

PERSPECTIVES ON ECONOMICS IN PUBLIC POLICY DEVELOPMENT

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The model of rational, economic man as a utility maximizer has dominated economic analysis for generations although many argue its ability to adequately describe human economic behavior. Simon argued for an administrative model of a boundedly rational satisficer. Newer models of human behavior developed by psychologists and others suggest that humans use a variety of shortcuts to analyze information, and may make many predictable mistakes in making choices. This article provides an overview of alternatives to the rational economic model given our understanding of the human decision making modes of reasoning and intuition, psychological findings including our tendency to use heuristics and biases, prospect theory relating to risk and loss aversion associated with choices, and the implications of framing effects. Specifically, this article examines characteristics, critiques, and future research considerations for evolutionary, neuroeconomic, behavioral, and cognitive economic models utilizing this additional information about human behavior. Understanding and appropriately applying these developing alternative models has the potential to significantly improve our ability to develop successful public policy.

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The model of rational, economic man has dominated economic analysis as well as public policy and social systems analysis for generations. And for a number of years, it's been argued that rationality

is not very good at describing behavior, certainly at an individual level, but also at the institutional level and beyond. This paper reviews some of the literature relating to the rational model as well as alternatives in economics proposed in more recent years. This effort culminates with a focus on ways that newer perspectives in economics may assist in public policy decision making.

Before embarking on a journey through various perspectives on economics, it may be appropriate to define economics. Webster says economics is the science that deals with production, distribution, and consumption of wealth, and with the various related problems of labor, finance, taxation, etc. (1994, p. 430). Caporaso and Levine note that “for the neoclassical thinker, “economics” refers to private transactions in pursuit of utility maximization” (1992, p. 4). Heilbroner defines economics as “an explanation system whose purpose is to enlighten us as to the workings, and therefore to the problems and prospects, of that complex social entity we call the economy” (1999, p. 311). Ross quotes Robbins’ definition of economics as “the science which studies human behavior as a relationship between ends and scarce means which have alternative uses” (2005, p. 87). Becker narrows the number of definitions down to three. He states that economics is said to be the study of (1) the allocation of material goods to satisfy material wants, (2) the market sector, and (3) the allocation of scarce means to satisfy competing ends (1976, p. 3). This paper does not begin to assimilate each of these definitions and many others into any sort of cohesive definition of the field of economics. The purpose of examining the definitions serves to illustrate that the context of an analysis may influence the theory and outcomes considered, and is also a consideration as changes are made to the field of economic inquiry. This paper assumes that the science of economics, in whatever form may be most appropriate, is useful to policy development and decision making in public administration. Levy notes that one advantage of applying economic theory to matters of public policy is that it can often move the debate away from the normative question of right or wrong toward the positive by asking how things work and what will happen if certain changes are made (1995, p. 3).

ECONOMIC MAN

At the center of many works on economics lives “economic man.”

Levy defines economic man (with no gender bias intended) as the behavioral model for economics “and thus the central figure in economic theory. “Economic man has two defining characteristics: he’s rational and he acts in his own self interest. Levy notes the term “economic man “was coined by Alfred Marshall, but as many other authors note, the idea of economic man goes back to others including Adam Smith in his 18th century work *The Wealth of Nations*. According to Smith in the often referenced statement, “It is not from the benevolence of the butcher, the brewer or the baker, that we expect our dinner, but from their regard to their own self interest. We address ourselves, not to their humanity but to their self love, and never talk to them of our necessities but of their advantages” (Smith, 1776, as cited in Levy, 1995, p. 9). Levy notes that this idea describes people’s economic relationships as structured, voluntary agreements based on the self-interests of the contracting parties. While this idea addresses behavior at the individual, microeconomic level, Levy notes that Smith also addressed economic behavior at the aggregate, macroeconomic level by expressing the idea of the “invisible hand.” This concept suggests that the net effect of self-interested behavior is to promote general prosperity. Levy also quotes Mandeville’s suggestion that the private vice of self-interest can produce public virtue through general prosperity (1995, p. 10). The idea of individual action resulting in aggregate social behavior is a concept that continues to echo throughout various economics perspectives.

Given the model of economic man, economics often looks to the family of theories described as expected utility theory to explain human behavior and decision making. Central to this theory is Von Neumann and Morgenstern’s work in 1947. They describe how people would behave if they followed at least 6 principle requirements of rational decision making: ordering (comparing) of alternatives, dominance (of alternatives when compared with others), cancellation (the choice between alternatives depends on the differences between them), transitivity, continuity (preference for a gamble between the best and worst outcome over a sure intermediate outcome if the odds of the best are good enough), and invariance (a decision maker should not be influenced by the way alternatives are presented)(Plous, 1993, p. 80). Another facet of expected utility theory that’s significant to continued economic theory development is stochastic models of choice developed by Luce and others. Stochastic models treat preferences as probabilistic

rather than fixed choices and expand the ability of expected utility theory to explain behavior (Plous, 1993, p. 83).

