. Viscusi and Chesson found that when the situation generates a 'fear' effect (or a small possibility of loss), people are more averse to ambiguity whereas when the situation generates a 'hope' effect, people are more inclined to seek ambiguity. Du's favorable forecasts could have generated a 'hope' effect, and hence, driven participants to seek ambiguity and invest more in companies with range forecasts.

Domain Specific Anchoring Hypothesis

Du (2009) suggested that her findings are consistent with the argument that participants selectively draw information from different focal end points of range estimates when the decision context changes (Du & Budescu, 2005). In particular, the domain specific argument posits that participants are more likely to focus on the upper bound of the range and seek ambiguity (or imprecision) when there is a potential for gains, but they are more likely to focus on the lower bound of the range and avoid ambiguity when there is a potential for losses (hereafter referred to as the *domain specific anchoring hypothesis*). Du's finding that people invested more in companies with range forecasts when the outcomes were favorable could be the result of a preference for the higher earnings values when participants compared the upper end of the range forecasts with the point forecasts.

Furthermore, this domain specific anchoring hypothesis has been linked to goal framing theory. Budescu, Kuhn and colleagues (2002) argue that investors are motivated by the goals to maximize gains and to minimize losses in the financial market, and thus, anchor their judgments on different focal end points in different contexts. In the domain of gains, participants anchor their judgment on the upper end of the range estimates so as to maximize the potential gains and vice versa in the domain of losses in order to minimize their potential losses.

Aim and Hypotheses

Whilst evidence shows that the domain specific argument is well-established, thus far, no research has tested this hypothesis directly in the context of investor decisions. Therefore, the current study examined the prevalence of domain specific ambiguity reactions and tested the extent to which these findings could be explained by the domain specific anchoring hypothesis. The current study adapted a method used by Du et al. (2011) and presented participants with eight forced choice options differing in the forecast format, predicted outcome favorability and forecasts values. After they read the brief descriptions of the two forecasts, participants evaluated the informativeness, accuracy and credibility of each form of presentation.

Prior to indicating their preference of investment in the two options, they were required to predict where the actual earnings would fall. That is, for the point forecasts (e.g., $2.00), they estimated the probability of the actual earnings being lower than, exactly at, and higher than the point estimate. For the range forecasts (e.g., $1.70-$2.30), participants indicated the probability of the actual earnings to be lower than the lower end, exactly at the lower end, between the range, exactly at the higher end, and higher than the higher end of the range forecasts (hereafter referred to as *the anchoring task*). Their responses served as an indication of where they anchored their judgments when making the investment decision under different domains.

In accordance with Du (2009), it was predicted that participants would show domain specific ambiguity reactions, that is, participants would show ambiguity-seeking behavior when the forecasts were favorable (i.e., prefer range over point estimates) and ambiguity-averse behavior when the forecasts were unfavorable (i.e., prefer point over range).

Furthermore, it was expected that these patterns of responses could be explained by the domain specific anchoring hypothesis. We predicted that the participants' estimates of the actual earnings to be more likely to occur at the higher end of the range estimates when forecasts were favorable and given that this upper end estimate was higher as compared to the point estimate, they would be more inclined to choose range forecasts when they saw favorable outcomes. In a similar vein, we predicted participants would anchor more on the lower end of the range estimates when the forecasts were unfavorable and since this lower bound estimate was lower than the comparative point estimate, participants would prefer point estimates more when the outcomes were unfavorable.

In terms of informativeness, accuracy and credibility, it was predicted that point estimates would be rated as more accurate than range ones (Du, 2009), and that as the imprecision increased, the perceived informativeness (Kim & Verrecchia, 1991) as well as its credibility (Longman, Turner, King, & McCaffery, 2012) would decrease.

Method

Participants

Thirty Psychology undergraduate students from the University of New South Wales participated (70% male, M_{age} = 19.5 year-old, SD_{age} = 2.2) in return for course credit.

Experimental Design and Measures

This study employed a 2 (forecasts format: point vs. range) X 2 (forecasts favorability: favorable vs. unfavorable) X 2 (forecasts values: high vs. low) within-subject design. Participants were asked to assume the role of an investor and to assess a number of investment options that varied in three dimensions: (1) earnings forecasts format, (2) forecasts favorability, and (3) forecasts values.

Forecasts Format The earnings forecasts (i.e. EPS) were presented either in a point (e.g. \$2.00) or a range (e.g. \$1.70-\$2.30) format. These two formats were considered to be informationally equivalent because the midpoint of the range estimate always matched the point estimate. The width of the range estimates was fixed at \$0.60.

