

Methodological challenges in Behavioural Economics: Towards a more holistic and empirically rooted economic science

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Abstract

This paper is a methodological one that addresses some of the shortcomings with contemporary behavioural economics, pioneered by Kahneman and Tversky. The latter relates to the heuristics and biases narrative that focuses on day-to-day choice behavior and individuals persistently deviating from neoclassical computationally intensive decision-making norms. I place this approach in the context of other alternative and sometimes complimentary perspectives on behavioural economics inclusive the fast and frugal approach and Simon's bounded rationality narrative. I argue for a more holistic empirical grounded behavioural economics that is more focused on better understanding the decision-making environment and individuals' decision-making capabilities and preferences that drive real work decision-making. This approach taps into the contributions of pioneers of behavioural economics and also compliments price theory and revises but does not abandon the notion of smart or intelligent decision-makers. It also allows for better understanding how individual freedom and empowerment is critical to optimal and welfare improving decision-making. Better understanding the over-arching decision-making environment can help fill the gaps in the choice literature with important implications for economic prediction and public policy.

JEL Classification: D90; B5; B41; D8

Keywords

behavioral economics — bounded rationality, heuristics, and biases — errors — institutional — asymmetric information — economic theory

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Introduction

This article seeks to address some critical methodological shortcomings of contemporary behavioural economics, pioneered by Kahneman and Tversky (2003; 2011). This article also offers a positive critique of the fast and frugal approach to decision-making pioneered by Gigerenzer (2007), that has also impacted contemporary behavioural economics, but from different perspective. Related to the above, we critically assess the public policy implications of the different approaches to behavioural economics, including the 'nudging' narrative put forth by Thaler and Sunstein (2008). Finally, we discuss the increasing focus of behavioural economics on classroom experiments as the main evidential basis for discussion and analysis. This particular methodological approach, first enunciated by Vernon Smith (1962, 1976), is often considered to be a pillar of contemporary behavioural economics. This article takes a more holistic methodological approach to behavioural economics that integrates the significant contributions of the pioneers of behavioural economics, that has been all too often neglected in the more recent iterations of the behavioural economics narrative.

A fundamental argument that we articulate is that a key distinguishing feature of behavioural economics should be that the assumptions underlying one's models should have a basis in socio-economic reality. Therefore, models should have strong inductive component which, in turn, provides substance to its deductive narrative. Economic theory should have a real world-realistic foundation. It is one's assumption that drive one's causal analysis, which is so vital to any hypothesis testing and meaningful model construction. Building models upon assumptions that have little bearing in reality, but are robust from a deductive perspective, should be a non-starter for behavioural economics. This reality-focused approach was the starting point of Herbert Simon's (1959, 1978, 1986, 1987) critique of contemporary economics and for his behavioural economics narrative. This represented a fundamentally important challenge to standard economics across the political and methodological divide (both neoclassical and heterodox). This important pioneering contribution to behavioural economics has been all too much neglected in contemporary behavioural economics.

Related to the realism of assumptions matter narrative, I also argue that contemporary behavioural economic remains too focused on critiquing conventional theories' rationality narrative. The argument should not be about whether or not people are rational (which tends to equate to being smart), but rather on what does it mean to be rational or smart in a real-world decision-making environment. How one defines rationality and how it is contextualized has important implications for policy.

A brief neoclassical backdrop

Neoclassical economics is often conflated with contemporary economics. Needless to say, economics is typically defined as being most concerned with the most efficient means by which one can allocate scarce resources. Given scarce resources this is a key means by which one can improve the socio-economic wellbeing of our population (Robbins, 1935). More generally, economics is said to be most concerned with human behaviour as this relates to ordinary business of life most closely connected with material welfare (Marshall, 1890).

But in terms of the methodology underlying both of the above overlapping objectives, contemporary economics has focused on relative prices and real income as the core determinants of human behaviour whilst assuming preferences to be given and institutional variables to be optimal, not something to be a determinant causal variable. Moreover, it is assumed that humans are rational decision-makers and that decisions are made by individuals independent of others and social context. This is largely the narrative put forth by Becker and Stigler (1977). And, this analytical narrative has taken on an increasingly mathematical/technical focus, although the latter is not necessary to the presumed cogency of the neoclassical narrative. Fundamental to this narrative, however, is the assumption that relative prices, income, 'neoclassical' rationality, decontextualized decision-making, little concern for institutions, 'stable preferences' and the individual as a hermetically sealed decision-maker, are the most appropriate simplifying assumptions to make when building models to explain real world decision-making. But these assumptions are not rooting in any empirical foundation; they are not deduced from socio-economic reality and therefore subject to constructive criticism by Simon (1959, 1978, 1986, 1987; see also Tomer, 2007).

Another crucial component of the neoclassical puzzle is the assumption that individuals will behave in accordance with specific behavioural norms. Such behaviour will generate decisions that will yield economic efficiency, if individuals are neoclassically rational, which they are assumed to be. So, there is a very important normative dimension to conventional neoclassical theory – one should behave in a particular prescribed manner to achieve particular objectives. This would be to achieve economic efficiency and also to maximize one's utility or level of wellbeing. To meet such neoclassical standards, it is assumed that individuals are excellent and profi-

cient calculating machines (the brain is not a scarce resource) and pertinent and accurate information is available at little or no cost (therefore information is not asymmetric), and individuals act on this information deliberatively, making reasonably accurate predictions on the consequences of their decisions such there should be no regret with regards to the decisions being made. Also, assumed is that individuals should maximize their effort inputs into the process of production. At a minimum effort inputs should be fixed at some high level so that profits are maximized and costs are minimized. This being said, it is assumed that not only are the neoclassical norms the most appropriate to achieve efficiency and utility maximization, but individuals actually abide by these norms. This is how one should behave, and this is how one actually behaves. This approach has also been subject to critical analyses by Simon (1959, 1978, 1986, 1987) where he rejects many of the neoclassical norms as fit-for-purpose or even rational. From his perspective, trying to abide by many of the neoclassical norms would yield inefficiency and relatively low levels of utility or wellbeing. This is consistent with the fast and frugal narrative (Gigerenzer, 2007; Todd & Gigerenzer, 2003) and Smith (2003), taking more a Hayekian-bottom-up approach to optimal decision-making norms and behaviours.

A final component to the neoclassical puzzle relates to Friedman's (1953) methodological approach that explicitly rejects the realism of modelling assumptions being of any analytical significance. What matters most is how well neoclassical models with their underlying assumptions 'predict' individuals' or group behaviour. Indeed, one's assumptions can be completely incorrect with regards to their empirical rigour and still be considered apropos so long as the model generates robust predictions in terms of the relationship between the dependent and independent variables. Of particular importance, for Friedman, is that the assumptions being made are consistent conventional economic theory. And, then a strong statistical relationship between variables is assumed to represent a causal relationship. It is then further assumed that individuals behave *as if* they are adhering to conventional economic behavioural norms since this would be consistent with the predicted relationship between dependent and independent variables. Friedman starts with the premise that neoclassical models are correct and if the prediction is in the right direction and/or strong, the model is vindicated. If the prediction fails, then it is likely that something is flawed with the data or how the model was tested.