The model of economic man, while on the one hand almost universally considered at least “a useful abstraction,” has also been the target of much critique (Levy, 1995, p. 12). Levy notes that “a large part of human behavior is not motivated by self-interest.” He cites charitable giving and volunteering to fight wars, and even voting as examples of non-self-interested behavior (1995, p. 13).

Welfare economics, when defined as how the net economic welfare of society can be improved or maximized, is an example of an economic perspective relying heavily on economic man and his utility maximizing ways to describe macroeconomic behaviors (Levy, 1995, p. 61). A central idea in welfare economics is Pareto optimal efficiency where a situation is considered optimal when the condition of one party cannot be improved without making at least one other party worse off (Levy, 1995, p. 67). Levy states this concept supports the idea that consumer preferences should determine the output of the economy (1995, pp. 12, 70). Some of the drawbacks, however, are that Pareto optimality sheds no light on the distribution of wealth and income in an economy, and that it only works in the absence of externalities (Levy, 1995, pp. 72, 75). Additionally, because individuals in an economy do not’ always behave rationally, there is a tension introduced between consumers such that all participants in a transaction do not’ receive the same utility (Levy, 1995, p. 76).

Herbert Simon made one of the most famous critiques of economically rational man. He states that “rationality is concerned with the selection of preferred behavior alternatives in terms of some system of values whereby the consequences of behavior can be evaluated.” He immediately follows this statement with questions about whether unconscious and non-deliberative behavior can be included within the definition of “rational.” “Shall we, moreover, call a behavior “rational” when it is in error, but only when the information is faulty? . . . “In terms of what objectives, whose values, shall rationality be judged?” (Simon, 1997, p. 84) He also notes that economic man is omniscient, and always has a complete and consistent system of preferences to allow him to choose among alternatives open to him; therefore, there is no limit on his ability to determine which alternatives are best. He notes that this theory “has a great intellectual and esthetic appeal but little discernible

relation to the actual or possible behavior of flesh-and-blood human beings” (Simon, 1997, p. 87).

BOUNDED RATIONALITY

Simon states that “the task of rational decision” is to select a strategy followed by the preferred set of consequences and that making this decision involves (1) listing all the alternative strategies, (2) determining all the consequences that follow upon each of these strategies, and (3) the comparative evaluation of these sets of consequences. He follows these statements by noting that “It is obviously impossible for the individual to know all his alternatives or all their consequences, and this impossibility is a very important departure of actual behavior from the model of objective rationality” (1997, p. 77)

In lieu of economic man, Simon proposed the use of the administrator as a behavioral model. In his 4th edition of *Administrative Behavior*, Simon compares the two. He states that “two alterations are needed to transmute economic man into the administrator – the person of bounded rationality.” Where economic man maximizes, his cousin the administrator satisfices, or looks for a course of action that is satisfactory or “good enough.” And while economic man purports to deal with the “real world,” the administrator recognizes that the perceived world is a simplified model of the real world. The administrator leaves out aspects of reality that appear irrelevant at a given time, and instead, takes into account just a few of the factors of the situation regarded as most relevant and crucial. “In particular, they deal with one or a few problems at a time, because the limits on attention simply don’t permit everything to be attended to at once” (1997, p. 119). “”

This type of thinking on the limits of human abilities and how we compensate as a result is exemplified in the research of Kahneman and Tversky, among others. In fact psychology plays an important role in understanding human behavior in decision making.

PSYCHOLOGICAL UNDERPINNINGS OF ECONOMICS

Kahneman notes that he and Tversky, in their long and unusually close collaboration, “explored the psychology of intuitive beliefs and choices and examined their bounded rationality” (Kahneman, 2003, p.

1449). He continues by stating their research attempted to obtain a map of bounded rationality by exploring the systematic biases that separate the beliefs people have and the choices they make from the optimal beliefs and choices assumed in rational-agent models. He also states that they viewed their research primarily as a contribution to psychology, but were drawn into the interdisciplinary conversation by economists hoping psychology could provide assumptions for economic theorizing and hypotheses for economic research.

Kahneman summarized his work with Tversky and others over many years by describing three separate research programs: (1) the heuristics and biases that people use in various tasks of judgment under uncertainty; (2) prospect theory that models choice under risk and with loss aversion in riskless choice; and (3) framing effects and their implications for rational-agent models. Based on recent research in the area, Kahneman states that most judgments and choices are made intuitively and that the rules that govern intuition are generally similar to the rules of perception (2003, p. 1450).

