Economic theory and the promise of behavioural approaches

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Abstract

Behavioural approaches have been developed in response to the somewhat tedious methodological hegemony enjoyed by neoclassical, utility-maximisation approaches in Economics. The tediousness arises from their frequent failure to accurately describe and predict human behaviour in a variety of situations. This essay delineates some of the methodological debates that underpin this discussion, such as the notion of a theory, and the use of experiments in refining such, and outlines how behavioural approaches are seeking to provide empirically-superior alternatives to traditional economic theory.

1 The need for a promise

As a fast-evolving and widely applied discipline, the latter more so than perhaps any other today, Economics seems all-encompassing. Surely a discipline with such flexible applicability would be based on equally flexible and dynamic theoretical frameworks? That this is not always so is a fact that has been pointed out in a variety of contexts, both philosophical and empirical. Economic theories, particularly those clubbed under the term 'neoclassical', and which have gained predominance from the 1950s onwards, specify mathematically-defined notions of behaviour. The notion that human beings are rational decision-makers out to maximise their utility forms the underpinning of most economic models, and it is these assumptions, coupled with their behavioural and philosophical implications that are subject to criticism.

Economic theory employs the terms 'rationality' and 'maximise' in a mathematical sense, and this forms the bedrock explanation for *how* human beings behave. *Why* they behave this way is usually not tackled straight-on in theory, but presented as an axiom, one which is problematic at best, and wrong at worst. Amartya Sen illustrates the problem with neoclassical theory rather effectively: ' "Where is the railway station?" he asks me. "There," I say, pointing at the post office, "and would you please post this letter for me on the way?" "Yes,"he says, determined to open the envelope and check whether it contains something valuable.' (Sen 1977, pp. 332).

Nonetheless, economic theory does succeed in providing explanations for human behaviour, and the idea of utility-maximisation is a flexible one, allowing distinct notions of utility which do not preclude behaviour such as charity (because I gain utility by giving) or a sense of justice (because I gain utility if others are treated fairly). Despite this apparent flexibility, the approach is severely criticised for its apparently problematic content regarding human behaviour on the counts of *why* and *how* (we seldom mathematically maximise, but seem to do quite okay in life nonetheless). Economic theory's explanations for why we act this way–our preferences–are universally applicable across time and space (see Sen (1977) for a discussion of 'univer-

sal', and comparison with 'egoistic'). After all, assuming that we use (and worse, with uncertainty) entirely different decision-making procedures based on whether we're visiting a relative or going shopping, whether we're old or young, and depending on how we've grown up, hardly makes for a convenient set of theory-defining assumptions.

The resulting theories of universally-defined behaviour have several implications: context-independent preferences, 'well-behaved' risk-aversion, bayesian-like inclusion of new information, and (contextually defined) selfishness, amongst others. Each of these assumptions have been shown to be false in certain contexts, contradicting their *universality*, and behavioural economics attempts, therefore, to put together an alternative, behaviourally-ratified theory of economics, where the term 'behaviourally ratified' refers to the application of theories and practices from psychology (Loewenstein 1999). Therein lies the promise.

2 The nature of economic theory

Disciplines, particularly those in the physical and social sciences, attempt to provide unifying threads with which to understand and predict observed phenomena. These unifying threads are usually in the form of ideas or structures which can be applied to understanding a class of phenomena, and are designated as 'theories' because they provide explanations for happenings, and are crucial for coming up with, and gradually enriching the mental frameworks with which we make sense of these phenomena. In the physical sciences for instance, mankind has been interested in (amongst much else) explaining how objects move in response to forces. Through repeated observation and informed guessing, this interest has gradually manifested itself in the form of theories which allow us (amongst other achievements) to fly airplanes.

Theory not only provides a historical context for tracing how an idea, and our analysis of it, is progressing, but also a virtual laboratory where predictions get tested in view of what a theory predicts, and the results of these tests add to, or demand change in those theories. The latter testing, as Popper (1959) explains, is the standard building block of theory in the

sciences–the experiment–and indeed, as economics exhibits increasing commitment to measurable, empirical findings, its proximity to these sciences grows, even as there is an obvious, and philosophically compelling need to ask whether human behaviour can ever be mathematically pinned down in the same way that the motion of moving objects, or to a less successful, but *theoretically* plausible extent, the study of weather can be [1].