From a realism of assumptions matter perspective (this takes one back to Simon's early methodological contributions), this approach is scientifically flawed (Altman, 1999, 2006). I would argue that an alternative model built upon realistic simplifying assumptions might generate the same or more robust analytical predictions. Even if the former, the alternative model yields a more robust causal model; a better explanation of the determinants of the dependant variable. Moreover, if the original model fails in the robustness of its prediction, then the alternative model is the more viable one. And, contrary to

Friedman's analytical instincts there might be nothing wrong with the data or the testing procedures. Rather, the problem might very well lie with the original model. Hence, paying specific attention to the realism of one's assumption can be highly significant in determining causality. But this also relates to whether or not and why one excludes an independent variable from one's model. Without careful consideration, this can also result in serious omitted variable problems. Simon's scientific point is that the realism of one's simplifying assumptions is critical, and they need to be informed from an economic, psychological, sociological, neurological, and institutional perspective – from a broad interdisciplinary perspective. Robust scientific methodology is not about choosing one theory over another because it fits into one's prior causal modelling framework or because it is more logically robust (or more mathematically cogent); not if it is built upon or derived from false or questionable empirical premises.

Simon (1979, p. 509) makes the point on the significance of empirically rooted assumptions for robust economic analysis thusly:

Our predictions of the operations of markets and of the economy *are* sensitive to our assumptions about mechanisms at the level of decision processes. Moreover, the assumptions of the behavioral theories are almost certainly closer to reality than those of the classical theory. These two facts, in combination, constitute a direct refutation of the argument that the unrealism of the assumptions of the classical theory is harmless. We cannot use the *in vacua* version of the law of falling bodies to predict the sinking of a heavy body in molasses. The predictions of the classical and neoclassical theories and the policy recommendations derived from them must be treated with the greatest caution.

Heuristics and biases

One influential critique of contemporary economics is heavily influenced by the research paradigm developed by Kahneman and Tversky, commonly referred to as the Heuristics and Biases approach. A core argument put forth here is that humans don't behave as predicted or expected by conventional economics, given its assumption of rational decision-makers. Basically, conventional economics defines rationality in a very specific manner (which is not empirically derived) and humans tend to deviate from the behavioural norms specified as rational by conventional economics. A large part of the research emanating from this approach to human behaviour is devoted to documenting the extent to which individuals' behaviour deviates from the ideal neoclassical behavioural norms. Kahneman and Tversky and colleagues document these deviations largely through a large number of experi-

ments using different methodologies and subjects.¹ Moreover, from the perspective of the Heuristics and Biases approach, theory should not only establish the norms for best or optimal behaviour, which neoclassical theory largely succeeds in, according to this approach, but it should also be able to describe how typical individuals actually behave. Theory should have both a robust normative and descriptive foundation. The evidence suggests that neoclassical theory fails in providing a robust descriptive foundation.

The Heuristics and Biases approach assumes that neoclassical norms should be (for the most part) the benchmark for how rational individuals (or, in this case smart or thoughtful behaviour) should behave. It is argued that the well-documented deviations from neoclassical norms are a product of biased (*typically hardwired*) behaviour which results in systemic errors in decision-making. Biases and errors are defined relative to the conventional or neoclassical benchmarks for rational behaviour. Deviations from neoclassical norms yield choices that tend to be error-prone and therefore sub-optimal. A major source of biased behaviour is a product of using decision-making shortcuts or heuristics as opposed to engaging in a more systemic and calculative decision-making process. It is implicitly assumed that the typical human has the means and capabilities to do so. One example of a bad heuristic would be to apply intuition (which can be driven by emotion) to make important decisions. The resulting errors in decision-making are typically regarded as systemic and correctable largely through external interventions in the decision-making process. Hence, one finds an increasing focus on nudging to induce individuals to behave in a relatively biased-free fashion (Thaler & Sunstein, 2008).

Fundamentally important to the heuristics and biases research programme is the development of a descriptive theory of decision-making, largely derived from decision making experiments, that find that the decision makers do not behave in the optimal fashion modelled and predicted by conventional (neoclassical) economic theory. A major question being asked is why doesn't the typical person behave in a neoclassically rational manner, which is assumed to be a realizable goal. And a core finding is that individuals tend to be seriously biased decision-makers because they don't conform to neoclassical behavioural norms. A big question which one must ask is are these biases (so-called) because individuals are hard wired

¹Kahneman and Tversky are both psychologists and they and their colleagues tend to use different methodologies from what has become increasing dominant amongst economists engaged in the field, now referred to as experimental economics. The latter was developed and refined by Vernon Smith. In the psychology performed testing of hypotheses no real money is used in their experiments. The same is the case when surveys are used to test the robustness of neoclassical descriptions of human behaviour. One should note that many economists also don't monetize experiments in human decision-making with real money. As with contingent valuation studies, individuals are asked to visualize the monetary costs involved in making particular decisions. Most economists, following Smith, now revert to paying subjects with real who engage in their experiments, to better map real world monetary incentives. A big methodological question is whether or not relatively small amounts of real money generate more robust behaviour than using play money or proxies thereof.

to behave in this manner, or are there rational reasons to explain such behaviour. Would individuals choose to behave differently under different decision-making circumstances?

This analytical perspective also has a very strong underlying psychological emphasis, using psychological perspectives to better understand decision-making either in addition to or as a replacement of traditional economic drivers such as relative prices and income. Indeed, economic variables, *per se*, tend to be a relatively minor player from this methodological perspective. From a realism of assumptions-matters perspective, adding psychological independent variables to one's model or replacing such variables for economic variables, do not necessarily provide value added to one's causal narrative even if it provides a strong prediction (from Friedman perspective), if these variables are not well-rooted in the reality of economic behaviour. This is the same type of methodological problem that we discussed above when discussing Friedman's focus of predictions as opposed to predictions plus the underlying empirical veracity of the assumptions underlying the infrastructure of one's model.