Kahneman distinguishes between two modes of thinking and deciding: reasoning and intuition. Reasoning is what we do to compute, or fill out forms, or consult a map, etc., and is done deliberately and effortfully. Intuitive thoughts come spontaneously to mind without effort, and both casual observation and systematic research indicate intuitive thoughts are the most common. Along with intuitive thoughts goes some monitoring of mental operations, but it's normally lax and allows many intuitive judgments to be expressed, including erroneous ones (2003, p. 1450). According to Kahneman and Frederick, people are not accustomed to thinking hard and are often content to trust a plausible judgment that comes quickly to mind, even if it is' wrong. Kahneman also notes that "intuitive thinking can also be powerful and accurate. High skill is acquired by prolonged practice, and the performance of skills is rapid and effortless" (2003, p. 1450)

Kahneman describes a model of perception, intuition, and reasoning where operations associated with intuition are fast, effortless, associative, often emotionally charged, governed by habit, and difficult to modify. Reasoning operations are slower, serial, effortful, deliberately controlled, relatively flexible, and rule-governed. He also states that reasoning processes tend to disrupt each other whereas intuitive processes can be combined with other tasks (2003, p. 1451). Studies of dual task methods

suggest that people performing a demanding mental activity are more likely to respond to another task by blurting out whatever comes to mind. He also distinguishes between impressions and judgments, where impressions are generated by perceptions and intuition, and judgments are explicit and intentional and always associated with reasoning even if they reflect impressions (2003, p. 1452).

Kahneman talks about research on accessibility—the ease with which mental contents come to mind. Findings suggest that some relational and statistical properties of objects are more accessible than others, both in perception and judgment. Attributes identified by perception or intuition are natural assessments based on physical and abstract properties. He notes that the assessment of whether something is good or bad is a particularly important natural assessment (2003, p. 1453). He also notes that accessibility is a continuum, not a dichotomy. In addition to physical and abstract properties, accessibility is affected by temporary associative activation i.e. just recently having seen something in one context will affect its interpretation in another. Kahneman summarizes the findings discussed and their relevance by noting that the compound cognitive system consisting of perceptions, intuition, and reasoning is an impressive computational device. It adjusts to changes by using either a flexible and effortful short-term process, or a long-term process of skill acquisition that eventually produces highly effective responses at low cost. Kahneman is clear that this model differs in important aspects from the rational agent model assumed in economic theory (2003, p. 1454). Prospect theory and framing effects explain some of these differences. But before we consider these ideas, a discussion on heuristics and biases is in order.

The early Kahneman and Tversky research published in 1974 predates prospect theory and identifies what the researchers defined as heuristics and biases. Their conclusion was that “people rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simpler judgment operations. In general, these heuristics are quite useful, but sometimes they lead to severe and systematic errors” (Tversky and Kahneman, 1974, p. 1124). Specifically, their research introduced three heuristics to explain many systematic biases in judgment under uncertainty: representativeness, availability, and anchoring. Some of the biases were identified by systematic errors in estimates of known quantities, while

others were defined by discrepancies between regularities of intuitive judgment, probability, Bayesian inference, and regression analysis. More recently, Kahneman and Frederick revisited these studies and proposed a formulation called “attribute substitution” (Kahneman, 2003, p. 1460). Their findings state that “Judgment is said to be mediated by a heuristic when the individual assesses a specified target attribute of a judgment object by substituting another property of that object, the heuristic attribute, which comes more readily to mind” (Kahneman and Frederick, 2002, as cited in Kahneman, 2003, p. 1460). And unlike the earlier findings, this conception of heuristics is not confined to the domain of judgment under uncertainty.

Kahneman states that the observation that biases are systematic was quickly recognized as relevant to the debate about rationality in economics. The more recent findings may be of particular relevance because of the core concept of “preference.” According to Kahneman, “To understand preferences, then, we may need to understand the psychology of emotions. And we cannot take it for granted that preferences that are controlled by the emotion of the moment will be internally coherent, or even reasonable by the cooler criteria of reflective reasoning” (2003, p. 1463).

Kahneman also discusses the idea of prototype heuristics, the representation of categories by their prototypes, and a consistent pattern of biases. He states that classical psychology establishes that “whenever we look at or think about a set (ensemble, category) which is sufficiently homogeneous to have a prototype, information about the prototype is automatically accessible” (2003, p. 1463). Kahneman notes that this high accessibility of prototypes has significant consequences in judgment tasks. He also states that extensional attributes are governed by a general principle of conditional adding that says each element in the set adds an amount that depends on the elements already included in the set to the overall value. Or said another way, the attributes of the prototype are averages, whereas extensional attributes are additive (2003, p. 1464). What this means is that extensional variables are relatively difficult to assimilate so intuitive responses are generated by substituting an attribute of the prototype for the more difficult extensional target attribute. When this happens, two major biases are found similar to those originally found in representativeness: violations of monotonicity (adding elements may lower the average and cause judgment to decrease), and extension

neglect (an increase in an extension of a category will increase the value of its extensional attributes, but leave the prototype attributes unchanged). An example is scope neglect in willingness to pay studies for public goods. Kahneman refers to Desvousges et al.'s 1993 study where respondents indicated their willingness to pay to prevent the drowning of migratory birds. The target attribute is willingness to pay and the heuristic attribute is the emotion associated with the image of a bird drowning, or conversely, being saved from drowning (Desvousges, et al., 1993, as cited in Kahneman, 2003, p. 1465). Kahneman goes on to highlight the importance of scope neglect to the controversial contingent valuation method used in assessment of economic value of public goods (2003, p. 1465).

