1 Introduction to smart decision-making

Morris Altman

This is an original contribution of essays on behavioural economics, which builds upon the research of Herbert Simon and, more generally, the Carnegie-Mellon school of behavioural economics. This perspective can be referred to as the bounded rationality methodological approach to behavioural economics (Altman 1999, 2005, 2015, 2017). In this perspective, the prior assumption is that decision-makers are relatively rational, intelligent and smart (satisficing, boundedly rational and evolutionarily rational). As one of the intellectual leaders of the Carnegie-Mellon school, James March (1978, p. 589), stated, it is of primary importance to determine if we can explain human behaviour in terms of rationality, broadly defined, even if at first glance such behaviour does not appear rational and might even appear to be error-prone or 'biased'. More generally, I refer to this methodological approach as smart decision-making, which encompasses bounded rationality, procedural rationality, fast and frugal heuristics, the brain as a scarce resource (following the insights of Friedrich Hayek) and the institutional, sociological and psychological-neurological determinants of decision-making. This is counter-posed to the world view of conventional or neoclassical rationality as well as the heuristics and biases perspective on behavioural economics, pioneered by Kahneman and Tversky (Kahneman 2003, 2011), that dominates contemporary behavioural economics.

Smart decision-making encompasses intelligent or smart decision-makers or agents, who develop or adopt decision-making processes and make decisions given their cognitive limitations, the decision-making mechanism of the brain, individuals (or economic agents) decision-making capabilities, decision-making experience, environmental factors, which include institutional and legal parameters, culture and norms, relative power in the decision-making process and related sociological factors. It is also recognized that cognitive limitations are affected by technology (computers and calculators, for example), the capabilities to effectively use new or improved technologies and the learning processes that affect how the brain is hardwired (neuroplasticity). Smart decision-makers or agents do the best they can, given the pertinent circumstances that affect the decision-making process and related outcomes. Herbert Simon refers to the act of doing the best we can as satisficing behaviour. Satisficing need not result in the best possible or optimal outcomes for the firm, household, society or individual; but it can, depending on circumstances.

Deviations from optimality do not imply that decision-makers are not smart and, in this sense, irrational. Nor does establishing that decision-makers are smart imply that decision-making outcomes are optimal. Here rationality, broadly defined, relates to the choices people make and the decision-making processes adopted by individuals given their various constraints and opportunities as well as their decision-making environment. Optimality in production and consumption at an individual, firm, household or social level need not necessarily flow from smart decision-making. Smart decision-making, however, would often be a necessary but not a sufficient condition for optimality to be

obtained. What these sufficient conditions might be are critically important to research that stems from the smart agent or smart decision-making perspective.

Inadequate decision-making environments, for example, would preclude smart agents from achieving optimal results from their own and from society's perspective (where externalities exist). For example, you might wish to increase your savings for retirement, but you invest in high-risk high-return financial paper because of the false or misleading financial information provided to you, resulting in you losing much of your savings. Women might want to have one child, but they end up giving birth to four or five, because they are not empowered to realize their preferences. A firm's productivity might not be maximized because decision-makers are maximizing a complex utility function that includes managerial slack and short-term returns. None of the above is a product of irrationality. They are a product of preferences, decision-making capabilities, experience and the overarching decision-making environment.

Conventional theory's point of focus is on very generalized concepts related to how humans should behave and are expected to behave to generate optimal outcomes. As long as the analytical prediction is correct, all is well. This is effectively the correlation-based analysis promoted by Friedman (1953). If you get the prediction correct, you can assume for reasons of simplicity that humans behave as if they are maximizing profits, minimizing costs and maximizing utility (which is often assumed to be identical wealth maximization, controlling for risk). The realism of the simplifying assumptions we make about decision-makers, the decision-making processes and the decision-making environment are not of importance from this perspective. We can simply assume that individuals behave as if they are maximizing profits or utility, as long as the analytical prediction is the correct prediction. The assumption here is that individuals ideally should behave 'neoclassically', if they are rational, which they are assumed to be. Rationality is defined in terms of neoclassical rationality. Apart from this, what transpires in the decision-making process is not of substantive interest. We simply abide methodologically with neoclassical simplifying assumptions of how individuals behave within the firm and in the household. Moreover, it is further assumed that the decision-making environment allows for the realization of optimal outcomes, given neoclassical rationality, for the individual, the household and the firm.