This being said, those working within or informed by the heuristics and biases narrative, have sought to uncover alternative explanations to decision-making behaviour than what is provided by price theory dominated conventional or neoclassical economic theory. Prospect theory is one such important example wherein, based on experimental evidence, it is argued that individuals place a greater weight on losses than on equivalent gains, wherein such weights are equal in neoclassical theory. Another example is that many individuals place an emphasis on perceived fairness when making decisions and this can generate different decisions, on the labour market for example, than if only price and income mattered. Many individuals also are shown to be overconfident in their decisions, contrary to what one would expect if they based their decisions on evidence alone. And, there are individuals who reverse their preferences (preference reversal) for goods after even a brief spell of ownership, contrary to how they should behave (their preferences should not change) if only financial consideration (price theory) mattered. Moreover, individuals are affected by how options are framed, even when there is no evidence material change in the available options. One can reject the assumption that such behaviour is 'biased' or an error in decision-making, whilst recognizing that these alternative explanations, which are evidence based, can enrich the economic analytical toolbox.

Given the assumption of systemically biased behaviour by the typical individual in the heuristics and biases narrative, which ultimately results in sub-optimal choices for the individual and society at large, a natural derivative of this narrative is that individuals' choices must be constrained and/or redirected to choices that more closely approach the optimal. The latter would be achieved if individuals adhered to neoclassical behavioural norms. This has given rise the nudging literature (Thaler & Sunstein) which has heavily influenced public policy. It is a call to arms for government and experts

to affect individuals' choices, which are assumed to be biased and error-prone for reasons of innate and, fundamentally hardwired, behavioural biases. Appropriate behaviour is identified by 'choice architects' who design policy to induce individuals to behave in what the experts deem to be optimal behaviour. Policy could also involve taxing products or legislating restrictions to promote the latter. This public policy narrative builds on Thaler and Sunstein's (2008, p. 6) challenging the assumption of those who largely support free of choice (if this causes no harm to others) that: "... almost all people, almost all of the time, make choices that are in their best interest or at the very least are better than the choices that would be made by someone else. We claim that this assumption is false. In fact, we do not think that anyone believes this on reflection."

Individual liberty is sacrificed in this narrative to de-bias individuals, so as to maximize or at least improve their level of wellbeing. The 'pure' nudging approach would induce individuals to make choices, even they comprise of choice which they would prefer not to make (it would lower their level of utility, welfare or wellbeing) because *experts* maintain that such nudged choices is actually in the best interest of the individual. This is a top-down approach to decision-making which is in contradistinction to the neoclassical perspective that the individual knows best what's in her or his best interest.² But this policy prerogative is rooted in the assumption that individuals are systemically biased and error prone. I would argue that this assumption is largely incorrect. And that a more reality-based approach, rooted in the bounded rationality narrative of Simon, better explains errors and biases in decision-making through sub-optimal decision-making environments. That latter is also typically ignored in the neoclassical narrative itself. But this alternative approach would recommend policy that would be welfare improving without sacrificing the freedom of the individual (discussed below).

To summarize some key attributes of contemporary behavioural economics, which builds upon the heuristics and biases narrative:

- Heavily biased towards particular approaches to decision-making that are largely informed by psychology and is largely focused on generalized decision making.
- Adopts neoclassical behavioural benchmarks for optimal decision-making.
- Heavily focused on documenting the extent to which individuals' persistently deviate from neoclassical norms.
- Assumes that deviations from neoclassical norms are a function systematic errors and biases in individual decision-making, assumed to be largely (but not entirely) hardwired in the brain.

²The neoclassical worldview assumes that the individual's decision-making environment facilitates optimal choices which, as I argue below, is often not the case. This can cause errors in decision-making without individuals being hardwired to make error-prone welfare reducing choices.

- Contributes to evidenced-based understanding of determinants of decisions that go beyond price theory by incorporating psychological variables.
- Focuses on nudging, choice architecture, and related policy to shift behaviour to more optimal, welfare maximizing choices, as defined by the choice architects.
- Focuses on description as opposed to modelling and prediction (that latter being in line with neoclassical economics).

Heuristics and smart decision-making

A related (and also psychologically rooted) and competing methodological perspective to behavioural economics builds on what is referred to as fast and frugal decision-making, pioneered by Gigerenzer (2007). This perspective has been of much less significance in informing contemporary behavioural economics. Gigerenzer's methodological perspective both overlaps and challenges significant elements of the heuristics and biases approach. Here too, the analytical starting point, based on the evidence, is that individuals don't behave neoclassically. They don't abide by neoclassical behavioural norms. Both the heuristics and biases and the fast and frugal approaches provide us with evidence that real people don't behave as one would expect neoclassically rational people to behave.

Consistent with Simon's analytical narrative, the fast and frugal perspective drops the neoclassical benchmarks for optimal behaviour as the measure for optimality and, relatedly, for best practice in decision-making. Hence, what appears to be biases and errors in decision-making from the heuristics and biases perspective, might very well be rational, best practice behaviour, from the fast and frugal perspective. Indeed, unlike in the heuristics and biases approach, which argues that heuristics (decision-making shortcuts) will yield sub-optimal outcomes and, relatedly, errors in decision-making, the fast and frugal narrative argues that heuristics should yield superior outcomes to the ones generated using more calculating, deliberative, neoclassical behavioural norms.

Fast and frugal heuristics are expected to generate superior outcome when they are most consistent and compatible with the human condition, with the real world decision-making environment. Much evidence is presented suggesting that fast and frugal heuristics yield outcomes that are superior to what would transpire had individuals adhered to neoclassical behavioural norms. But this perspective often reads as if the chosen behaviour of an economic agent is optimal since it is the behaviour or decision-making process and related choices made by the individual. However, this approach casts a very positive light on the significance of bottom-up decision-making. Based on experience, individuals develop and devise decision-making processes and make choices that can be superior to what is derived exogenously with little or

no relationship to the real world of decision-making – which is oft the case with neoclassical behavioural norms. Individuals adopt heuristics (decision-making shortcuts) that are both effective and efficient. This includes heuristics based on the experience of the individual (related to intuition – which is considered to be a bias and even irrational in neoclassical theory) and the perceived experienced of others, which can involve herding (Baddeley, 2018), which is also considered to be biased behaviour in neoclassical theory.

This particular bottom-up approach overlaps with some of the theoretical insights of Vernon Smith and relate to what both Smith (2003) and Gigerenzer refer to as ecological rationality. Ecological rationality is related to Simon's (1987) concept of bounded rationality, which receives relatively little attention in the new behavioural economics as articulated in the Kahneman-Tversky narrative. Bounded rationality specifies real world conditions (the realism of assumptions matter) which bound and affect the decision-making process and the choices individuals make in the real world. This results in both processes and choices, grounded in the reality of real world decision-making, differing from neoclassical behavioural norms.

Ecological rationality, effectively bounded rationality, recognizes the brain as a scarce resource, with limited processing capabilities, dealing with imperfect and costly information (Altman, 2017) (the latter concepts are further elaborated upon by Akerlof (1970)).³ Simon refers to real world decision-making processes as satisficing to distinguish this from the neoclassical concept of maximizing, where the latter is given a very narrow mathematical bent, something which real world decision-makers typical don't understand or exploit. Satisficing is the best that a smart and, in this sense, rational individual can be expected to do given her or his decision-making environment. Here, from Gigerenzer's and Smith's analytical perspective, decision-makers tend to be ecologically rationally, practically rational. And, at this point, it is once again important to reiterate the importance of the realism of the assumptions that serve as a backdrop to fast and frugal modelling and to Smith's approach to economic analysis.