Forecasts Favorability Similar to Du (2009), benchmark information for each forecast was provided to indicate the overall performance of the company. Participants were asked to assume that an earnings forecast that was *higher* than market expectation indicated good performance whereas one that was *lower* than market expectation indicated poor performance.

Forecasts values Prior research has shown that investors' decisions were affected by the expected earnings values (Du & Budescu, 2005). Thus, the absolute values of the current earnings forecasts were also manipulated. Half of the estimates were *high* in values (with a midpoint of \$5.00 or \$6.00) while the remaining half was *low* in their absolute amount (with a midpoint of \$1.00 or \$2.00).

Procedures

Subsequent to providing informed consent, participants were given earnings forecasts of two companies and asked to indicate which company they would invest in. They could also express indifference between the two options. However, prior to making their investment decision, they were required to evaluate the informativeness, accuracy and credibility of each of the formats on a 6-point scale (1: *Not at all*, 6: *Very*). Then, they were instructed to complete the anchoring task for each form of presentation. After completing the rating and anchoring judgments, the respondents made their investment decision.

The two forecasts formats and two favorability outcomes yielded four possible combinations of the two dimensions:

1. Range favorable vs. Point favorable
2. Range unfavorable vs. Point unfavorable
3. Point favorable vs. Range unfavorable
4. Point unfavorable vs. Range favorable

For example, participants comparing statements in the first combination would evaluate "Company PA with a predicted EPS of \$2.00, which is higher than market expectation" (*point favorable* statement) and "Company QC with a predicted EPS in the range of "\$1.70- \$2.30, which is higher than market expectation (*range favorable* statement). Altogether, participants completed eight forced choice options, two versions (a high and a low absolute value version) for each combination.

Results

Table 1 displays the distribution of investor's preferences of forecasts format and outcome favorability across high and low earnings values. Contrary to prediction, the pattern of responses did not show that participants favored range (point) forecasts when the outcomes were favorable (unfavorable). Instead, Table 1 shows that when the outcomes were favorable (comparison 1), participants were about equally likely to choose the company with point or range forecasts. When the forecasts were unfavorable (comparison 2), participants were biased towards choosing range estimates. However, in situations where there was a mix between forecast format and outcome favorability (comparisons 3 and 4), participants almost always opted for the ones with favorable outlook, regardless of format.

A statistical analysis was conducted to examine if these differences were statistically significant. Participants' choices were coded into an index of preference for precision. As in Du et al. (2011), a preference for point forecast was given a value of 0 whereas a preference for range forecast was given a value of 1. Indifferent (or "Either") option was assigned a value of 0.5[1]. A mean preference score was calculated with a mean of less than 0.5 indicating a preference for point estimates and a mean score of more than 0.5 indicating a preference for range forecasts. A one-sample t-test, with a test-value of 0.5, was conducted and support for the patterns of responses aforementioned was found (see Table 2).

In short, no evidence of domain specific ambiguity reactions was found. As can be seen in Table 2, participants seemed to prefer range estimates more especially when the forecasts were unfavorable, and when they were faced with a choice with mixed forecast format and outcome favorability, their decisions were almost always swayed by the favorability of the outcomes.

[1] A further analysis showed that excluded indifferent responses did not alter the statistical pattern of effects.

Domain Specific Anchoring Hypothesis

The distributions of participants' predictions about the range and point forecasts are summarized in Figure 1. Figure 1 shows, overall, participants estimated that the actual earnings were more likely to be in between the range estimates and exactly at the point estimate. The participants also appeared to believe that the actual earnings were roughly equally likely to occur at the different focal end points, regardless of decision context.

Recall that the domain specific anchoring hypothesis predicted that participants' allocation of the probability judgments at the different end points would differ as a function of favorability of the outcomes. Specifically, the hypothesis predicts that participants will anchor their judgments at the lower end of the range forecasts when the outcomes were unfavorable, but at the upper end when the outcomes were favorable. The data plotted in Figure 1a seem to show no support for this anchoring hypothesis.

In order to test this prediction statistically, an average of participants' responses at the lower ends (i.e. both 'exactly at lower bound' and 'lower than lower bound') and the upper ends (i.e. both 'exactly at upper bound' and 'higher than upper bound') of the range estimates were calculated. T-tests were then carried out to examine if participants' prediction of the occurrence of the actual earnings at the lower and upper ends would differ as a function of outcome favorability. No significant differences were found. The results indicated that participants believed that the actual earnings were equally likely to occur at the lower and upper ends regardless of outcome favorability, $t(29)_{lower} = -.408$, $p_{lower} = .686$ and $t(29)_{higher} = 1.378$, $p_{higher} = .179$ respectively.

