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Discussion

Yueran Ma began by responding to a number of points made by the discussants. One issue that was raised was the extent of serial correlation in the data. Ma noted that their data is constructed from yearly forecasts and that there was overlap between consecutive forecasts. The authors have used different Newey-West lag lengths in their regressions and found the results were robust to the choice of the number of lags. Next, Ma mentioned an issue from the discussion by Christopher Sims regarding the distinction between expectations and “expectational shocks,” which the authors define as the unpredictable component of their survey expectations. The authors chose to focus on survey expectations as a whole, rather than the unpredictable component. Related to this choice, Ma and her coauthors used basic regressions rather than a VAR structure, in part because they have only 60 quarters of survey data. The authors agreed that studying expectational shocks would be useful in future work.

Ma also addressed the issue of the authors’ choice of earnings measure. The authors focused on pro forma earnings, in part because they are typically the focus of earnings announcements for CFOs. The authors also reported that, if they used a GAAP earnings measure instead of pro forma earnings, the CFO forecasts appeared to be of lower quality. The authors also tried a variety of alternative specifications, including using median or modal forecasts instead of means and using least-absolute-deviation regressions, all of which yielded similar results. They also found that the level of the forecast predicted forecast errors; however, this would be expected when either the forecast or the outcome is measured with noise. Their results were robust to including additional terms, such as lagged forecasts, but those results were only

available at the aggregate (rather than firm) level because the CFOs do not necessarily participate in the survey every quarter.

Finally, Ma responded to some of the points made by Monika Piazzesi in her discussion. Ma and her coauthors agree that their findings are related to a paper by Piazzesi and coauthors (Piazzesi et al. 2013), which documents time variation in forecasts of bond returns. In particular, both sets of authors find that expectations are more persistent over time than known predictors of returns. Piazzesi, in her discussion, mentioned the tension between the authors' finding of extrapolative expectations and firms' ability to time the market. Ma responded by mentioning how mechanical rules might lead to this result and mentioned a finding by Robert Shiller that individuals can simultaneously think that the stock market is overvalued and that it is going to keep rising in value. Ma and coauthors find some suggestive evidence that CFOs hold similar beliefs.

Harald Uhlig spoke next, recalling a conversation he once had with V. V. Chari about investing in the stock market. Chari had complained to Uhlig that he was always losing money and told Uhlig, "My advice to you is to do the exact opposite of what I'm doing. That way, you would make money." Uhlig recalled this advice in the context of the present paper, in which the authors find that CFOs make systematic, predictable errors. Uhlig suggested that, in theory, one could start a consulting firm that asked these CFOs what their plans were and then suggest altering them based on these predictable errors. Uhlig noted that the authors' results suggest this hypothetical consulting firm would help its clients and asked the authors to measure the extra profits the CFOs' firms could make if they didn't have these biases. Uhlig also suggested an alternative interpretation, in which the CFOs' stated expectations cannot be treated as the CFOs' actual expectations but are useful for predicting investment and related quantities. Andrei Shleifer responded by acknowledging that he and his coauthors are unable to estimate the cost of these errors, given their data. He speculated that a more fully developed structural model might be able to answer this question.

Andrew Atkeson spoke next, addressing a question to one of the discussants, Monika Piazzesi. Atkeson summarized a chart Piazzesi presented as showing stable survey expectations of bond returns and volatile statistical estimates of expected bond returns, with expected returns in the statistical model ranging from -10% to $+10\%$. Atkeson argued that, if expected returns moved as much as the statistical model implies,

investment would also be very volatile. Firms, responding to these expected returns, would go through periods in which they slashed investment and periods in which they “go crazy.” Atkeson stated that we do not observe this kind of behavior and suggested that this might indicate a problem with the statistical model rather than a problem with survey expectations. If the statistical model happened to work well in-sample but was overfitted, we would expect the results that Piazzesi documents.

Atkeson also addressed a question to the authors, regarding the time horizon for CFOs. He used the example of Tesla Motors and argued that Tesla would make investment plans over a five- or ten-year horizon. If CFOs were focused on long-term trends, such as whether Tesla could ever sell as many cars as Volvo, and short-term earnings contained a lot of noise around these trends, that would rationalize the sort of forecast errors the authors find. Atkeson asked the authors about the horizon their CFO survey respondents were using and whether they thought this type of explanation could make sense of their results.

Andrei Shleifer responded by arguing that growth rates in earnings are correlated at one-year horizons but not at four- or five-year horizons. Andrew Atkeson disagreed, arguing that there are fast-growing firms and slow-growing firms, which occasionally switch type. Shleifer agreed that some firms will exhibit growth dynamics that are different from what their basic model assumes but argued that the authors’ model captures the essential features of the data.

Monika Piazzesi spoke next, agreeing with the points raised by Andrew Atkeson. Piazzesi noted that there is a large literature on the predictability of returns, which she has participated in, and acknowledged that data mining is a possibility and that papers might find predictability that does not exist. Piazzesi expressed her sympathy with these concerns while reiterating the point that there is a very large difference between these statistical models and survey data. The survey data generally exhibit stable risk premia and predict large risk premia only during the great inflation. Piazzesi pointed out that, under these beliefs, standard preferences can be consistent with observed asset prices.