An example of this bottom-up approach, related to ecological rationality, is provided by Smith (2005, 149-150):

It is shown that the investor who chooses to maximize expected profit (discounted total withdrawals) fails in finite time. Moreover, there exist a variety of nonprofit-maximizing behaviors that have a positive probability of never failing. In fact it is shown that firms that maximize profits are the least likely to be the market survivors. My point is simple: when experimental results are contrary to standard concepts of rationality, assume not just that people are irrational, but that you may not have the right model of rational

³See Hannah Altman (2020), for an important application and implications of the introduction of the realistic concept of imperfect and asymmetric information in the domain of sports.

behavior. Listen to what your subjects may be trying to tell you. Think of it this way. If you could choose your ancestors, would you want them to be survivalists or to be expected wealth maximizers?

Smith's key point is that one learns about best practice decision-making processes by investigating how individuals behave in the real world, albeit Smith's evidential base is largely derived from classroom experiments. Theory should be deduced from reality. If neoclassical behavioural norms prove to be inappropriate one then adopts alternative norms, actually, behavioural norms that should *replace* the inappropriate neoclassical behavioural norms. But it should be noted, and very much overlapping with Gigerenzer, that the choices individuals make are typically superior than anything that can be derived from the exogenously given and artificially derived neoclassical behavioural norms. This yields superior outcomes. And Smith's point is that to be economically or otherwise efficient one should not abide by neoclassical behavioural norms. Behaving neoclassically is not the same thing as being efficient. And, economic agents and entities tend to be efficient because their behaviour is reality based and contextualized. There is nothing irrational or sub-optimal here.

The bounded rationality-smart agent approach to behavioural economics

I argue that Simon's approach to behavioural economics offers the potential to better understand the shortcomings of contemporary behavioural economics and provides a platform to further develop behavioural economics as a powerful analytical tool in economics to enrich and revise contemporary economic analysis. Aspects of the heuristics and biases and the fast and frugal narratives contribute to this endeavour. Simon's analytical narrative is heavily informed by a multi-disciplinary perspectives of which price theory and psychology are but two. Simon pays particular attention to the importance of the realism of a model's underlying assumptions, the decision-making environment, individuals' decision-making capabilities, the practical intelligence of decision-makers (as opposed to neoclassical rationality), process rationality, and the possibility of persistent inefficiencies in the economy. He also maintains that neoclassical theory is a poor normative theory for 'economic' behaviour and lacks in analytical rigour. And, this critically relates to the poverty of the behavioural and institutional assumptions that underly much of neoclassical theory.

A key point of intersection between the heuristics and biases and the fast and frugal narratives is that they both provide evidence supportive of Simon's argument that neoclassical norms fail as a benchmark for actual human. Research from both perspectives also provide evidence, as do the researchers associated with Smith, on how individuals behave,

make choices under a variety of circumstances. This is important to Simon's approach since he argues that the assumptions underlying economic theory must be evidenced based.

In terms of economic theory, of model building, the bounded rationality approach rejects the heuristics and biases approach of adopting neoclassical norms as benchmarks for optimal behaviour. Therefore, it would not define behavioural deviations from neoclassical norms as necessarily biased, error-prone, irrational or quasi-rational, and not subject to change as the decision-making environment changes. This is in contrast to the heuristics and biases narrative. But I would argue that the bounded rationality approach would not necessarily maintain that a particular set of bottom-up constructed choices or processes of decision-making yield optimal results. Hence fast and frugal heuristics need not yield best possible outcomes even given the decision-making environment and even if it yields superior outcomes than would arise if one adheres to neoclassical behavioural norms. Which decisions are best are determined by circumstances and by the individuals' or organizations' objectives. They must be determined by analysing actual human decision-making behaviour which, in turn, informs the construction of one's models. Moreover, individuals and organizations can make errors in their decisions and suffer from biases for a variety of 'rational' reasons and, therefore, these errors and biases can potentially be corrected and repaired.

A close colleague of Simon, James March (1978, p. 589), summarizes the bottom-up-bounded rationality approach to behavioural economics:

Engineers of artificial intelligence have modified their perceptions of efficient problem solving procedures by studying the actual behavior of human problem solvers. Engineers of organizational decision making have modified their models of rationality on the basis of studies of actual organizational behavior. . . Modern students of human choice behavior frequently assume, at least implicitly, that actual human choice behavior in some way or other is likely to make sense. It can be understood as being the behavior of an intelligent being or group of intelligent beings. . .

Fundamentally important here is that decision-makers are assumed to be intelligent or smart *within the bounds* of their decision-making environment and their decision-making capabilities. And March urges us to begin with the hypothesis that behaviour engaged by decision-makers is smart or rational (boundedly rational). This does not imply that individuals can't make mistakes or that their choices can't be purposely inefficient. These points are elaborated upon by Simon (1986, S211):

The rational person of neoclassical economics always reaches the decision that is objectively, or substantively, best in terms of the given utility

function. The rational person of cognitive psychology goes about making his or her decisions in a way that is procedurally reasonable in the light of the available knowledge and means of computation.

Simon emphasizes the descriptive aspects of decision-making. Unlike in contemporary economics, there is no one rule or norm fits all situations. Here, again, one has an unequivocal emphasis of the importance of the realism of one's model and its underlying assumptions. There is also a difference between how individuals make decisions (which tend to be intelligent or smart), how close to the optimal these decisions are, given the decision-making environment and the decision-making capabilities of the individual, and why individuals make particular decisions. Decisions yielding sub-optimal outcomes are not considered, in the first instance, to be irrational, biased, or stupid. Simon's less well-known concept of procedural rationality is designed to address issues of rationality, benchmarking, and optimality.

Procedural rationality's starting point is to evaluate individuals or organizations 'efficiency' relative to the goals that they set for themselves and given their decision-making environment and their decision-making capabilities. The reality-based question that is being asked is, given the above have individuals and organizations done their best to meet their objectives? From this perspective it is possible to evaluate the objectives set by individuals and organizations and to determine if these objectives have been met, how they've been met, have they been met in the most effective manner possible given real-world circumstances and, if they have not been met, why not. This narrative then should take into consideration a wide range of variables including price and income, but also imperfect and asymmetric information, preferences of individuals, decision-making 'biases', good versus bad heuristics, organizational structures, power relationships, institutional settings, sociological factors, and neurological factors, for example. There is room here to consider errors in decision-making, learning, and perverse incentive environments. But these various causal variables should be rooted in the real world of decision-making. Also, of some importance, is the recognition that the decision-making environment and decision-making capabilities of individuals and organisations are subject to change, which can facilitate improvements in decision-making and outcomes.