2.1 Mathematics

The commitment to *empirical*, and often *mathematical* explanation is what sets economics apart from several other social sciences such as sociology and anthropology. With mathematics comes an elegant framework, that of logically deductive (and thus *conclusive*) argument structures. No longer does the theoretician need to rely on 'appeals to good sense' or 'ample demonstrations' to make her point. Instead, once the audience concurs with certain assumptions about human behaviour that characterise its motivations and expression, a theory that translates these assumptions into mathematics becomes uniquely convincing of its outcomes, since the latter are a result of deductive reasoning not dissimilar from the notion that two plus two equals four. Of course, as with mathematics, we must first define the notions of 'two' and addition. But once we set up a logically consistent framework (such as that of a *group* in mathematics, and its eventual extension to a *field*), the conclusion that two plus two equals four becomes undeniable. Economic 'models' are, most usually, an abstract environment where motivations, avenues for behaviour, and the outcomes that result from the actions of actors involved are all mathematically defined. The predictions of an economic model are then obtained by following through with the mathematical logic of actions, and assigning economic interpretations to these.

Mathematics is intimately linked with economic theory, so much so that the latter hardly exists today without the former: the eminent economist Paul Samuelson is credited with selecting and applying several mathematical theorems, an application that appears today to have crowded out non-

[1] Hargreaves-Heap and Hollis (1984) provide an illuminating discussion on the latter.

mathematical approaches, even as this might be 'unreasonably ineffective' (Velupillai 2005), and often makes unrealistic predictions–the very ones that behavioural economics seeks to change.

2.2 The truth about assumptions

The criticisms of Economic Theory appear to focus, at least partly, on its unrealistic assumptions about human behaviour–maximisation, rationality and so on. Were we to focus our critique on this, however, we would be committing an error that Friedman (1953) had decried half a century ago, for a theory must, and can only be criticised, for the quality of its *predictions*. Assumptions clearly impact those predictions, but their realism or lack of it can never be a criteria for judging the theory, for the theory merely says 'this prediction is made by pretending that the mechanism at play is this.' Lo and behold, if its predictions are proved accurate through empirical observation, then the abstractions imposed in its assumptions prove themselves to have been worthy, and their unrealism is no longer in focus.

The critique of (neoclassical) economics based in behavioural economics, however, is somewhat different, and therefore valid. The behavioural approach simply says "I've got a better theory, and its based on actual observation, so it works better. As it so happens, its assumptions are often realistic because they themselves are previous observations, *but that's not what makes this a better theory.* Its a better theory because, and only because its predictions are proved more accurate through observation."

3 Behavioural approaches to theory

As the practice of economics moves closer to becoming empirical, experimental economics has emerged as a branch of economics that actually adopts a 'scientific' methodology. The latter entails building a theory as a way of explaining a set of observed phenomena–a causal story that links them together. For a theory to 'have teeth', it must be falsifiable, and thereby capable of giving rise to potentially falsifying tests (in comparison to a set

of truistic statements or a tautological argument). The more such tests a theory passes, the stronger it becomes, and depending on the results of these falsifying tests, the theory may have to be amended or dropped altogether. Economic theories too are falsifiable, and as Sugden (2008) explains, experimental economics began as an effort to test the conclusions of economic theory and its resulting models, and came up with several demonstrations that contradicted. Moving forward however, this approach has grown closer to that of science, wherein experiments set up exhibits, and a set of exhibits prompts the invention of a theory, or the amendment of an older one. If the same experiment is performed across different contexts (people, ethnicities, places, situations) and leads to similar results, our faith in the inductive generalisability of its underlying mechanism, or that which is being proposed, grows.

Friedman felt that "Unfortunately, we can seldom test particular predictions in the social sciences by experiments explicitly designed to eliminate what are judged to be the most important disturbing influences." (Friedman 1953, pp. 10) Experimental economics attempts to do just that–design experiments to highlight particular aspects of human behaviour. While disturbing influences can never be removed in practice, and sample sizes are unlikely to be representative of populations owing to feasibility and costs, the replication of experiments across different contexts improves our faith, if not statistical confidence, in their implications [2].

Non-experimental parts of behavioural economics have increasingly involved the study of phenomena through the "application of psychological insights to economics" (Camerer and Loewenstein 2004, pp. 8), even as experimental methods were, and continue to be prominent. While Simon (1987) describes the application of behavioural approaches to studying companies in terms of decision-making and salaries, with the aim of evolving more realistic theories to explain the real world, a large body of research pursues similar aims though largely motivated by (and arguably restricted to) psychological

[2]Randomized Controlled Trials in social contexts are something of an extension to this approach, though not usually included in the behavioural category. By randomly assigning a treatment, these trials generate a virtual laboratory which in theory controls for all non-treatment influences.

approaches. Reviews by Mullainathan and Thaler (2000) and Camerer and Loewenstein (2004) gather the main implications of this work for economic theory, and where relevant, how this research should force economic theory to change.

