of central banks and financial markets I could refine these upper and lower bounds. But I don't think that I would be doing this by thinking in terms of frequencies and objective probabilities. Financial history is simply not homogeneous enough for the notion of frequency to be applicable. The subjective probability theorist seems at least to have a more accurate way of describing what I would be doing – namely, as fixing a subjective probability interval (a range of degrees of belief).

The key question, then, is whether Binmore's approach can be understood in terms of subjective probabilities. He argues persuasively that subjective probabilities cannot be applied in the way that the subjective Bayesian wants to apply them – at least, not outside the small worlds where it is possible to look before one leaps, as he puts it. But, given that he is proposing an extension of Bayesian decision theory to larger-than-small worlds, his position must be that his own arguments do not apply to subjective probabilities that fix upper and lower bounds, as opposed to giving unique degrees of belief. The book does not, however, explain why this should be the case. What's so special about subjective probability intervals that they should be immune to arguments that are effective against subjective probabilities in the classical sense? As far as I can see, the arguments for restriction to small worlds based on the requirements of Bayesian updating and fixing priors apply just as forcefully in the case where upper and lower probabilities diverge as in the case where they coincide. In any event, this is something that I hope Binmore will clarify in future work.

As I hope this review has made clear, *Rational Decisions* contains a wealth of stimulating arguments and thought-provoking claims. It would be an excellent text for an advanced seminar in decision theory, particularly for students with a solid technical background. And no economist, philosopher or political scientist seriously interested in theories of rational decision-making can afford to ignore Binmore's controversial and iconoclastic claims.

José Luis Bermúdez
Washington University in St Louis

doi:10.1017/S0266267110000106

The Foundations of Positive and Normative Economics: A Handbook, ed. Andrew Caplin and Andrew Schotter. Oxford University Press, 2008, xxii + 382 pages.

In November 2005 Faruk Gul and Wolfgang Pesendorfer, two prominent economists at Princeton University, published a polemical working paper entitled 'The Case for Mindless Economics'. The main goal of the paper was

to show that psychological and neural evidence cannot be used to support or reject standard economic models, and hence is not directly relevant to economic theory. To attain this goal, Gul and Pesendorfer (henceforth GP) pictured standard positive economics as concerned only with observable choices, and welfare economics as characterized by the identification of what is better for the individuals with what they choose.

The paper sparked some debate in the economics profession, and this prompted Andrew Caplin and Andrew Schotter to organize a conference discussing the issues addressed by GP. The conference took place at New York University in August 2006 and involved 22 major economists and decision scientists, but unfortunately only one philosopher. The volume under review contains the final versions of the 15 papers presented at the conference.

The book is divided into four parts. Part I consists only of GP's 'Case' in a version that is almost identical to the original one, as if the entire debate about the paper had no effect on the authors' convictions. Part II offers five chapters that discuss GP's case from various critical perspectives. In direct opposition to GP, Colin Camerer argues that neural data can help us to better understand human decision-making and discriminate among different theories of decision. Schotter questions the idea that economics should be concerned only with choice data. Ran Spiegler argues that characterizing a theory of decision in terms of its choice implications is a useful exercise in developing behavioural decision models, but this exercise cannot be used as the sole criterion for theory selection. Ariel Rubinstein and Yuval Salant claim that there is no escape from including mental entities in economic models. And finally, Daniel Hausman, the only philosopher participating in the conference, provides three possible interpretations of GP's claim that only choice data are relevant to the acceptance of economic models, and finds the claim wanting in each interpretation.

The three papers in Part III explore how to carry out welfare analysis when it is acknowledged that 'chosen' does not always coincide with 'better'. Douglas Bernheim and Antonio Rangel present a model where choices may depend on features of the environment not directly related to utility, and some choices are excluded for welfare analysis purposes because they are not considered indicative of well-being. Botond Köszegi and Mattew Rabin identify certain decisions as systematic mistakes and outline how a theory of behaviour can incorporate them. George Loewenstein and Emily Haisley provide examples illustrating that people often do not choose what is better for them and make a case for a light paternalistic approach to welfare economics.

Part IV contains six papers that investigate issues broadly related to the methodology of economics. These contributions are highly diverse with respect to topic, style and depth, and often do not connect at all to GP's

paper. Among them, I found particularly interesting Edward Glaeser's essay, 'Researcher Incentives and Empirical Methods'. It shows how the decreasing costs for producing and elaborating data create wider room for selective presentation of findings, and hence increase the probability that spuriously significant results get published. I also found very helpful Caplin's chapter, 'Economic Theory and Psychological Data: Bridging the Divide', which is the last contribution to Part IV and aptly closes the book. Caplin puts forward a fruitful interpretation of GP's article and proposes a methodology to bridge the divide between GP's strictly choice-theoretic approach to economics and the approach practised by behavioural economists and neuroeconomists.