Kahneman's recent work also refers to expected utility theory and defines "Bernoulli's Error" as "The proposition that decision makers evaluate outcomes by the utility of final asset positions" has been retained in economic analysis for almost 300 years." (2003, p. 1456). Convinced of the inadequacy of the utility function for wealth as an explanation of choice, he and Tversky constructed numerous thought experiments on risky choice that in 1979 led to the development of prospect theory. By examining many choice pairs as part of their research, Kahneman and Tversky conclude that the very abrupt switch from risk aversion to risk seeking could not plausibly be explained by a utility function for wealth. Instead, preferences appeared to be determined by attitudes to gains and losses relative to a reference point, often the status quo. The alternative theory of risk they propose focuses on changes of wealth rather than states of wealth. Prospect theory is one of the first models presented explicitly as a formal descriptive theory of the way people actually make choices (2003, p. 1456).

According to Plous, prospect theory is one of the most widely accepted alternatives to expected utility theory. Some of the differences between the two include replacing "utility" as net wealth with "value" in terms of gains and losses, and also the asymmetry of loss aversion in prospect theory, where the value function of loss is steeper than for gains. These differences play out in interesting ways. For example, during negotiations each party may view its own concessions as losses that loom larger than gains achieved by concessions of the adversary (1993, p. 96). Plous also describes the "endowment effect" where the value of a good increases when it becomes part of a person's endowment. People often

name a selling price for something they own at a much higher value than they would pay to own the item. Plous quotes Thaler and his colleagues as noting that this asymmetry is routinely used by companies that offer products on a trial basis, increasing the value to the buyer and making it more difficult to return (1993, p. 97).

Plous also notes that, unlike expected utility theory, prospect theory predicts that preferences depend on how a problem is framed. Prospect theory predicts that preferences will be affected when the reference point shifts. If the reference point is defined so that an outcome is viewed as a gain, the resulting value function will tend to be risk averse. If the reference point is defined so an outcome is viewed as a loss, then the value function will be risk seeking (1993, pp. 97-98).

Another significant difference between expected utility theory and prospect theory is the way prospect theory deals with probabilities of particular outcomes. Prospect theory treats preferences as a function of decision weights that tend to overweight small probabilities and underweight moderate and high probabilities. As an example, Kahneman and Tversky's work demonstrates that people's tendency to overweight the chances of a large loss greatly benefits the insurance industry (Kahneman and Tversky, 1979, as cited by Plous, 1993, pp. 98-99).

Plous describes the "certainty effect," another component of prospect theory. This says that "a reduction of the probability of an outcome by a constant factor has more impact when the outcome is initially certain than when it is merely probable" (p. 99). One example describes removing bullets from a gun in Russian roulette. Even though the probability of being shot is reduced by the same amount with each bullet removed, people regard the difference between 0 and 1 bullet as more important than the difference between 3 and 4 bullets (Plous, 1993, p. 99). Essentially, people would rather eliminate risk than reduce it because of the overweighting of small probabilities discussed above. The same idea comes into play with the idea of "pseudocertainty," except that certainty is apparent rather than real (Plous, 1993, p. 100).

Other theoretical models such as regret theory (based on experiencing regret and rejoicing, and making decisions under uncertainty trying to anticipate or avoid those sensations), multi-attribute choice (acknowledging that people use multiple metrics to measure outcomes), noncompensatory strategies (strategies that do not allow trade-offs), and Slovic's "more important dimension" model, where subjects tend to

choose alternatives that are superior on the dimension determined to be more important, also provide alternatives to the rational model (Plous, 1993, pp. 101-105).

As noted above, invariance is one of the 6 principle requirements of rational decision making. Kahneman and Tversky's work in the 1980's looked at framing effects on alternative selection (Kahneman, 2003, p. 1458). The basic principle of framing is "the passive acceptance of the formulation given" (p. 1459). Framing effects, by definition, violate invariance which says that people will make the same choice regardless of how options are presented. One of the more significant findings in this research is that, given a choice between two options A and B, whichever option is designated as the default has a large advantage over the other choice, even if they are considered equivalent without the default designation (2003, p. 1459).