From this perspective, in contrast with the neoclassical approach, and even the with bottom-up approach championed by Smith and Gigerenzer, effective or efficient decision-making and outcomes can't be assumed a priori.⁴ These are a function of a variety of variables and there are no guarantees that these will be in place. Making such a critical a priori assumption results in misplaced and misleading causal analyses. Also, no

⁴As discussed above both Smith and Gigerenzer reject neoclassical behavioural norms as the sine qua non for achieving optimal outcomes. Rather it is the behavioural norms garnered through experience that invariably achieves this end.

a priori assumption is made as to how a person or organization should behave to achieve particular goals and objectives. Such norms need to be derived from an analysis of real-world situations from which best-practice behavioural norms can be derived that can be used to assess and analytically predict behaviour in context.

In terms of public policy, the bounded rationality-smart individual analytical approach is respectful of individual's preferences and choices. Individuals' choices might be sub-optimal in the sense that they are not able to realize their own preferences or their preferences are different from what they would be under a different decision-making environment. Neoclassical theory tends to assume that consumers are able to both form and realize their preferred or true preferences. Therefore, their revealed preferences (what they purchase or do) represents their preferred or true preferences. This follows from the exogenously given (not empirically based) assumption that the decision-making environment and individuals' decision-making capabilities are fit for purpose (Altman, 2010). The new behavioural economics largely assumes that individuals are systemically biased and one requires experts to dictate or nudge 'correct' and ultimately optimal behaviour. The latter may not be perceived as utility maximizing by the affected individuals, but it is from the perspective of the choice experts. These individuals are somehow not affected by the inherent biases that pollute the decisions of normal or typical individuals.

But if the actual empirically based choice problem relates largely to the decision-making environment and related capabilities, then for individuals to improve their level of utility or wellbeing requires improving their decision-making environment and their decision-making capabilities. And, in this manner, individuals' freedom of choice, individuals' fundamental liberties in their choice space, can and should be respected as long as their choices cause no harm to others.

One basic example of this would be a women's target number of children. From the bounded rationality approach, consistent with the evidence, the lack of empowerment and education of women results in there being more live children per household than there might otherwise be. This is would be the case holding relative prices and real income constant. Changing their decision-making environment and capabilities, empowering women and improving their education, will result in fewer children. No nudging is required and relative price and changing real income can't tell the whole analytical story. This bounded rationality, empirically grounded approach, actually compliments the neoclassical narrative that focuses entirely on economic variables.

To summarize, some of the core characteristics of the bounded rationality/smart agent approach are:

- Realism of assumptions in model construction.
- Economic agents (decision-makers) are intelligent or smart even if they don't abide by neoclassical behavioural norms.

- Best practice norms are determined from the bottom-up, experientially. Therefore, heuristics can be superior to exogenously given neoclassical behavioural norms.
- Decision-making environment and capabilities affect decision-making processes and outcomes.
- Neither neoclassical norms nor bottom-up decision-making processes are necessarily best practice.
- Optimality or efficiency is not a given.
- Sub-optimal outcomes can be a function of errors in decisions-making,
- Sub-optimal outcomes can be a product of a sub-optimal decision-making environment and decision-making capabilities (a point that overlaps with North's (1971) narrative on the importance of institutions as a determinant of decisions and for the extent to which outcomes are optimal or not.
- Errors in decision-making are possible and can be unrelated to any innate biases,
- Errors can be corrected over time.
- To increase individual's level of utility of wellbeing, public policy should be focused on improving the decision-making environment and decision-making capabilities, not on changing the preferences of individuals to match those of choice architects.

Thinking Fast – Thinking Slow

Kahneman (2011) has developed an important addendum to his and Tversky heuristics and biases perspective. The important nuance here relates to what type of heuristic should one adopt to arrive at the most effective or optimal decisions. Contrasting and comparing fast and slow heuristics is a much more nuanced approach to the use of heuristics where the optimal thought process is context dependent. The point made by Kahneman is that slow heuristics, slow thinking, is required when more careful and deliberative thought is required to make a decision. In other instances, fast heuristics, fast thinking, would be best.

What approach to decision-making makes more sense depends on the type of decisions being made and decision-making environment that a decision-maker is embedded in. A key point made by Kahneman is that fast thinking can generate suboptimal results in many decision-making contexts. And slow thinking might yield superior outcomes if one has the time to engage in this type of decision-making. This approach overlaps with the fast and frugal narrative, but slow thinking, which is in contrast to the latter is given a place of pride. Fast and frugal heuristics work best for individuals with the requisite accumulation of specific decision-making experience. But fast and frugal heuristics may not be fit for purpose

for all decision-makers in all decision-making environment. Slow thinking is more closely related to neoclassical norms in so far as it can involve more calculated and time-consuming deliberation. However, the Thinking Fast – Thinking Slow narrative is consistent with the analytical perspective that optimal decision-making norms must be context dependent. There can be no one size fits all rule.

Gary Becker and Akerlof: A sociological interlude

Although Gary Becker is one of the pioneers of modern neoclassical theory, what is not well discussed is his analytical modelling that incorporates sociological variables. Becker (1996) acknowledges that there are serious gaps in price theory's explanatory powers. But he rejects the proposition embedded in the heuristics and biases narrative that these gaps can be best explained or predicted by assuming that the typical individuals is systemically biased and perhaps even irrational. Becker argues that contemporary economists all too often ignore non-economic variables, especially sociological ones, in their modelling framework.

Becker argues that individuals past and current relationships and social context, related to his concepts of personal and social capital, help explain choice behaviour that might appear to be otherwise biased. He argues that this is all consistent with individuals being utility maximizers and rational agents, where price and income are only two amongst other independent variables. Moreover, nonmaterial considerations are said to be important, money is not everything to rational decision-makers. And, this helps explain what might appear to be biases or irrational behaviour using more puritanical neoclassical behavioural benchmarks.

For example, neoclassical theory suggests that the neoclassically rational consumer should have consistent preferences, there should be no preference reversal. Therefore, if one preferences A to B one should continue to prefer A to B as long as nothing changes materially with regards to A and B. But evidence suggests that there is preference reversal in the sense that individuals offer less to purchase an item than to sell the same item after they purchase it (referred to as the endowment effect). But for Becker, this is not preference reversal since possessing an item provides additional value to the possessor of this item, hence the increased offer price. Preferences are consistent and context dependent.

More generally, the community that one belongs to and is raised in (as well as family), affects individuals' utility maximizing decisions, controlling for price and income. Moreover, robust prediction of behaviour requires contextualizing predict behaviour in terms of context within which individuals make decisions. It's not all about price and income. These decisions may not be consistent with certain neoclassical norms, but they are sensible decision.