Starmer (2000) has reviewed several alternatives to expected utility theory, the central building block to how individuals make utility-maximising decisions under risk. The author separates these alternate approaches into 'conventional' and 'nonconventional', where the former continue with the assumptions that individual maximise utility with computational adeptness, but, in order to make the theory correspond more accurately to actual behaviour (usually observed through experimental methods), the utility functions and thereby indifference curves are no longer identical throughout the domain of choices. Instead, depending on the particular approach, they allow the utility function to be suitably altered, for instance by allocating different weights to the individual's choices (and therefore the degree of risk averseness can change with the expected value of the choices presented). The 'nonconventional' approaches discard the utility-maximisation axiom. They hypothesise that individuals use sets of rules to make choices, which may or may not involve maximisation. Using experimental or other observations, theorists attempt to define those rules and where possible present mathematical functions that approximate the resulting decisions.

An example of a 'nonconventional' approach is the theory of satisficing– the notion that people search for satisfactory strategies, but not the *best*. Simon (1993) illustrates satisficing in the context of altruistic behaviour, constructing a model where an organism satisfices to survive, but without involving optimisation. The implications of satisficing appear highly plausible as two examples elucidate: (a) playing chess is based on 'sense', not computation of a gigantic, though finite set of strategies, and humans do remarkably well against computers [3]; (b) purchase decisions usually entail some sort of comparison with other available alternatives up to the point where we're happy with our choice, even though the comparison-exercise is

[3]Kasparov was eventually beaten by an IBM computer, Deep Blue. For an insightful commentary linking chess with behaviour and computation strategies see Kasparov (2010)

never *exhaustive* (nor the choice *best*). As a behavioural approach to theorising, Simon's model is striking in its elegant simplicity and non-reliance on optimisation. Equally striking however is the relative scarcity of discussion on this approach within economics–an indication, perhaps, that several constituents of behavioural theory may yet be premature given our cognitive submersion in the expected-utility-maximisation approach.

Another, and seminal nonconventional approach is that presented by Tversky and Kahneman (1979). They describe psychological experiments and the findings of how subjects behaved, and propose a theory–prospects theory–based on this. They then draw out how mathematical functions tracking that behaviour would have to look, an exercise that helps highlight where these functions depart from the traditional utility, or risk-aversion functions.

3.1 Differences

Traditional, expected-utility theorisation works by starting with an assumed mathematical function that describes behaviour, and applying this to predict the outcomes of an abstract situation where agents behave according to these functions. Behavioural approaches are inspired by the fact that the predictions of traditional theories are often wrong, in degree quite often and occasionally even in essence. Starting from actual observations, these provide alternative descriptions of why and how agents behave the way they do. That behavioural theories start out from actual observations guarantees their superior accuracy. It doesn't, however, promise mathematical tractability. Put crudely, these theories are of the form "Here is an accurate description of a particular behaviour. It doesn't rely on an underlying maths function, though if you want, you could try building one based on it." The resulting efforts to theorise can, in 'nonconventional' approaches, hypothesize the existence of decisions rules distinct from utility maximisation (allowing then for notions including bounded rationality and satisficing), and in 'conventional' approaches, suggest changes to the utility functions that underly expected utility theory in order that its predictions are closer to actual observations.

4 Implications for the promise

Most applications of economics deal with human behaviour–even analyses of collective actions such as in macroeconomics, or of stock-markets in financial economics, are ultimately based on facets of human behaviour. Given that the majority of contexts where economics is used are in fact behavioural, this indicates the looming presence of a reasonably-sized iceberg: Isn't all of economics behavioural? That 'behavioural economics' exists as a distinct entity indicates that the answer is no; no in practice at least, if not in what *should* be the answer.

A large and growing literature has tested the implications of conventional economic theories and assumptions, and found contradictions, reversals or at least partial mismatch. Behavioural Economics is thus a term coined to indicate an alternative, behaviourally-ratified theory, or at least assumptions which should underly a theory of economic behaviour. An associated pursuit is that of experimental economics, which uses experiments with human subjects to construct empirical demonstrations of behaviour, though not necessarily situated within a framework of psychological theories.