Kahneman concludes his discussion by proposing that a rational agent be considered as endowed with a single cognitive system that has the logical ability of a flawless reasoning system and the low computing costs of intuition. He continues by stating that theories in behavioral economics have generally retained the rational model and added assumptions about cognitive limitations. The model he is presenting is a two-system structure consisting of the large role of intuition and the extreme context-dependence that is implied by accessibility. The central characteristic of these agents is not that they reason poorly, but they often act intuitively. And their behavior is not guided by what they are able to compute, but by what they see at a given moment. He also notes that what is natural and intuitive in a given situation is not the same for everyone; different cultural experiences favor different intuitions and new behaviors become intuitive as skills are acquired. He closes this paper by stating that incorporating a common sense psychology of the intuitive agent into economic models will present difficult challenges. But he also states that "It is encouraging to note, however, that the challenge of incorporating the first wave of psychological findings into economics appeared even more daunting 20 years ago, and that challenge has been met with considerable success" (Kahneman, 2003, p. 1470)

DEVELOPING ECONOMIC MODELS

As noted by Rizzello and demonstrated by the above discussion,

“Economists more and more adopt concepts arising from other disciplines, and use them to find their own answers” (p. 255). He also warns that these “adoptions” are never easy and an incorrect or superficial “adoption” can lead to serious errors in theory (2004, p. 255). This section of the paper defines various economic models gaining credibility in recent years and examines how they support or contradict the rational model to the extent its uses are consistent within a particular area. These models include, among others, evolutionary economics, neuroeconomics, behavioral economics, and cognitive economics. Other authors include game theory and complexity economics as separate economic models, although the literature does not appear to be particularly consistent in how the terminology is used. This is not an exhaustive list of the various forms of economic inquiry, and the lines of inquiry are often not well-defined. In fact, the descriptions in the literature between various areas are more often ill-defined. Significant overlaps occur in ontology, heuristics, and methodology, not only in evolutionary economics as noted by Witt, but in other areas of specialization as well (2008, p. 548). What follows is a crude, but hopefully illustrative, overview of these areas of interest and the amount of change ongoing in recent years with respect to the field of economics as a whole.

Evolutionary Economics

Per Davis, evolutionary economics reflects Darwinian biology (2006, p. 9). According to Witt, the question of what is specific to evolutionary economics has been discussed since the late 19th century (2008, p. 547). He notes that there is still little agreement among researchers in the field when it comes to deciding what is specific about evolutionary economics (2008, p. 570). There is still interest in the search for a unified evolutionary approach while at the same time a more recent development, evolutionary game theory, often takes little notice of evolutionary economics, and vice versa (Witt, 2008, p. 548).

Witt notes that generally, evolution can be characterized as a process of self-transformation whose basic elements are the endogenous generation of novelty and its contingent dissemination (2008, p. 552). He notes Veblen was one of the first evolutionary economists using a methodology that set out to reconstruct historical habits, institutions,

technologies, etc., and the order in which they occurred over time (2008, p. 553). Various methodologies make use of historically collecting and analyzing information and outcomes, mechanisms of change, or typical transition patterns including diffusion models, selection models, path-dependence models, etc. Much of the theory of evolutionary economics relates to the performance of firms. According to Nelson and Winter (1982, as cited by Witt, 2008, p. 557) who based their analyses on assumptions of bounded rationality, different routines and different decisions lead to differences in the firms' growth. Routines that are successful are not changed, but routines that result in deteriorating performance are "unlikely to multiply" (Witt, 2008, p. 557) Witt notes that simulation plays a role in analyzing implications of the selection processes within firms, often by focusing on the changing composition of populations (2008, p. 558). Compared to rational game theory, the distinctive features of evolutionary game theory are assumptions about how strategies are determined and as a consequence, how solutions are developed to meet the explanatory requirements of biology and sociobiology. Applications of game theory are typically either based on interactive selection mechanisms and corresponding algorithms to model human interactive learning processes, or they are based on very basic features of human economic behavior like altruism, moral behavior, fairness and other rules of conduct that can be explained as a result of natural selection (2008, p. 563-564).

Experimental Economics

Experimental economics draws on a long history of experimental practice in natural and physical sciences almost entirely absent from economics (Davis, 2006, p. 9). Because its discussion in the literature is almost exclusively in conjunction with other economic perspectives, it is treated similarly in this paper.

Neuroeconomics

According to Rizzello, neuroeconomics is the study of behavior by examining the neural mechanisms responsible for individuals' behavior as they address economic problems (2004, p. 257). Sanfey notes that in recent years, researchers in economics, psychology, and neuroscience

have joined forces to better specify the foundations of decision making. Sanfey reiterates the goals of decision making in much the same way as Simon and others. He states the study of decision making has “as its goal the understanding of our fundamental ability to process multiple alternatives and choose an optimal course of action”. A “good” decision is one in which the best available course of action is chosen in the face of characteristic uncertainty about the consequences (Sanfey, 2007, p. 151).” He elaborates that the new field of neuroeconomics takes into account the cognitive and neural constraints on the decision making process as investigated by psychology and neuroscience, while also utilizing the mathematical decision models and multiplayer tasks that have emerged from the field of economics. Sanfey explains that various neuroimaging techniques are used during utility theory and game theoretic experiments. Preliminary findings suggest that, in contrast to the standard economic model, current research is examining how the twin systems of automatic and controlled processing sometimes cooperate, and at other times compete when making decisions. He also states that while there are challenges yet to address theoretically and methodologically, there is a belief that this cross-disciplinary approach will be valuable in providing additional constraints on any theory that seeks to accurately model human decision making (2007, p. 154).