Clearly emanating from a behavioural economics narrative, Akerlof (1982; Akerlof & Kanton, 2010) signifies

the importance fairness and identity and social context for decision-making. Fairness impacts on the wages paid and how wages impact on productivity (how hard workers and economic agents work, in general). This relates to the efficiency wage model. Also, one's social group (related to identity) impacts on one's decisions (overlaps with Becker's personal and social capital). Institutions also matter in terms of affecting the incentive environment. Institutions need to be designed to generate optimal outcomes or to facilitate individuals maximizing their wellbeing. Related to this, power relationships effect decision-making. We are not all equal. And this impacts how one interacts with price and income changes. Institutions and power play an important role in the bounded rationality narrative as articulated by Simon.

X-efficiency theory and behavioural economics

Much of contemporary behavioural economics pays no attention to the theory of the firm. As Hugh Schwartz (2015, 2018) points out, this is a critical gap in the literature. The firm is, after all, the centre of the production process. It is the source of economic prosperity and can be the source of economic immiseration. It is where gaps in productivity and efficiency can be identified. And, Simon identifies and underlies the importance of persistent inefficiencies in the economy as compared to the neoclassical assumption of persistent efficiencies. But contemporary behavioural economics focuses on choice behaviour outside of the realm of production, with some focus 'irrationality', heuristics and biases, and nudging for example. There is an abundance of research on the firm stemming from neoclassical theory. But it largely builds upon the assumption of efficiency and uses neoclassical norms as the benchmark for optimality.

The firm is not alien to the corpus of behavioural economics. It has a rich tradition in this area, exemplified in the research of Cyert and March (1963), and Leibenstein (1966). And, there is also the research pioneered by Akerlof (1984)⁵, extending the work of Leibenstein on efficiency wages (1957). Leibenstein (1966; Frantz, 1997) also introduced the concept of x-efficiency. For both efficiency wage and x-efficiency theory the starting point for modelling the firm is that economic efficiency, as compared to allocative efficiency, cannot be assumed to be given or typical. Firms cannot be assumed to efficient in the sense of performing the best that they can, given traditional factor inputs. This allows for an understanding of the micro-conditions for achieving economic efficiency and why economic efficiency is all too often *not* achieved. This brief venture into efficiency wage and x-efficiency theory highlights the importance of the realism of assumptions for robust economic modelling which, I argue above, should be the cornerstone of behavioural economics, as it is in the Simon narrative.

⁵See, Fehr & Goette (2007) on efficiency wage related classroom experiments.

Based on the evidence, efficiency wage theory stipulates that there is a positive relationship between real wages and effort inputs. Factors such as health and wellbeing can impact on the level of effort inputs. But so can perceived fairness, which can be proxied by the level of wages. In efficiency wage theory, effort inputs need not be maximized. In x-efficiency theory attention is paid to the relationship between managerial preferences and competitive environment and the level of x-efficiency. More generally, there is focus on the overall incentive environment inside the firm (Altman, 1999, 2001, 2019; Sheffrin, 2008). How a firm is managing, therefore, effects the level of firm productivity. In other words, unlike in conventional modelling, effort (quantity and quality) is a variable in the production process. Conventional economics tends to model why effort is at the assumed optimal. But efficiency wage and x-efficiency theory force us to determine the conditions under which effort inputs can be less than optimal and those conditions that facilitate moving towards some optimum.

One should note that both efficiency wage and x-efficiency wage theories accept the 'neoclassical' assumption, which is rather common sense, that effort needs to be at some optimum for productivity to be maximized (labour and total factor productivity). What is rejected is the assumption that this optimum is realized and that economic agents behave a manner consistent with achieving this optimum. This unrealistic assumption results in the analyst paying no heed to the actual process required to achieve economic efficiency, which relates to identifying the required behavioural norms to achieve this end. The conventional assumption can also result in failing to recognize sub-optimal performance in the firm. Adopting the flexible assumption that economic inefficiency is a very real possibility and that economic agents do not automatically adopt the norms and/processes to achieve economic efficiency, opens the door to more robust causal economic analysis. Being able to identify how one increase economic efficiency in the real world has significant implications for improving global wellbeing.

Critical issues with the New or Contemporary Behavioural Economics

Following the above discussion of neoclassical economics and behavioural economics, I would summarize some of key characteristics of contemporary behavioural economics, which is dominated by the heuristics and biases narrative, as follows, separating out, what is in my view. the positive from the negative.

The key positive characteristics comprise of:

- Examining and documenting the extent to which neoclassical predictions fail, especially in the realm of basic choice behaviour.
- Providing explanations of choice behaviour based on empirical evidence, large derived from classroom experiments and surveys.

- Identifying non-economic explanatory variables, based on classroom experiments and surveys, that allows for more robust analytical predictions.

The key negative characteristics comprise of:

- Normative benchmarks for optimality largely remain neoclassical in orientation. Sub-optimality is therefore measured as deviations from the neoclassical behavioural norms.
- Rationality is neoclassically defined and therefore measured as deviations from the neoclassical norms.
- Contemporary behavioural economics is not focused, methodologically, on causation. It is more geared towards analytical prediction as is neoclassical economics. Individuals are said behave as-if they possessed specific behavioural traits rooted in the psychological domain. Although these traits/variables are empirically rooted, it is not always clear that individuals actually behave in this manner in the specified modelling scenario. *But this approach sheds light on possible explanatory variables rooted in the real world. And, this can contribute to a more robust causal analysis.*
- Too narrow of a focus on psychological variables to improve predictive power. However, on the positive side, experimental and survey evidence is used to inform the psychological variables, such as loss aversion and fairness.
- Little attention is devoted to asymmetric information, capabilities development, and institutional design.
- There is a strong focus on persistent errors and biases in decision-making and, relatedly, in the choices made by individuals. This relates to behavioural deviations from neoclassical behavioural norms, such as the use of heuristics in decision-making.
- Errors and biases are presumed to be largely hardwired in the individual.
- This leads to a focus on nudging by choice architects who are presumed to know better than the individual what's in her or his best interest. This contains a very strong assumption biased against individual freedom in the typical choice environment.

There is also the contribution of the fast and frugal approach which, on a positive note:

- Rejects neoclassical behavioural benchmarks for optimal decision-making, based on empirical analysis.
- Focuses on context-based benchmarks – related to bottom-up experientially related decision-making, based on empirical analyses.

- Focuses on the decision-making environment and the decision-making capabilities of decision-makers as key determinants of decision-making.