As this brief overview may have suggested, many of the papers collected in the volume are stimulating and thoughtful. However, I see two main shortcomings in the book as a whole. First, it lacks unity. Almost half of the papers address issues only marginally related to those raised by GP. This makes it difficult for the reader to understand the main outcomes of the debate. In this respect, a shorter but more focused volume would probably have been preferable. I also think that a final rejoinder by GP would have been highly desirable, especially because all papers discussing their contribution are, in one way or another, critical of their position. As already mentioned, the version of GP's paper published in the volume is almost identical to the original one, and this suggests that GP judge these criticisms off the mark. It would have been interesting to understand why.

Second, the title of the book – *The Foundations of Positive and Normative Economics: A Handbook* – seems to me inappropriate. In effect, the volume collects contributions mostly related to individual choice theory and welfare analysis, which are a fundamental but circumscribed part of economics. Issues related to the foundations of other parts of the discipline, such as game theory, applied economics, macroeconomics or growth theory, are not addressed in the book. With respect to the papers contained in Part IV, they are too diverse and unsystematic to be considered as chapters of a handbook. Finally, for those scholars who are not familiar with the GP origin of the conference and the volume, the title may be misleading.

The remainder of this review is mainly devoted to examining the debate about GP's choice-based characterization of positive economics and hence will focus on the papers contained in Parts I and II of the volume, as well as on Caplin's final chapter. That characterization is in fact the key argumentative move in GP's case, and for good or bad it shapes not only their paper but the entire debate about it.

In the first section of their article, GP write: 'In the standard approach, the terms 'utility maximization' and 'choice' are synonymous. [. . .] The relevant data are revealed preference data, that is, consumption choices given the individual's constraints. These data are used to calibrate the

model (i.e. to identify the particular parameters), and the resulting calibrated models are used to predict future choices [. . .]. Hence, standard (positive) theory identifies choice parameters from past behavior and relates these parameters to future behavior' (pp. 7–8). Later in the paper, GP acknowledge that psychological factors may be relevant for economic decision making and that economists routinely take their inspiration from psychological data or theories. However, psychological insights should have no place in the model itself: 'In standard economics, the testable [choice] implications of a theory are its content; once they are identified, the non-choice evidence that motivated a novel theory becomes irrelevant' (p. 8).

This picture of positive economics owes much to the behaviouristic approach to choice theory proposed by Paul Samuelson (1938) and the instrumentalist methodology popularized in economics by Milton Friedman (1953). Both Samuelson's behaviourism and Friedman's instrumentalism have been widely criticized in the philosophical and economic literature, but GP ignore these previous discussions (see among others Nagel, 1963; Sen, 1973; Musgrave, 1981; Hausman, 1992).

With respect to the descriptive adequacy of GP's image of positive economics, Caplin notices that fundamental parts of standard positive economics rely on psychological elements that can be hardy inferred from choice data. The most important example is game theory, which refers to unobservable variables such as interactive beliefs or out-of-equilibrium strategies. Therefore, either game theory cannot be considered as a part of standard positive economics, which is a difficult position to maintain, or GP's picture of positive economics is too narrow.

Furthermore, GP's claim that in the standard approach revealed preference data 'are used to calibrate the model [. . .] and the resulting calibrated models are used to predict future choices', seems an overly optimistic depiction of what standard economists do. It seems rare to find theory papers that bother to empirically calibrate the model they put forward, or discuss the significant implementation problems associated with parameter estimation (for a similar point, see Harrison, 2008a).

It can also be noted that the fact that theoretical models are rarely estimated empirically or tested experimentally often makes the distinction between 'choice' and 'preference' merely a rhetorical divide. In fact, from a formal viewpoint preference and choice are just two mathematical objects: the former is a binary relation while the latter is a correspondence. The alleged distinction between them is that choice is at least in principle observable, while preference is not. However, since the choice experiments that should transform what is observable in principle into actual observations generally remain purely imaginary, the crusade for the methodological primacy of choice over preference appears to be 'much ado about nothing'. Hausman makes a similar point when he notices that the

revealed preferences choice theorists refer to are in fact only 'hypothetical revealed preferences'; however, 'in switching from actual to hypothetical choice, one has abandoned the empiricist ideal of avoiding references to and reliance on anything that is not observable' (p. 137).