The analytical focus, therefore, is on correlation as opposed to true causation, where the latter relates to determining what particular behaviours and decision-making environments generate particular outcomes. Modelling true causation would address issues of spurious correlation, omitted variables and the possibility of alternative behaviours, yielding similar sustainable outcomes. What is key is the determination of what specific behaviours, decision-making processes and institutional and sociological variables yield specific outcomes. This deeper modelling agenda is part of the bounded rationality approach to behavioural economics.

The bounded rationality tradition in behavioural economics plays particular attention to identifying the actual decision-making process that generates particular outcomes. It ventures into the black box of the firm, the household and the individual. Only by understanding how individuals actually behave, how they make decisions, can we determine if these decisions are smart and in this broad sense rational. Hence, rationality here is contextualized. Benchmarks for what is rational are, therefore, not constructed by some imagined ideal unrelated to the decision-making capabilities and environments of the individual, household or firm.

For this reason, a core attribute of the approach taken in this book is, following from Simon, the overall importance of reasonable, reality-based, simplifying modelling assumptions for robust economic analysis. Related to this is the significance of situating our definition of rationality and smart decision-making in context. Simon writes (1986, p. S209):

> The judgment that certain behavior is 'rational' or 'reasonable' can be reached only by viewing the behavior in the context of a set of premises or 'givens.' These givens include the situation in which the behavior takes place, the goals it is aimed at realizing, and the computational means available for determining how the goals can be attained. In the course of this conference, many participants referred to the context of behavior as its 'frame,' a label that I will also use from time to time. Notice that the frame must be comprehensive enough to encompass goals, the definition of the situation, and computational resources.

The smart agent, smart decision-making approach to decision-making and behavioural economics not only stands in contrast to what we find in much of conventional economics, it also stands in contrast, as mentioned above, to a theme running through much of contemporary behavioural economics where much of the typical individual's behaviour is deemed irrational and error-prone. This is the heuristics and biases approach pioneered by Kahneman and Tversky (Kahneman 2003, 2011). A common thread running through this approach and conventional economics is adopting neoclassical benchmarks for rationality and, flowing from this, benchmarks for optimal outcomes in the domain of consumption and production (although the latter is not a point of focus in the heuristics and biases approach). In the heuristics and biases approach, as in conventional economics, these various benchmarks are not empirically derived. Rather, they are taken for granted. As in the conventional approach, causal analysis is not the point of focus, and it appears that analytical prediction (correlation analysis) is of greatest significance. However, in the heuristics and biases approach psychological factors are introduced into the modelling framework to supplement or replace economic variables. Typically such new variables are said to generate deviations from neoclassical optimality and, therefore, errors in decision-making. This is often derived from assumed, but not proven, hardwired biases in the human decision-maker. However, in terms of the derivation and introduction of psychological variables, these are often not predicated upon an assessment of how individuals behave within the household and the firm. Rather, they are generalized descriptors of human behaviour introduced into the modelling framework to produce improved analytical predictions or predictions that are as robust as those generated in conventional models, but now contain more realistic behavioural assumptions. To reiterate, the realism of these new assumptions is typically not tested against how individuals actually behave in the real world of decision-making.

A point of commonality between the bounded rationality approach, the broader smart agent approach and the heuristics and biases approach is recognizing that real-world decision-makers typically do not behave like the individuals in the traditional economic models. We should note that Gary Becker (1996), for example, makes a similar point with regard to neoclassical models ignoring sociological variables to their analytical and scientific peril. He argues that neoclassical predictions are often wrong because they systematically ignore how social context impacts the decisions of rational agents. Douglass North (1971) makes a similar point with respect to neoclassical economics systematically ignoring the importance of institutional variables to decision-making by rational agents.

Especially with respect to the heuristic and biases approach, a large scholarly industry has developed documenting the extent to which actual human behaviour deviates from predicted neoclassical behaviour. More generally, experimental economics, often done in classroom settings, has documented significant deviations from neoclassical norms. The fact that individuals tend not to behave neoclassically is no big surprise, even to many neoclassical economists. The latter simply assume that individuals behave as if they make decisions and choices based on neoclassical norms, not that they actually behave in this fantastical manner.