One important negative of the fast and frugal approach is that it often reads as if fast and frugal heuristics generate optimal outcomes, when this need not be the case. Such heuristics can be good or bad, depending on circumstances. Also, Smith and colleagues, working on experimental economics, have demonstrated when and why non-neoclassical norms yield superior outcomes than when applying neoclassical norms. But also of importance is the argument, flowing from some of this research, that suboptimal outcomes are more a result of issues related to the decision-making environment and decision-making capabilities, as opposed to the persistent biases of decision-makers.

An assumptions-matters and holistic approach to behavioural economics

Rooted in the research of Simon, and taking us back to the origins of behavioural economics, a critical distinction between conventional economics and behavioural economics relates to the importance that Simon attaches to the realism of assumptions to the construction of robust economic models. This includes the assumptions that one makes about the decision-making environment and the decision-making capabilities of decision-makers. Also significant is the importance of the realism of behavioural norms for best-practice decision-making. Related to this, is how one defines rationality and smart or intelligent behaviour for real world decision-makers. This behavioural economics core, this behaviouralist methodological approach to economics, contributes to building a more scientific, causality focused real world economics.

As discussed above, Simon challenged neoclassical economics for its lack of realism in its modelling building blocks and this also relates to its approach to decision-making. There is some confusion in this approach because behavioural economists then use terms such as bounded rationality, quasi-rationality, and ecological rationality to contrast to neoclassical rationality which is referred to as to as rationality. Non-neoclassical behavioural ends up being classified as a qualified type of rationality, which can then be dubbed as irrational, not quite rational, or systemically biased behaviour. Also, critical to Simon and to the core of behavioural economics is the possibility that economic efficiency can exist and persist over time. I would argue that these represent four critical pillars of behavioural economics, and more holistic approach, which is not well captured in the dominant heuristics and biases approach and, relatedly, in the nudging approach, albeit this should not distract us from its contributions to economic analysis.

The above approach is more in line with what Simon's overarching bounded rationality narrative. Bounded rationality simply recognizes that individuals make decisions in a real-world decision-making environment and, given this environment, decisions are conditional upon the decision-making capabilities of decision-makers as well as on their preferences. This is what sets behavioural economics scientifically apart, in many ways, from other methodological narratives in economics. Here theory is grounded in the facts where the latter is contextualized by the environment within which decisions are made.

I would argue that here there is a combination of inductive and deductive reasoning, where the inductive piece is critically important. And this takes us beyond simply focusing on economic variables as causal determinants of one's dependent variables – taking us into interdisciplinary space, a more holistic approach to economic analysis. This speaks to the importance that Tomer, for example, places on soft variables as important independent variables. From this modelling perspective, one would ask which variables should be included in one's model, which possible missing variables should one test for. This speaks to an empirically grounded understanding of the potential independent variables that impact on the dependent variable. Moreover, this approach would not take for granted that there is a strong causal relationship between dependent and independent variable simply because there is a strong empirical relationship. There might be an important omitted variable lurking in the background, and the strong empirical relationship might simply be a spurious empirical relationship. Much depends on the realism of the assumption one makes when one builds one's model. The realism of assumptions matter.

One example of this would be recognizing the reality of asymmetric and costly information, which will affect how individuals make decisions, how this might affect market outcomes, and the role of public policy to facilitate more efficient and effective decisions within such an information environment. This approach has been pioneered by Akerlof, more generally, and Shiller (2008) with regards to financial markets. Another example of the importance of the realism of assumptions is dropping the assumption of no effort variability forces us to think more broadly about the impact of higher real wages on micro and macroeconomic outcomes. Higher wages need not generate the employment losses and higher unit costs predicted by conventional economics when one introduces more realistic behavioural assumptions into labour market modelling. If one more realistically assumes that inefficient firms (not optimally productive or x-efficient) can survive and be profitable in a competitive market then one would investigate the possibility that productivity challenges in the firm and the economy can be related to how the firm is governed. One can't simply assume that efficiency is an inevitable outcome of investor-owned firm behaviour. Yet, in another example, if one assumes that institutions aren't automatically designed to generate 'best' possible outcomes,

then one can examine the role that institutional design plays in determining the extent of economic development, poverty alleviation, and improvements in socio-economic wellbeing.

In a more micro-level examples, it is typically assumed that individuals weight losses the same as they do gains. But, actually, they weight losses more than gains. And this impacts on our understanding of choice behaviour. It is assumed in the conventional wisdom that how one frames options makes no difference to decision-making, but can actually have a significant effect, especially given asymmetric information. The more realistic are one's simplifying assumptions the more robust is one's model in determining cause and effect.

A core focus of debates related to behavioural economics, however, speaks to what one assumes to be intelligent or rational behaviour, what are the benchmarks for such behaviour, whether or not one assumes that individuals' behaviour is consistent with optimal outcomes, and whether or not deviations from optimal outcome generating behaviour is indicative of persistent biases and possible 'irrationality' on the part of the decision-makers. I would argue, consistent with March, that one should apply the default assumption that economic agents, individuals, are smart or intelligent, and in this sense rational. And they make smart decisions given their decision-making environment and decision-making capabilities. This does imply that their decisions can't be prone to error or that they can't be biased in their decisions. Nor does this imply that individuals should be neoclassical in behaviour for decisions to be in some sense optimal.

The current default assumption amongst many behavioural economists is that economic agents are not so smart, which then has significant implications for policy. But by defining smartness in the sense of doing the best one can, given one's decision-making environment and decision-making capabilities, one maintains the important rhetorical and philosophical link with neoclassical economics by stipulating that individuals are rational without accepting neoclassical norms as the gold standard. What can confuse debate and analysis with regards to smartness, intelligence and rationality, is accepting the (false) assumption that being smart or intelligent is equivalent to being neoclassically rational.

We should also be more focused on determining what are the real world-conditions, including behavioural norms, required to achieve optimal outcomes, as defined by the individual or organization. This relates to Simon's concept of procedural rationality. And this nudges us, methodologically, to determine why individuals and organizations often don't achieve optimality, whilst assuming that economic agents are smart or intelligent. Critical here is recognizing, based on the evidence, that neoclassical norms should not be the benchmark for optimal behaviour or outcomes, and that one should not automatically assume that conditions exist for optimality to obtain.

As discussed above, one contribution of conventional behavioural economics is demonstrating that in all too many instances individuals don't behave neoclassically and that

there are serious explanatory gaps emanating from neoclassical theory. But once one recognizes that these ‘deviant’ behaviours and gaps are not necessarily or even likely to be a function of systemic biases or irrationality, this opens the door towards a more nuanced understanding of why these outcomes arise. These gaps might a function of neoclassical behavioural norms not being optimal or preferred by the individual or the organization. There is nothing irrational here. But even, in this case, as mentioned above, there might be errors in decision-making and sub-optimal behaviour that’s consistent with individuals being smart or intelligent.

