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The formation of expectations: Competing theories and new evidence☆

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ABSTRACT

Agents form expectations about the future in many markets, and these expectations drive investment and consumption behavior, inform entry and exit choices, and can even provide direct satisfaction or distress. How agents form expectations is therefore of central interest to economists. This paper reviews three competing theories and then provides empirical evidence about what elements make up an agent's expectation about an outcome that is person-specific, susceptible to influence by the agent's own actions, and fairly well predictable on the basis of historical precedent. We examine repeated cross-sections of hundreds of undergraduate students' expectations at mid-semester of their own final course grades at two Australian universities. Data on actual and expected grades are exploited, as well as demographic and psychological information, course information, and data on students' academic background, effort levels, happiness, and historical progress at university prior to expectation formation. Results indicate that a simple rational expectations model of expectation formation provides a poorer fit to the data than a utility model involving either direct utility benefits from expectations, or a psychological need to hold high expectations.

1. Introduction

This paper discusses and empirically tests a selection of simple theoretical models that might explain why students in two Australian universities expect to receive higher grades than they actually receive. Such an optimistic bias, which we find to be economically meaningful and statistically significant in our student sample, has also been found in many other contexts. Economists have found people to be overly optimistic about their odds of winning competitive tasks (Caliendo and Huang, 2008; Scheinkman and Xiong, 2003; Camerer and Lovallo, 1999; Barber and Odean, 2001), and psychologists have found that people display over-confidence about the future in general (Weinstein, 1980). We place particular focus in this paper on the role of effort in the area of expectation formation, because we hypothesize that over-optimism helps individuals to motivate themselves to put in more effort than they otherwise would.

Our data consist of over 7000 student-course observations drawn from two Australian universities over 3 years. Each semester, each student in our data was asked to report the 'percentage out of 100' that he expected to receive in each course in which he was enrolled. We are then able to compare these expectations to actual grades, and link both measures to an array of information about ability, effort, and psychology. By asking people about their stated happiness, we also have access to a measure of experienced utility, which will be useful in checking whether there is a 'joy from high expectations'.

Classic expected utility theory (Neumann and Morgenstern, 1947) would yield the prediction that these expectations are on average correct, and that nothing systematically explains the difference between expectations and realizations. If this difference were in fact predictable at the moment of expectation formation, then that would signify an inability on the part of the respondent to use currently available information in predicting his outcome. Instead, we find that students on average expect their grades to be more than half a standard deviation higher than they turn out to be, and that many observable characteristics systematically predict this difference: males are more optimistically biased than females, and ability, both self-reported and revealed via previous grades, significantly predicts over-optimism.

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In this paper we search for alternative theories to explain this over-optimism. Yet it is important to recognize that alternatives to the standard expected utility model are superabundant. A whole economic sub-literature has grown around prospect theory and other 'non-expected utility' models that tackle particular deviations from the standard model (see Starmer (2000) for a review), including models of mis-perceptions of probabilities (Edwards, 1962; Yaari, 1987; Kahneman and Tversky, 1979; Gigerenzer and Selten, 2001) and mis-perceptions of actual magnitudes (Freudenburg and Rursch, 1994). A large amount of work in cognitive psychology also directly yields implications for expectation formation. There is, in fairness, a veritable wilderness of irrationality from which to choose candidate explanations. The choice of which alternatives to 'try' is unavoidably driven in part by what one sees as the most important deviations from the standard model. The two deviations we have chosen to compare against the standard model in this paper derive mainly from emerging literatures in happiness economics and cognitive psychology, but we are keen to acknowledge that there are many alternative candidates to explore.

The core of the first alternative theory that we juxtapose against the standard model is that expectations themselves are a consumption good. By this we mean that they are not merely the outcome of a person's considered reflection about his likely future reality, but represent a set of internal images and stories about the future that are consumed much as a person consumes images and stories about the present and the past. Our first variation therefore incorporates the possibility that individuals obtain a direct utility benefit from imagining a higher outcome, and therefore would choose to hold higher average expectations than are warranted by reality. This idea has already been offered by economists examining utility streams, for example from income growth (Senik, 2008; Clark, Frijters, and Shields, 2008; Foster, Frijters, and Johnston, 2012) or income relative to a reference point (Gollier and Muermann, 2010). It accords with the proposition that people can engage in 'anticipatory savoring'—for which Bryant and Veroff (2007) have developed empirical measures—and rests on the observation of neuroscientists that imagining the future involves the same mental apparatus as perceiving the present (Carlsson et al., 2000; Breiter et al., 2001). It is a first-step deviation from the standard economic model in the sense that we will still assume for this first alternative that the ensuing over-optimism is independent of effort choices.