Still this research remains important as it disabuses economists (theoretical and applied), model users and various types of practitioners, including policy-makers, from the notion that humans behave neoclassically. The big question is what does this actually means for analysis and policy? Experiments suggest that, on average, individuals engage in a wide array of behaviours that are contrary to what conventional economics assumes. For example:

- Individuals weigh losses more than gains.
- Emotions and intuition drive much of decision-making.
- Individuals are willing to self-sacrifice to punish those who they deem are treating them unfairly.
- Individuals are willing to punish or hurt those they don't like.
- Individuals are willing to self-sacrifice for those towards whom they feel sympathy.
- Ethical concerns play a role in economics decision-making.
- Wealth maximization, even when controlled for risk, finds many exceptions.
- Framing affects choices.
- Relative positioning often matters more than absolute levels of income or wealth.
- Sentiment or animal spirits often matter more to decision-making than 'real' economic variables.
- Individuals often follow the leader when making decisions (herding).

Are these 'average' human traits a sign of hardwired cognitive biases, yielding suboptimal choices, as the heuristics and biases approach intimates? Or, are these characteristics of smart agents given their capabilities, experience and decision-making environment, even when some of their decisions are wrong, at least in the first instance (a one-shot game)?

This is where the smart agent or smart decision-making approach and bounded rationality approach part company with the heuristics and biases approach. From the smart agent approach, deviations from neoclassical norms typically imply that rational decision-makers do not abide by these norms for good rational reasons that need to be identified and understood to better engage in robust causal analysis. From the heuristics and biases approach, deviations from the neoclassical norms imply systemic biases and errors in decision-making, typically a function of how the brain is hardwired. Humans do not and typically cannot behave the way they should behave to obtain optimal outcomes. Free will in decision-making can result in perverse socio-economic outcomes that can sometimes be corrected by experts nudging individuals to behave in the appropriate fashion as defined and articulated by the expert (referred to in the literature as the choice architect) (Thaler and Sunstein 2008).

From the smart decision-making perspective, errors in decision-making can and do

occur. There can be biases in decision-making, individuals can make decisions that are not in their own self-interest or they can make decisions in their self-interest but not in the interest of their group, organization or society, and preferences can be inconsistent across individuals and within an individual across historical time. All such non-traditional behaviours can be consistent with the hypothesis that economic agents are smart and, broadly speaking, rational. Moreover, these smart agents need not generate choices that are in any sense efficient. This is in stark contrast to the conventional approach wherein being 'rational' implies efficient outcomes. However, rationality need not imply efficiency or optimality in either consumption or production.

Not conforming to neoclassical behavioural norms need not be symptomatic of irrationality, and free will in choice behaviour in and of itself need not result, therefore, in perverse socio-economic outcomes. Errors and biases and suboptimal socio-economic outcomes, for example, can be the product of inadequacies in decision-making capabilities, suboptimal decision-making environments and lack of experience. In this sense rationality does not mean perfection in actual behaviour or outcomes. Of critical importance is the determination of the conditions under which decisions and the decision-making processes can be improved upon; under what circumstances can rational or smart decision-making result in efficiency or optimality in either consumption or production? Identifying these circumstances is a critically important research agenda.

Also, non-neoclassical behaviours can generate superior outcomes to those that flow from traditional neoclassical norms, such as narrowly maximizing behaviour. In other words, conforming to neoclassical behavioural norms can generate suboptimal outcomes and might therefore even signal irrationality in behaviour or at least serious biases and errors in decision-making. Gerd Gigerenzer (2007) and his colleagues have articulated this perspective in their fast and frugal heuristics narrative. Heuristics (decision-making short cuts), often considered to be biased and error-prone in the heuristics and biases narrative, is argued to exemplify superior decision-making processes in the fast and frugal modelling of decision-making. From this perspective individuals have evolved decision-making processes that are partially derived from the fact that the brain is a scarce resource, has a particular processing capability and processes information within a particular decision-making environment. A prior assumption here is that individuals are broadly speaking rational. Hence, it is important to investigate whether, and the extent to which, non-neoclassical behavioural norms (such as fast and frugal heuristics) yield superior outcomes, and under what circumstances.

At one extreme it could be argued that not only are individuals always rational, but their decision-making processes and decisions are always optimal as well. This perspective is derived from Hayek and his notion of ecological rationality (Hayek 1948; Smith 2003; Gigerenzer 2007). But it is critical to determine benchmarks for smart or broadly rational behaviour and, moreover, contextualized benchmarks for efficiency and optimality in decision-making outcomes. Smart decision-making is not a necessary and sufficient condition for efficiency and optimality.