Wilcox critiques the idea of neuroeconomics’ implicit assumption that the individual human is the important agent in neoclassical economics. He argues that the main genius of the human species is its ability to distribute cognition across individuals and to incrementally accumulate physical and social cognitive artifacts that obviate limitations of individuals. Instead, he advocates moving away from studying what individuals do with simple decision games and toward studying distributed cognition in groups that confront complex problems. While he acknowledges some experimental economists have been contrasting the behavior of individuals and groups, he argues that the groups are either overwhelmingly unstructured or symmetric where all members have equal access to information. Real groups have asymmetric and hierarchical structural features that divide tasks into subtasks, restrict data availability, and vest final decision making in only a subset of group members. He advocates ethnography as a neighboring discipline of choice to better understand economic decisions (Wilcox, 2008, p. 530).

Behavioral Economics

Behavioral economics receives its impetus from fairly recent psychological findings (Davis, 2006, p. 9). As discussed above, knowledge of heuristics and biases plays a fundamental role in understanding behavior. Weber and Camerer state that behavioral economics is generally defined as using evidence and constructs from neighboring social sciences, especially about limits on computation, willpower, and self-interest, to inform economic analysis (2006, p. 187). In addition to psychology, Weber and Camerer note that anthropological research provides important insights into the understanding of how social institutions and interactions shape strategic behavior. They also state that most behavioral economists seek to develop theory consistent with realistic aspects of human judgment (such as bounded rationality), and have the goal of incorporating new assumptions and methods into mainstream economics research. They hope to accomplish this by comparing theoretical predictions and the actual behavior of individuals to explain how people and economic institutions actually behave (2006, p. 187). Interestingly, they also note that historically, behavioral economics has been defined in practice by adding variables to a rational-choice model or weakening rationality in a systematic way. As this approach becomes more widespread, using the term “behavioral economics” to describe all contributions is likely to become unwieldy “and the term will likely evaporate (replaced by specific names of models as they become familiar)” (2006, p. 188)

Beaulier and Caplan (2007) state that “this large and growing literature casts a degree of empirical doubt on even the most elementary principles of microeconomics” (p. 487) They argue behavioral economics strongly undermines, for example, the rational expectations account of belief formation, and uncovers a variety of other anomalies such as self-control problems. As a result, economists should rethink microeconomics in terms of behavioral economics (2007, p. 487). Their work focuses on development of welfare policy, but behavioral economics concepts are also used by others like Altman and Simon to rethink the neoclassical results of consumption and demand, as well as reviewing the domain of production in the tradition of March, Cyert, and Leibenstein (Altman, 2005, 683).

Not only is the behavioral economics literature growing rapidly in the economics field, it also has much wider appeal as evidenced by the

number of recent books and newspaper articles published in the mainstream literature. These include such titles as Thaler and Sunstein's *Nudge: Improving Decisions about Health, Wealth, and Happiness*, Brafman and Brafman's *Sway: The Irresistible Pull of Irrational Behavior*, and the New York Times Bestseller by Ariely, *Predictably Irrational: The Hidden Forces That Shape Our Decisions*. All three of these rely heavily on the psychological research discussed above and give numerous examples of how these concepts play out in everyday decision making. Each of these books also makes specific policy recommendations that could be implemented to improve individual decisions about managing health, money, political decisions and governance, etc. Ariely summarizes his work by stating that:

“If I were to distill one main lesson from the research described in this book, it is that we are pawns in a game whose forces we largely fail to understand. We usually think of ourselves in the driver's seat, with ultimate control over the decision we make and the direction our life takes; but, alas, this perception has more to do with our desires - with how we want to view ourselves - than with reality.” (p. 243)

He argues that each chapter describes a force like emotions, social norms, etc. that influences behavior. He continues by saying that once we realize we make erroneous decisions, we can try to be more vigilant, force ourselves to think differently, or use technology to overcome our inherent shortcomings. He also suggests this is where businesses and policy makers could revise their thinking and consider how to design policies and products based on these ideas (Ariely, 2008, pp. 243-244).

Thaler and Sunstein introduce the concept of a “choice architect” as someone who has the responsibility for organizing the context in which people make decisions (Thaler & Sunstein, 2008, p. 3). Choice architects exist in all walks of life at every organizational level, but the concept is particularly useful in describing the characteristics and significance of those who develop public policy. A better understanding of behavioral economics could provide choice architects with relevant information to design policy choices resulting in improved decision outcomes.