Similar analyses were also conducted on point forecasts. In accordance with the domain specific anchoring hypothesis, it was predicted that participants would be more optimistic and believe that the actual earnings were more likely to be higher than the forecast when the forecast was favorable, but they would be more pessimistic and consider the actual earnings to be lower than the estimate when the forecast was unfavorable. T-tests revealed that none of the effects were significant, both *p*s > .05.

Collectively, findings from both the point and range analyses showed no support for the domain specific anchoring hypothesis. Participants did not focus on the different end points when the favorability of the outcomes differed.

Informativeness, Accuracy and Credibility Ratings

A 2 X 2 X 2 repeated measure ANOVA was carried out on participants' informativeness, accuracy and credibility ratings. Consistent with prior research (Du, 2009), point estimates ($M = 4.07$, $SD = 1.18$) were rated as more accurate than the range forecasts ($M = 3.32$, $SD = 0.87$), $F(1,29) = 11.242$, $p = .002$. In terms of credibility ratings, favorable forecasts (or forecasts that were higher than market expectation; $M = 3.26$, $SD = 1.14$) were rated as slightly less credible than unfavorable ones (or those that were lower than market expectation; $M = 3.46$, $SD = 1.13$), $F(1,29) = 6.849$, $p = .014$. No other significant effects of forecast formats and favorability on how participants rated informativeness, accuracy and credibility judgments were found.

Table 1. Distribution of preferences of forecast format and outcome favorability across different earnings conditions.

	DMs prefer	Low EPS	High EPS	Average
1. Point Fav vs. Range Fav	Point Fav	11	9	10
	Range Fav	15	18	16.5
	Either	4	3	3.5
2. Point Unfav vs. Range Unfav	Point Unfav	5	8	6.5
	Range Unfav	17	14	15.5
	Either	8	8	8
3. Point Fav vs. Range Unfav	Point Fav	17	22	19.5
	Range Unfav	8	6	7
	Either	5	2	3.5
4. Point Unfav vs. Range Fav	Point Unfav	6	3	4.5
	Range Fav	21	23	22
	Either	3	4	3.5

Note: DM = Decision Makers; EPS = Earnings per share; Low EPS = EPS with low values (with a midpoint of $1.00 or $2.00); High EPS = EPS with high values (with a midpoint of $5.00 or $6.00); Fav = Favorable; Unfav = unfavorable, Either = indifferent between the two options.

Table 2. Comparison of point and range forecasts differing in favorability.

	Mean Preference	*t*(29)	Sig. (2-tailed)
1. Point Fav vs. Range Fav	0.61	1.383	0.177
2. Point Unfav vs. Range Unfav	0.65	2.473	**.019***
3. Point Fav vs. Range Unfav	0.29	-3.117	**.004****
4. Point Unfav vs. Range Fav	0.79	4.592	**.000****

Note: Ms **> 0.5** indicates a preference for **range** forecasts; Ms **< 0.5** indicates a preference for **point** forecasts
*indicates significance at the .05 level
** indicates significance at the .01 level