In this case, when one has smart decision-makers, the more paternalistic expert based solutions to obtain improved outcomes may no longer be the preferred option for policy makers. We would need to open the analytical door to institutional design and capabilities gaps as well as sociological and psychological variables that can be changed so that individuals and organizations can make welfare improving decisions.⁶ Here individuals are provided with the means to make welfare improving choices as opposed to these being imposed upon them by experts. Behavioural economic can, for this perspective, contribute to policy debate, by better understanding the context within which decisions are made.

Also, of critical importance to behavioural economics is the evidence developed to test hypothesis and to interrogate the integrity of the model’s underlying assumptions. Most recently, experimental economics, especially classroom experiments, have been one of the main vehicles used to accomplish this task. But it is important that one recognizes other data sources that can serve similar ends, which include traditional data sources, ‘big’ data, survey data, interviews, focus groups, and experiments conducted using different methodologies from those adopted in experimental economics that largely builds on the contributions of Smith. The increasing focus on experimental economics is suggestive of experimental economics and behavioural economics being one and the same, where this simply is not the case (Charness, 2015). This is like asserting that econometrics is the same as economics. Experimental economics represents one empirical methodology for testing hypotheses and the testing these hypotheses in a relatively controlled environment.⁷ Behavioural economics, in its

⁶Related to the nudging approach, however, based on the research of Kahneman and Tversky, is the notion of framing, wherein an individual changes her or his preference for a prospect when the framing of this prospect is changed. Some suggest that this signals a form of irrationality wherein individuals can be easily manipulated by the frame. A classic example of this is when the default for pensions is not to enrol in a company pension program, most don’t enrol. When the default is to enrol, most enrol. Change the frame (default in this case), change the preference. But since defaults can be taken to signal to the consumer what ‘experts’ or ‘leaders’ believe to be the optimal choice, in a world of asymmetric information, changing choice as defaults change can be regarded as a rational act. In the case of pensions, changing defaults by government is a form of institution design that carries with it great ethical responsibility since it also signals to the consumer that ‘experts’ have determined that a particular pension fund is a safe bet.

⁷However, one flaw of experimental economics is its focus on students where experiments are decontextualized from the real world, albeit efforts are made to proxy real world decision-making environments in the experiments.

various representations, is a methodology of economic inquiry, which takes us beyond price theory and rejects, for the most part, the neoclassical assumption that decision-makers adhere to neoclassical behavioural norms. Experimental economics has contributed to enriching this methodological approach. It is part of the behavioural economics toolbox.

Power is a neglected analytical piece in both conventional economics and in conventional behavioural economics. But this is considered to be of importance in Simon’s behavioural economics narrative. This becomes especially important since decisions are made in the context of the power relationship within which a decision-maker is embedded, be it in the household, in school, or in her or his place of employment. It is important to understand how power impacts on the choices made by individuals and organizations. Different power relationships will yield different choices, *ceteris paribus*.

Another important piece of the behavioural economics toolbox relates to the mental models that individuals adopt to make decisions (Altman, 2014). These are informed either by the theory one adopts to inform one’s decision-making. For example, if one assumes that effort inputs are fixed then one eliminates from one’s modelling and analysis that incentives and preferences can impact on economic efficiency. If one assumes that the benchmark for optimal behavioural are neoclassical norms this encourages policy that drive individuals to behave in this manner. If one assumes that individuals are systemically biased, this encourages policy that tends to override individual freedom in the choice domain. The theory that underlies one’s mental models plays a fundamentally important role in determining how decisions are made and the resulting choices, hence the importance of providing behavioural economics with substantive empirical foundation within a more holistic theoretical framework.⁸

For behavioural economics to move forward it is of critical importance to assure that price theory (the importance of prices and income) is one of the cores pillars of behavioural economics methodology. Price and income are important determinants of behaviour, but they are only two amongst other significant causal variables. This speaks to the underlying significance of a more holistic approach to economics championed by Simon. Behavioural economics can and should contextualize price theory with respect to institutional, psychological, and sociological and other variables, allowing for more robust and finessed causal analysis and analytical predictions.

Conclusions

Contemporary behavioural economics, which has been heavily influenced by the heuristics and biases approach, has made significant contributions to the literature by persistently testing the extent to which individuals actually behave in accordance with neoclassical behavioural norms. This testing has generated insights into how individuals make decisions and how

⁸Keynes (1939, 383-384) spoke to the importance of mental models in informing life changing macroeconomic policy in *The General Theory*.

context matters for their decisions. But there is also a strong bent towards evaluating the efficiency, effectiveness, and optimality of decisions relative to neoclassical behavioural norms. But, I argue, behavioural economics needs to be broader than this to enrich economic theory, making it more robust, and to serve as a vehicle to better understand human decision-making, especially in the economic realm. It must also facilitate a better understanding of the decision-making environment and individuals' decision-making capabilities and preferences that drive decision-making and choice behaviour. One cannot assume, a priori, that the environment and capabilities are fit for purpose. Finally, behavioural economics should be welcoming of different rhetorical forms of articulating models and arguments, inclusive of more mathematical and narrative forms of address.

I summarize what should be critical distinguishing characteristics of behavioural economics as follows:

- The importance of the realism of the modelling simplified assumptions (which makes reference to Simon's early contributions to behavioural economics).
 - Causal analysis, which requires a realism matters approach to economic theory.
 - Going beyond a simplistic as-if approach to analysis – individuals behave as if they are selfish, altruistic, profit maximizers, etc. As-if propositions need to be grounded in reality.
 - A more holistic approach to economic analysis, a more pluralistic approach. One must go beyond introducing psychological variables into one's analytical narrative. This too, very much relates to Simon's approach which sought to be informed by a multiplicity of disciplines.
 - Better understanding that neoclassical behavioural norms need not be the benchmark for optimal behaviour in the real world. Therefore, what appears to be systematically error-prone and biased behaviour can be a function of problems with decision-making environments and decision-makers' capability gaps.
 - Recognize that individuals' decisions can be sub-optimal without being a function of the human condition, opening the analytical door to institutional change and other parameters whilst maximizing the extent of individual freedom in the domain choice.
 - Incorporate the significant insights of price theory into one's modelling framework.
 - Recognize the importance of the decision-making environment and individuals' decision-making capabilities.
 - Recognize that inefficient economic organizations can survive and even prosper over the long term – leaving significant degrees of freedom to the type of non-maximizing behaviour that runs contrary to the corpus of neoclassical theory.
- Recognize the importance of power and power relationships to decision-making.
 - Recognize the significance of mental models to the decision-making process.
 - Recognize that experimental economics is only one empirical instrument in the behavioural economics toolbox – it is not the same thing as behavioural economics.

Acknowledgments

The author thanks Hannah Altman, Louise Lamontagne, and Roger Frantz for their comments and suggestions.

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