With respect to methodology, Weber and Camerer note that an important feature of behavioral economic research is its reliance on laboratory experiments and the fact that many behavioral economists are also experimental economists. They argue that the close relationship

between these sub-fields is best confirmed in the joint award of the 2002 Nobel Prize in Economics to Kahneman for his work in behavioral economics and to Smith for his work in introducing experimental methods into economics (Weber and Camerer, 2006, p. 188). Game theory is routinely used in these experiments to develop theories of strategic thinking and to test basic assumptions. Weber and Camerer also disagree with the traditional practice of initiating field tests once experiments are completed in the laboratory. Instead, they argue that typical, naturally-occurring features of decisions can be introduced into the lab experiments to provide improvements to economic theory and identify the kinds of outcomes that may occur outside the lab (2006, p. 190).

Cognitive Economics

Rizzello defines cognitive economics as an interdisciplinary approach to the study of human problem-solving, choice, decision making and change. According to Rizzello, cognitive economics goes beyond cognitive psychology, centers on the individual and attempts to use an understanding of human cognitive processes to explain the nature and evolution of organizations and economic institutions in a context of structural uncertainty (2004, p. 256). According to Bourguine, cognitive economics takes into account the cognitive processes of individuals in economic theory, both on the level of the agent and on the level of their dynamic interactions and the resulting collective phenomena. He notes that this requires the cooperation of not only economists and cognitive scientists, but also mathematicians, physicists, and computer scientists to study and simulate models of dynamical systems involving economic agents and their cognitive mechanisms (2004, p. v). He defines cognition as the processing of information in the widest possible sense, and defines a cognitive system as a system for processing information that can be either individual or distributed over a society (2004, p. 2).

Bourguine states that in cognitive economics, the rationality of agents is bounded and procedural; agents adopt dynamics of adaptation to satisfy individual and collective constraints. Agents' information is incomplete and they are constantly changing their beliefs in uncertain and non-stationary environments. To regulate their interactions, they generate and choose various institutional forms, and then these

institutions develop a level of autonomy and escape control of the agents. Consequently, he argues, the concepts of cognition, interaction, evolution and institution should all be considered together by focusing on cognitive constraints. He identifies these constraints as: (1) no strategy can be constructed based on what one does not know; (2) no action can be undertaken based on what one cannot do. With respect to the spreading and selection of institutional forms within human society, Bourguine states that here we come across self-organized institutions that Hayek called “spontaneous orders,” specifically markets. According to Bourguine, this also includes social networks (2004, p. vi).

With respect to methodologies, Bourguine notes that the links between cognition, evolution and institutions must be tested by field surveys, laboratory experiments, computer simulation and model analysis. He also refers to the 2002 Nobel Prize to Kahneman and Smith as “heartly encouragement” for the development of experimental economics. Progress in communication and technology makes possible the emergence of a new type of field survey and numerical simulation that Bourguine states is most notably represented by agent-based computational economics. He sees the economy as a complex adaptive system and notes that parallel themes are being explored in cognitive psychology and cognitive neuroscience. He states that there should be broad, open debate between all related specialties and approaches (2004, p. vii).

Bourguine makes reference to the traditional core of classical economics, the maximizing rationality of the agent, concepts of equilibrium in game theory and the general equilibrium theory resulting in both Pareto equilibrium and market equilibrium (2004, p. 1). Collective rationality in game theory is defined as the attempt to find Pareto equilibrium in the game, where “time” is limited to the present, interactions between agents are confined to anonymous exchanges in the marketplace, and the cognitive capacities of the agents are assumed to be sophisticated and unlimited. He also states there are two types of criteria for judging the success of a cognitive system. Viability of the system to maintain adaptation of the whole system within its constraints, and validity, where the cognitive system is responsible for anticipating what may happen. Bourguine notes that within cognitive economics, rationality is defined as reasoning well and acting well. In fact, he calls this adaptive rationality, and describes the focus of rationality in cognitive economics

as moving towards the individual and social adaptive rationality (2004, p. 3).

One of the key ideas presented is that of procedural rationality. Bourguine attributes procedural rationality to all individuals enabling them to move toward their goals. Other authors use the terms heuristics, production rules, situation/action patterns, and habits that manifest as implicit know-how. When it is 'explicit, it makes reasoning possible. He also notes that in cognitive economics, instead of focusing on maximizing a utility function, the concept of rationality is reversed, and rationality is now focused on the procedure itself and the procedural knowledge it makes use of, including the satisficing rules of bounded rationality. He argues this shifts the whole focus of economics from finding the optimum solution to finding the best decision process satisfying the viability criteria for success of a complex system. What it does not' do is explain how procedural knowledge is constructed. Bourguine says the role of this construction belongs to the learning process (2004, p. 5).