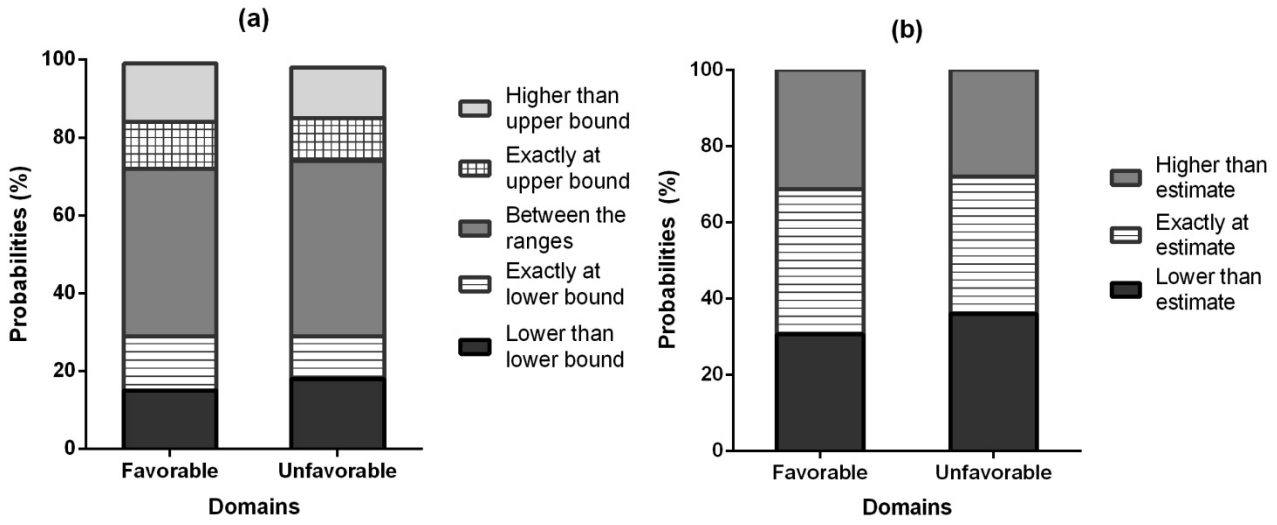

Figure 1. Distribution of probabilities of occurrence of actual earnings at different focal points for (a) range and (b) point estimates.

Discussion

The current study aimed to test the domain specific anchoring hypothesis directly in the context of financial decision making. An examination of investors' preferences for point or range presentation format in favorable and unfavorable contexts revealed no evidence for domain specific ambiguity reactions. Participants did not show ambiguity seeking or avoidance behavior when the favorability of the outcomes changed. A further investigation of participants' anchoring judgments on where the actual earnings would fall also failed to support the domain specific anchoring hypothesis. Somewhat surprisingly, we found that even though participants believed that point forecasts were more accurate than range forecasts, they still seemed to prefer forecasts in range format more than those in point format, particularly when the forecasts were unfavorable. This finding was not affected by the perceived informativeness and credibility judgments on the presentation format.

Interestingly, favorable forecasts were rated as less credible than unfavorable estimates. Given the growing uncertainty in the current economy, participants may be more cautious and skeptical about the forecasts provided. They may feel that favorable forecasts have not sufficiently incorporated the uncertainty in the current economic conditions, and hence, rated them as less credible than unfavorable ones.

Another interesting finding of the present study is that financial decisions are largely dominated by the favorability of the outcomes. In the third and fourth comparisons where forecast format and outcome favorability were mixed, participants almost always selected the ones with favorable outcomes. Given that participants were told to regard 'higher (lower) than market expectation' as an indication of good (poor) performance, it is perhaps unsurprising that the effects of favorability may overshadow the concern for forecast format when both dimensions are mixed. It would be interesting in follow up work to see if participants' preferences' differ when favorability of the outcomes is manipulated between subjects.

One possibility for why we did not find domain specific ambiguity reactions could be that the current participant pool was psychology undergraduates rather than the MBA students used in Du (2009). Moreover, we did not take into account participants' prior investment experience or knowledge about the stock market. Limited exposure to the financial settings may have affected participants' understanding of the earnings prediction presented to them making them less susceptible to the influence of the different forecast formats. Future work could examine this role of 'expertise' in reactions to imprecision.

Another difference between the current research and Du's (2009) is that Du employed range forecasts with variable width whereas we used range forecasts with fixed width. The largest range width used in Du's study (i.e. $1.80) was three times the value of the current width (i.e. $0.60). It could be that the domain differences in ambiguity reactions are only found in forecasts with larger range width.

This assertion is further supported by examination of the range width used in Du and Budescu's (2005) study which also found support for domain specific ambiguity reactions. The size of the range width chosen by the authors ranged from $2.00 to $32.00. Although participants in the current study rated range forecasts as different (in terms of accuracy) from point forecasts, the $0.60 range width may still be too narrow, and hence, too subtle to influence their preferences between the two formats.

On the other hand, previous evidence of domain specific ambiguity reactions (e.g. Du & Budescu, 2005) is not as direct as Du's (2009). For example, Du and Budescu (2005) found that domain specific ambiguity reactions was task specific. They only found the reversal of ambiguity attitudes in a certainty equivalent task but not in a pairwise

comparison task. Thus it seems that reactions to ambiguity might be dependent on the particular task used to elicit preferences.

Furthermore, in their study, the authors manipulated the sources of uncertainty – whether it is uncertainty in the estimates or in the outcomes (Du & Budescu, 2005). It could be that the effect of domain specific ambiguity reactions would be stronger when another source of uncertainty is included. Future research specifically focusing on these issues will help to clarify the exact nature of domain specific ambiguity reactions.

In conclusion, we found no evidence for domain specific ambiguity reactions or for the anchoring hypothesis in the context of investment decisions. However, our results revealed that favorability of the outcomes dominates judgments and its effect may have masked the concern for presentation format when both dimensions were mixed. Future research, controlling for the issues discussed, is required to unpack the domain specific observations more thoroughly.

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