In addition, in his paper Spiegler observes that GP's behaviouristic picture of positive economics does not even describe what GP themselves do as theorists. In an article about temptation, GP (2001) model a two-period dynamic decision problem. In period 1 the agent chooses a menu of options, while in period 2 she chooses an element from the menu chosen in period 1. This idea is captured by 'decision paths': a decision path is a pair (A, x) where A is the menu chosen in period 1, and $x \in A$ is the element chosen from A in period 2.

GP (2001) impose axioms on the individual revealed-preference relation over decision paths, such as completeness and transitivity. Spiegler points out that in many cases there is no 'choice experiment that directly reveals the ranking $(A, x) \succ (B, y)$' (p. 111). In fact, if after choosing A in the period 1 the agent is tempted by option z, then he 'never chooses x from A out of his own free will' (p. 111), and therefore the pair (A, x) will be never behaviourally observed. Spiegler concludes that the notion of preference in GP's model of temptation is inconsistent with GP's identification of preference with choice.

Other chapters in the volume point out that GP's picture of positive economics is debatable also from the prescriptive viewpoint. Both Schotter and Hausman notice that GP's claim that economic theory should be trimmed down to its observable implications, belongs to a more general epistemological stance that denies the legitimacy of unobservable variables in science. Yet, this is a minority stance in the philosophy of science, and the use of unobservable concepts is quite common in other sciences such as physics. Schotter and Hausman also stress that the observable implications of a theory do not exhaust its content, because economists are not only interested in knowing whether the observations are consistent with the theory but also want to understand why this is the case. Understanding how a theory works and why it is successful is important in order to apply it to different contexts and to amend it when it is violated. Therefore, and in contrast to GP's claims, economists may be interested in the psychological or neural mechanisms behind choice behaviour.

Both Hausman's piece and that of Rubinstein and Salant also call attention on the circumstance that 'psychological preference' and 'behavioral preference' (that is, preference as revealed by choice) are different notions, and suggest that positive economics would lose much of its content if psychological preference were identified with choice. In effect, agents may have psychological preferences over things they cannot choose; in this case their psychological preferences are not revealed by choice. For instance, a player does not choose the outcome of the game since he does not control

the actions of the other players. However, his psychological preferences over outcomes, even over non-equilibrium outcomes, are decisive for the strategic analysis of the game. Moreover, choices may not derive from the maximization of psychological preferences, but be the result of some boundedly-rational procedure. In this case, the chosen element may not be the best one for the agent, and the identification of preference with choice would prevent appreciating this aspect of the situation.

Although Caplin and Spiegler are critical of GP's contribution, they manage to provide a fruitful interpretation of it, and this renders their chapters particularly worth reading. In contrast to GP, Spiegler claims that a 'revealed preference exercise', that is, a characterization of a decision model in terms of general properties of the choice pattern it induces, cannot be used as the sole criterion for theory selection. However, Spiegler also opposes the idea that behavioural economists can safely express decision models in the language of utilities without trying to perform a revealed preference exercise. In fact, such an exercise 'brings to the fore key behavioral properties [of the decision model], which are known to be insightfully linked to the properties of utility, and yet are sometimes obscured by the utility language' (p. 103). Thus, a revealed preference exercise 'may serve as a safeguard against misleading interpretation of the model's assumptions, domain of applicability, and conclusions' (p. 99). Spiegler substantiates his claim by showing how our understanding of some behavioural models in which the agent's well-being is directly affected by his beliefs (for instance because he derives direct satisfaction from anticipation of high material payoffs) is substantially improved by the revealed preference exercise.

Caplin sees GP's paper as motivated by their concern that the proliferation of behavioural models of decision-making may threaten the unity of economics. According to Caplin, GP's insistence on observable choices should be interpreted as a method to discipline the development of economic theory: 'The challenge before us concerns how best to open up new avenues of exploration while retaining the essential coherence of economic thought. In direct response to this challenge, [GP] have proposed a highly disciplined method by which to expand the domain of economics. They propose fixing empirical attention firmly on standard choice data, using choice-theoretic [...] methods to characterize how psychological factors may affect such choices' (p. 337).

Caplin is sympathetic to GP's concerns, but he outlines an alternative methodology that could discipline the development of economics without impeding the research of behavioural and neuroeconomists. Similarly to GP's approach, Caplin's 'involves characterization of the exact empirical content of a model for a particular data set. As in standard choice theory [...] models producing the same data are to be regarded as equivalent' (p. 361). However, Caplin enriches the set of legitimate data in a substantial

way, including not only choice data but also response data such as answers to surveys, data related to the decision-making process (such as the time taken in making a decision), and neural data. All of these, in Caplin's view, may serve to characterize the empirical content of a model. The problem with Caplin's proposal is that the empirical characterization of a decision model in terms of response data, data related to the decision-making process, or neural data is generally far from clear, and this risks rendering the characterization exercise he suggests impracticable.