Kahneman (2011) has articulated a categorization of different types of decision-making, which he refers to as slow and fast thinking. He is basically looking at when particular thought processes yield better outcomes. Sometimes these might be fast thinking; very often these would be slow thinking. Some would argue that individuals do not know which type of thinking best serves their own self-interest and that of their organization

and, all too often, individuals make the wrong choices as to which thinking decision-making platform to use. This would be contrary to the fast and frugal approach that maintains that typically individuals make the right choices with regard to decision-making platforms. From the smart decision-making perspective, it is a testable hypothesis as to which thinking platform would be best. This hypothesis needs to be contextualized by the capabilities and experience of individuals and their decision-making environment. A critical point here is that the thinking platform the individual should adopt is not determined a priori by the expert or by theory. It is context dependent.

The smart decision-making approach has differential implications for policy and approaches for structuring decision-making. The conventional wisdom is, in its extreme, very 'hands off' on policy, both in terms of government and even on suggestions of what can be done inside the firm and household to improve decision-making processes and decision-making outcomes. The prior assumption is that 'free' markets plus rational agents would generate optimal results. So, government could intervene to make markets 'freer' and perhaps to better secure property rights. If individuals are hardwired to be error-prone and biased (the heuristics and biases approach) then intervention must be much more proactive, nudging or more forcefully driving individuals to make what are deemed optimal or at least better decisions.

With the smart decision-making or smart agent approach, it is assumed, at least as an analytical starting-point, that individuals are rational. Hence, we need to address issues of capabilities, decision-making environments, experience and externalities to determine what is required to facilitate best practice, but also context informed, decision-making processes. Barring externalities, it becomes critically important to construct decision-making capabilities and environments to facilitate and nurture informed decisions, based on the free choice of decision-makers. Therefore, it also becomes important to understand the circumstances under which individuals lose the capacity (or this capacity is severely reduced) to make informed choices, such as possibly severe addictions and mental illness, and perhaps even more importantly the power and even the legal rights to make informed choices.

These methodological differences between the smart agent–smart decision-making approach to behavioural economics (related to the concept of bounded rationality), the heuristics and biases approach to behavioural economics and conventional economics are illustrated in Figure 1.1. The smart decision-making approach incorporates and is informed by bounded rationality, process rationality and institutional design. These are informed by a variety of variables, inclusive of human capital, mental models, preferences, information, power and learning. Smart decision-making can result in either optimal or suboptimal outcomes depending on the above economic, sociological and institutional variables. Both these outcomes can be 'rational' from the perspective of the individual, but they can generate socially inefficient outcomes. We can have what I refer to as rational inefficiency, but this can be corrected (more often than not) by changing some of the key variables mentioned above. However, benchmarks for what yields optimal outcomes is largely unrelated to neoclassical behavioural norms. Rather, it is reality based.

In contrast, the heuristics and biases approach predicts that what is often hardwired behaviour yields deviations from conventional norms for optimal behaviour, that is, from neoclassical rationality. The latter is retained as the gold standard for achieving optimality for the individual, the household, the firm and society. Deviations from the neoclas-