Nonetheless, contemporary theoretical literature in non-behavioural areas of economics testifies to two facts–one, that the theoretical applications of economics, *even when they apply squarely to behaviour,* seldom draw on insights from behavioural economics, and two, that the framework of assumptions these theories use is hardly different from what it was four or more decades ago, when behavioural economics was starting to be hailed as a discipline-changing phenomena. Indeed, Lazear's (2000) aptly titled essay *Economic Imperialism* explains how economic theory has been pervasively and successfully applied in what were traditionally 'non-economics' areas (but with the same attributes that have been behaviourally criticised).

As an illustration, consider micro-finance: credit for the poor sans collateral, which works through group-lending and displays stellar repayment rates in the face of debatably weak repayment incentives. Given that micro-finance is practiced in developing countries where market structures are weak, 'non-rational' behavioural influences such as trust, tradition and social structures

might be expected to be strongly influential. Economic analyses of microfinance (Ghatak 1999; Besley and Coate 1995; Armendariz et al 2007) involve some of these influences, but only insofar as they lend themselves to inclusion into mathematico-deductive, expected-utility frameworks; utility functions that account for imperfect information, social pressure, and repeated games. While the inclusion of imperfect information is one example of 'fresh' theory within the utility-maximisation approach, this does not represent a change in the assumptions or theory for *why* micro-finance clients behave as they do–they continue to be just as selfish and computationally adept as homo-economicus has ever been [4].

What does this imply for the promise of behavioural economics? I would submit the following:

4.1 Mathematical manipulability

The accusation that economists look for lost objects in areas chosen according to the brightness of illumination, irrespective of their proximity to where the object was lost, may seem an exaggerated concern. Behavioural economics has shown that traditional economics' predictions are often inconsistent with reality–they are sometimes right, but also regularly wrong or only partially accurate. Behavioural approaches also provide alternative 'exhibits', and based on these, theories or at least the beginnings of such. What they do not provide, however, are well-behaved mathematical functions.

Traditional economic theory has involved the adept and often elegant handling of mathematical arguments that result in tractable algebraic manipulation and the prediction of well-behaved equilibria. This is the part where the light is good. Where the object was lost, however, is in the territory where behavioural-experimental approaches describe its disappearance, but because these do not result in well-behaved mathematical functions, they are poor candidates for the kind of algebraic manipulation that leads to neoclassical theory. Unless a *value judgement* unfolds in economics regarding what

[4]Behavioural studies of microfinance such as Bauer et al (2008) are an indication that such approaches are gradually making inroads, though the majority of analysis remains neoclassical.

is considered appropriate, it is unlikely that most neoclassical approaches will be pushed towards behavioural reform.

4.2 Digital simulation

On the other hand, as behavioural-experimental approaches provide us with an ever-growing set of data on exhibits, their inductive generalisability becomes more credible. Analysing these data may give rise to badly-behaved (in terms of changing slopes, continuity and differentiability) mathematical functions, but there is no reason why these cannot be put to use. Specifically, as a small body of work currently indicates, it is possible to programme computers according to these (empirically generated) functions, assigning particular behaviours to abstract agents, and running simulations to predict how these agents interact given the behaviourally-ratified underlying motivations and conduct. Owing to the seemingly limited computational capacity of human beings, it is unlikely that such research could be undertaken by hand, nonetheless, the fact that a computer can be programmed to simulate such exercises means that it can also make theoretical predictions based on this.

4.3 Turbulence

The biggest promise of behavioural economics lies, arguably, in the plethora of discussions it has catalysed, which focus on economic methodology, the philosophy of economics, and theory. By no means were these discussions brought into existence solely by behavioural advances, but the insights provided by the latter have certainly re-focused critiques, and made these more tractable from *within* the economics discipline (in contrast to critiques based in other disciplines). Some of these critiques, as discussed, are leading to the re-casting of economic theory, and with it, the methodology of economic analyses. The behavioural approach does not necessarily preclude small-scale, observation-based theorising either, and one might suppose that ideas such as 'economic ethnography' could find space as well.

As behavioural approaches gradually pry open the door to (re-)recognising the weaknesses of traditional economic theory and the need for versatile

methodological approaches, this itself symbolises major progress. The further promise lies in improving the inductive generalisability of behavioural findings, exploring both laboratory or real-world experimental approaches, and revisiting notions such as satisficing.

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