The main outcome of the debate seems to be that GP's case calls attention on the importance of the 'revealed preference exercise' (Spiegler) and may be understood as a reaction to the proliferation of behavioural models (Caplin). However, GP's characterization of positive economics as a discipline concerned only with observable choices appears untenable.

This does not mean that everything is well and good with behavioural and neuroeconomics, but only that GP's move of criticising them in an indirect way, i.e. by bringing into play a partial and narrow definition of economics, appears a losing one. Probably a direct critique of the practices of behavioural and neuroeconomics would have been more fitting and fruitful.

In this respect, the attack on neuroeconomics and partially on behavioural economics proposed by Harrison (2008a, 2008b) in a recent issue of the present journal is much more effective than GP's. Among other things, Harrison points out that a number of criticisms of standard economic theory on the part of behavioural and neuroeconomists is due to misrepresentation or misunderstanding of standard economic analysis, that the way neuroeconomists construct and statistically elaborate their data is highly questionable, and that the inferences they draw about the causal connection between the activity of certain parts of the brain and certain cognitive processes is often fallacious.

In conclusion, although GP's paper is not the best starting point for an informed and constructive discussion, Caplin and Schotter have managed to collect a number of thought-provoking contributions, which help us understand better some foundational problems related to the rise of behavioural and neuroeconomics and put again methodological discussion onto the agenda of economists.

Ivan Moscati
Bocconi University

REFERENCES

Friedman, M., Ed. 1953. The methodology of positive economics. In *Essays in Positive Economics*. Chicago, IL: University of Chicago Press.

Gul, F. and W. Pesendorfer 2001. Temptation and self-control. *Econometrica* 69: 1403–1435.

Musgrave, A. 1981. 'Unreal assumptions' in economic theory: the F-Twist untwisted. *Kyklos* 34: 377–387.
Nagel, E. 1963. Assumptions in economic theory. *American Economic Review* (*Papers and Proceedings*) 53: 211–219.
Samuelson, P. 1938. A note on the pure theory of consumer's behaviour. *Economica* [NS] 5: 61–71.
Harrison, G. W. 2008a. Neuroeconomics: a critical reconsideration. *Economics and Philosophy* 24: 303–344.
Harrison, G. W. 2008b. Neuroeconomics: a rejoinder. *Economics and Philosophy* 24: 533–544.
Hausman, D. 1992. *Essays on Philosophy and Economic Methodology*. Cambridge: Cambridge University Press.

doi:10.1017/S0266267110000118

Reciprocity, Altruism and the Civil Society: In Praise of Heterogeneity, Luigino Bruni. Routledge, 2008, xiii + 158 pages.

Luigino Bruni, Professor of Economics at the University of Milan-Bicocca, outlines in this book a new theory of reciprocity, understood as the bond or cement of society. A historian of thought with expertise in economic and social theory, Bruni is convinced that nothing can be said on this subject without taking game theory seriously (p. xiii). The book stands thus on a tripod: one foot on history, one on conceptual or theoretical analysis, and a third one on mathematical calculations of expected utility and evolutionary dynamics (with help from Alessandra Smerilli). Synthetic or bridge-building efforts like this one are welcome in today's highly compartmentalized scientific enterprise, although they risk leaving specialists in each field unsatisfied. Game theorists, for example, are unlikely to find anything new in the game theory used. However, game theory is only instrumental to the goal of the book. Its main message concerns a theory of reciprocity. The attempt to present a unified theory of the diverse forms of reciprocity is already, in my opinion, a durable contribution. Readers interested in a synthetic perspective will find the book rewarding. This review presents the main outlines of the theory and makes some critical considerations to the inclusion of unconditional reciprocity among its forms.

As Bruni notes, economic theory has tended to reduce all social bonds and relations to forms of contract, whereas social theory has seen contracts as opposed to, and destructive of, genuine social bonds. Bruni sees these contrapositions as ideological ('left' against 'right', p. xi). His main goal is to overcome them; to show that three forms of reciprocity, covering the ideological spectrum from left to right, are complementary and simultaneously required in a healthy society. These three forms are, in his words: '(1) the reciprocity of contract or 'cautious'; (2) the reciprocity of friendship or *philia* and (3) the 'unconditional' reciprocity, the one more controversial . . .' (p. x). In a sense, the book can be seen as an ingenious argument based on game theory to prove their complementary nature