Xavier Gabaix praised the authors’ use of expectations data and suggested that the authors attempt to “document the expectation formation function.” Gabaix suggested that expectations can be thought of as the sum of a rational component and an excessively extrapolative component, and then he asked the authors to determine whether investment responds mostly to the rational component of expectations, the extrapolative component, or expectations as a whole.

Andrei Shleifer replied, claiming that the decomposition Gabaix asked for requires many additional assumptions. In the context of a firm, it is not clear whose expectations—those of CFOs, other managers, board members, shareholders, or activist investors—will actually determine investment. Firms often act as arbitrageurs in their own securities, as documented in Yueran Ma's senior thesis. Additionally, some agents appear to extrapolate past returns rather than past cash flows growth or some other "fundamental." Understanding which combination of these beliefs ultimately determines investment is a challenging problem.

Daron Acemoglu spoke next, making two points. Acemoglu agreed with Andrei Shleifer's point that investment behavior will depend on both the firm manager's beliefs and on market participants' beliefs and argued that there will be some learning, on the part of the market, about the manager's beliefs as a result of her investment decisions. Moreover, the market participants beliefs may constrain the manager, because of the manager's need to finance new investment projects.

Acemoglu also agreed with some of the points made by Harald Uhlig, concerning the treatment of survey expectations as a proxy for actual expectations. Acemoglu cited the work of Nathan Hendren (Hendren 2013) as, in the context of insurance, treating survey expectations as a variable that is not equal to subjective beliefs but has explanatory power above and beyond other observables in predicting those beliefs. Acemoglu pointed out that, in this context, Hendren was able to derive nonparametric restrictions about behavior given prices, conditional on survey beliefs. Acemoglu suggested that the authors might be able to pursue a similar approach in their data.

Andrei Shleifer responding by agreeing that the approach suggested by Acemoglu would be reasonable. However, Shleifer pointed out that the CFOs are being asked about a number that is central to their compensation, job performance, and career concerns. Shleifer agreed that issues regarding whose expectations matter are important but argued that the most sensible way to treat these CFOs forecasts is as their sincere report of their actual beliefs. Acemoglu pointed out that CFOs might be most concerned about some nonlinear function of this growth rate. Shleifer and coauthors responded by noting that they had tried a variety of specifications and found no support for the idea that the CFOs were reporting some other moment of their expectations. Christopher Sims suggested that CFOs might have a "loss function" associated with their expectations that causes them to give biased survey answers. Sims recalled doing a consulting project for the CDC and be-

ing told that his forecast of a particular division's revenue growth was useless because his growth forecast was lower than the corporate plan called for. Sims argued that some CFOs might feel obligated to report the corporate plan rather than their actual expectations. Shleifer replied by noting that the CFOs are assured anonymity but agreed that this problem might apply to stock analysts.

Robert Hall raised a more general concern along the lines of what Christopher Sims had suggested, about whether the statistic the CFO survey respondents are forecasting is the same one the authors are using to check their forecasts against. Yueran Ma stated that the question the CFOs are asked is, "Relative to the past 12 months, what is the percentage change over earnings in the next 12 months?" Hall pointed out that there are many ways of describing and measuring earnings growth and asked if the CFOs had really had understood the exact question being asked—the "fine print." Andrei Shleifer objected, arguing that there isn't really any "fine print," and noting that, for a misunderstanding to explain their results, the misunderstanding would have to be correlated with past earnings growth so as to generate the extrapolation that the authors find. Yueran Ma also noted that the results are robust to various transformations and also highly correlated with analysts' forecasts. The authors essentially "do the algebra for the analysts" when they convert the quarterly forecasts into their measure; therefore, this measure is unlikely to be affected by misunderstandings.

Jonathan Parker agreed with the authors' premise that expectations data are informative and worth studying. He noted that the authors take the view that probabilities are observed, but utility is not. Parker pointed out that there is a large literature attempting to measure happiness and well-being, sometimes by using surveys. He then argued that if economists are willing to use surveys to elicit individuals' beliefs, they should also be willing to use surveys to elicit their preferences. Next, he characterized the rational expectations assumption as useful because it determines how expectations change when regimes or policies change. In other words, it allows economists to make forecasts "out of sample." Parker argued that, within sample, it is not necessary to distinguish between beliefs and preferences. Out of sample, this distinction is necessary. Finally, Parker noted that if the CFOs were responding with risk-adjusted beliefs, the authors would be confounding bias expectations with risk premia. Parker stated that there is some evidence in the psychology literature that people do focus on tail events, and in particular worry a lot about these events when prompted to think about them.

Andrei Shleifer responded by arguing that, in some cases, individuals neglect the risk of tail events and don't think about them unless prompted. He argued that there is no unambiguous mapping between the probability of an event and an individual's assessment of that event's probability. In response to Parker's points about measuring happiness, Shleifer reiterated that he felt the CFO's forecasts had a straightforward interpretation, whereas happiness assessments are a lot more complicated. Individuals report significant changes in lifetime happiness in response to small payments and in response to very recent events.

To conclude, Andrei Shleifer reemphasized the importance of considering whose beliefs matter, and how those beliefs are mediated by markets, for the purpose of understanding corporate decision making. He argued that corporations are easier to study than individuals because their goal is to maximize profits, not utility.