One evolutionary rationale for giving an organism an incentive to be overly optimistic is that this makes individuals more convincing when they promise things to others: because they themselves truly believe that a good outcome will ensue, they sound more believable to others when they make impossible promises.[1] Still, we construct this second model to be similar to the model in Foster, Frijters, and Johnston (2012), in which there is a utility value of having high expectations but in which the individual makes his effort decisions based on the truth. This is close in flavor to the classic economic notion that individuals behave 'as if' they are rational, while still accommodating expectations that deviate because of a warm glow associated with self-deception. While this theory fits the over-optimism we observe in our data, its implication that effort does not depend on the factors that drive over-optimism turns out to be incorrect. In our data, high self-esteem individuals both over-predict their outcomes and put in additional effort than otherwise identical individuals.

Building from that finding, the third model we consider features a link between expectations and effort via self-esteem. In this model, inflated self-esteem leads individuals to expect they will get higher grades because they systematically think they are better than they truly are. This mis-perception in turn leads them to put in more effort, since they misjudge their personal marginal returns to effort. The driving mechanism in this model is that higher self-esteem, rather than the expectation *per se*, brings about a direct utility benefit.[2] The evolutionary rationale for this mechanism is more precise, since the over-optimistic signal to potential partners relates directly to own abilities. Optimistic expectations are then the natural outflow of an inflated estimate of one's own abilities. This would imply a narrower set of outcomes about which one is overly optimistic: in particular, we should over-estimate the likelihoods of positive outcomes that reflect favorably on our abilities. Under this model, one would expect individuals to be overly optimistic about their driving abilities and thus under-invest in car insurance, while not expecting much systematic bias in, say, the distance they must drive to work or how happy they will be in 5 years. Consistent with this, Frijters et al. (2009b) indeed find no systematic bias in the degree to which German respondents in a large panel thought they would be happy in the future.

The contribution of the present paper is that it is the first attempt to judge the degree to which a utility flow from expectations and/or self-esteem is able to make better predictions about effort and over-confidence than the classic model. The data we use was purpose-gathered and is a unique combination of information on self-esteem, expectations, effort and administrative data on actual outcomes. While the three models are all new and the hypotheses that we derive from them are hence novel, the basic ideas incorporated in this paper are not new. In particular, Brunnermeier and Parker (2004) constructs a model where expectations of the future directly bring pleasure, and use it to show among other things that optimally, people will choose to hold expectations that are higher than reality. Gottlieb (2014), as previously mentioned, embeds a value of high self-image into a utility model. One main difference between these papers and ours is that these papers do not have a direct psychic cost of self-delusion involved in screening out information detrimental to over-optimism (as we have), but implicitly let the cost arise from bad choices. In this sense, we follow instead the cognitive dissonance tradition wherein it truly takes some effort and psychological pain to ignore information that runs counter to false beliefs (Sharot, Korn, and Dolan, 2011).

Another major difference is in how outcomes and probability distributions are treated. The papers mentioned above fit the Bayesian mold of presuming that individuals have a (subjective) probability distribution in their heads when thinking about the future, and that they are capable of manipulating their own estimation of good future outcomes at no cost, but also that they are still disciplined enough to have true probabilities in their heads (since the subjective probabilities still sum up to one). Within that tradition, questions like 'how happy do you expect to be in the future?' and 'what do you expect your grade to be?' are in fact

[1] Social psychology offers that self-deception about one's own abilities is useful inasmuch as truly believing that one is terrific helps in convincing potential mates, who have evolved to be good at reading other people's true feelings, that one is in fact terrific (Trivers, 2000; von Hippel and Trivers, 2011); see Byrne and Kurland (2001) for a formal evolutionary model of this idea.

[2] This is similar to the mechanism proposed in Gottlieb (2014) in the sense of implying an optimal self-deception. However, in Gottlieb's framework, selective memory is also a factor and, crucially, people with sufficient practice learn to stop deluding themselves and devolve to satisfying the predictions of expected utility theory. An alternative rationale for a connection between expectations and self-esteem is that high self-esteem might be directly related to our mental health and hence our outlook. In support of this possibility is the fact that optimists have, on average, been found to be psychologically healthier than pessimists (Scheier and Carver, 1992).