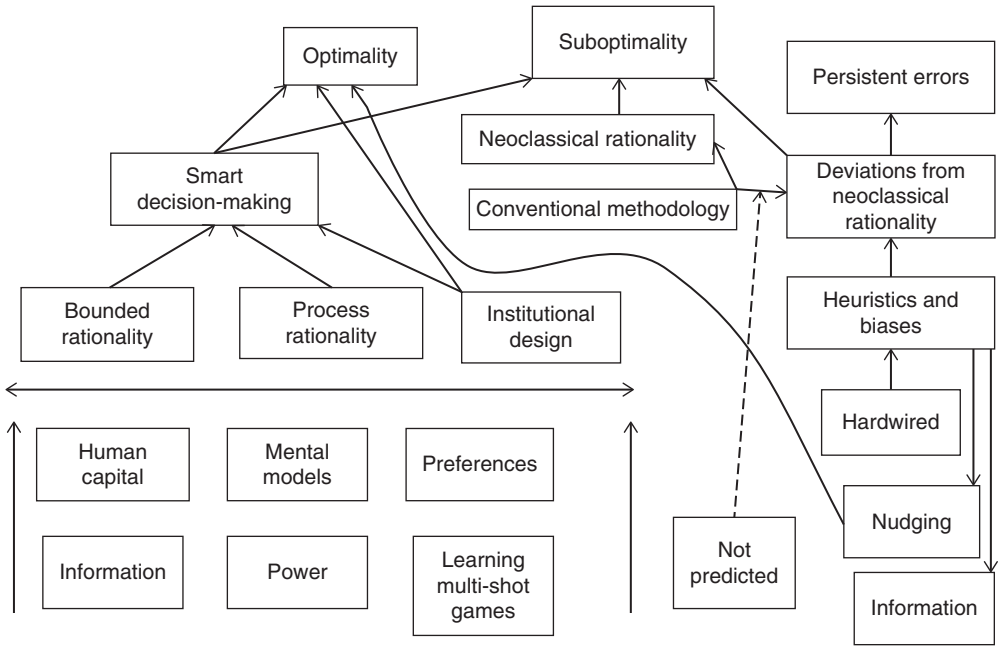

Figure 1.1 Decision-making models

sical rationality yield persistent errors in decision-making, hence suboptimal outcomes. This can be corrected by nudging (which can involve varying degrees of paternalism) and, sometimes, by correcting for failures in institutional design. The latter includes improvements to information. Also, the latter as well as institutional design are critically important to the smart decision-maker approach to behavioural economics. Neoclassical models predict neoclassical rationality and optimal outcomes. They do not predict persistent deviations from neoclassical rationality which have been well documented in the literature.

This book covers a wide range of themes from micro to macro, sub-disciplines within economics, economic psychology, heuristics, fast and slow thinking, experimental economics, the capabilities approach, institutional and sociological dimensions, methodology, nudging, ethics and morals, and public policy. The book is divided into a number of parts: 'Smart decision-makers, different types of rationality and outcomes'; 'Aspects of smart decision-making'; 'Development and governance'; 'Tax behaviour'; 'Smart macroeconomics and finance'; 'Dimensions of health'; 'Sociological dimensions of smart decision-making'; and 'Morals and ethics'. The authors critically explore the modelling, methodological and policy implications of a smart decision-making or smart agent approach to behavioural economics.

This alternative approach to behavioural economics, rooted in the tradition established through the research of Herbert Simon and his colleagues, holds much promise, incorporating learning from the bounded rationality approach, the heuristics and biases approach as well as important insights from other disciplines, such as psychological, institutional and sociological analyses and neuroscience.

REFERENCES

Altman, M. (1999), 'The methodology of economics and the survivor principle revisited and revised: some welfare and public policy implications of modeling the economic agent', *Review of Social Economics*, **57** (4), 427–49.

Altman, M. (2005), 'Behavioral economics, power, rational inefficiencies, fuzzy sets, and public policy', *Journal of Economic Issues*, **39** (3), 683–706.

Altman, M. (2015), 'Introduction', in M. Altman (ed.), *Real-World Decision Making: An Encyclopedia of Behavioral Economics*, Santa Barbara, CA: Greenwood, ABC-CLIO.

Altman, M. (2017), 'A bounded rationality assessment of the new behavioral economics', in R. Frantz, S.-H. Chen, K. Dopfer, F. Heukelom and S. Mousavi (eds), *Routledge Handbook of Behavioral Economics*, New York: Routledge, pp. 179–94.

Becker, G.S. (1996), *Accounting for Tastes*, Cambridge, MA: Harvard University Press.

Friedman, M. (1953), 'The methodology of positive economics', in M. Friedman (ed.), *Essays in Positive Economics*, Chicago, IL: University of Chicago Press, pp. 3–43.

Gigerenzer, G. (2007), *Gut Feelings: The Intelligence of the Unconscious*, New York: Viking.

Hayek, F.A. (1948), *Individualism and the Economic Order*, Chicago, IL: University of Chicago Press.

Kahneman, D. (2003), 'Maps of bounded rationality: psychology for behavioral economics', *American Economic Review*, **93** (5), 1449–75.

Kahneman, D. (2011), *Thinking, Fast and Slow*, New York: Farrar, Straus and Giroux.

March, J.G. (1978), 'Bounded rationality, ambiguity, and the engineering of choice', *Bell Journal of Economics*, **9** (2), 587–608.

North, D.C. (1971), 'Institutional change and economic growth', *Journal of Economic History*, **31** (1), 118–25.

Simon, H.A. (1986), 'Rationality in psychology and economics', *Journal of Business*, **59** (4), S209–24.

Smith, V.L. (2003), 'Constructivist and ecological rationality in economics', *American Economic Review*, **93** (3), 465–508.

Thaler, R.H. and C. Sunstein (2008), *Nudge: Improving Decisions about Health, Wealth, and Happiness*, New Haven, CT and London: Yale University Press.