Bourguine notes that the essential question for cognitive economics concerns the way the economy is studied as a complex adaptive system composed of adaptive agents to explain the emerging properties that link the micro level of organization to the macro level. Part of that analysis requires developing a whole epistemology of models and simulation as in the study of other complex systems. He says consensus is forming behind the idea of starting with available facts and trying to reconstruct them with the help of theories, models, and simulation. He follows this thought by suggesting that there are two ways economics can interact with the cognitive sciences. One is by borrowing cognitive science results concerning high level symbolic cognition (essentially doing what Simon did by extending the limits of rationality to bounded rationality) and the other is by focusing on neurosciences and the learning processes (2004, p. 11).

Kirman extends the idea of collective rationality by noting that in some experiments, the aggregate behavior might seem closer to the result of rational behavior than the empirical behavior of individuals i.e., collective behavior may be rational while individual behavior is not'. He refers to a series of public goods experiments where the total contributions of the individuals converged towards the Nash equilibrium, but the individual behavior is often far from equilibrium (Kirman, 2004,

p. 298). He also provides the division of labor among bees as an example of this where individual bee behavior follows very simple mechanical rules, but the collective outcome is very sophisticated (2004, p. 300). He concludes by stating that complexity is a property of economic organizations, not of economic individuals (2004, p. 310).

One of the primary weaknesses Lesourne highlights as a result of the cognitive economics approach is the number of assumptions made by model builders in describing complex stochastic processes. He cautions it is necessary to remain careful in asserting the validity of model results. At the same time he notes that simulations are an excellent tool for obtaining a first vision of the behavior of a system and to test its consistency. He also cautions against using standard models borrowed from other disciplines since they may not adequately represent reality from an economic viewpoint (2004, p. 468). With respect to policy considerations, Lesourne suggests that since many dynamical systems have no stable equilibrium states to target, the economist suddenly finds himself in the position of policymakers faced with difficult decisions. Pareto optimality no longer exists, but the economist may suggest “reasonable” policies“ knowing that procedural rationality is all that exists. He argues this represents a new and immense field for public economics research where, on an empirical level, it is’ essential for economists to engage in detailed chronological description of the ways governments have reached important economic decisions. He concludes that in the past, economists deduced their proposals from a paradigm that did not offer a world picture similar to the one familiar to policymakers. He suggests that with cognitive economics and a broader view of the world available to the economist, the proposals may be more difficult to elaborate in theory, but easier to introduce in practice (2004, p. 471).

Walliser’s recent publication on cognitive economics discusses many of the main ideas touched on above, some in great detail. He offers some specific warnings and recommendations about where cognitive economics could go in the future. He notes that it is a progressive research program including both theoretical and empirical components that may provide increasing returns. It may also import devices from cognitive science, mathematics, or natural sciences, but it has to avoid the danger of “wild economics,” where foreign concepts are artificially introduced without precisely studying their relevance. He suggests cognitive economics needs to refine its ontology by developing simple

and original schemes incorporating both reasoning and learning. Cognitive economics needs to shift its epistemology towards more empirical work and to treat it in a more inductive way. And finally, cognitive economics needs to develop its praxeology by adapting achievements in game theory to more specific economic problems. He also suggests it must avoid being diluted as the theoretical movement of “social cognition” or the explanatory program of “complex systems.” It must also avoid being reduced to overly specific economic problems. His last words are that “If economists really become persuaded that the cognitive dimension is important and fruitful, they will turn this weak heterodoxy into full orthodoxy and progressively abandon its labeling as ‘cognitive economics’ (2008, pp. 170-171).”

SUMMARY AND CONCLUSIONS

One thing that became clear throughout the research leading to this paper is that the standard assumptions from classical and neoclassical economic theory, while useful to a certain extent and not necessarily flawed, are incomplete. Economics took a giant leap forward thanks to Simon’s concept of bounded rationality, Kaheman and Tversky’s study of heuristics and biases as well as others insights into the way humans’ process information to make decisions. These insights have led to incorporating information developed by other fields of science into economic analysis to help complete economists’ models of the real world rather than economics acting in isolation.

Another thing that seems clear, especially with respect to more recent developments in some of the new economic models, is that economics as a field has not yet agreed on consistent use of terminology or approaches causing some confusion when attempting to read and interpret a broad perspective of newer ideas. As economists in both the behavioral and cognitive literature suggest, as these ideas continue to develop, the language used to describe them may change or become integrated and differences may disappear over time.

Other observations include that behavioral and cognitive economic models, at least for the short term, seem to be where much of the research action is. Evolutionary and neuroscience theory, game theory, experimental economic theory, and complex adaptive system modeling all seem to feed into the behavioral and cognitive models. And while

both of these models offer different explanations and preferences for utility, they still seem to treat utility in much the same way neoclassical economics does, even given our bounded rationality. In other words, utility is still a useful concept, but how to define it and at what level has become more complex.

This review also seems to suggest, as some of the individual authors did, that the field of economics is expanding beyond its former boundaries of the market and transactions within the firm. It now seems to be more inclusive of all manner of institutions and other social constructs. One of the benefits of these lines of inquiry may be additional insight into interest group theory and collective action behaviors. Or, just a better understanding of interactions between institutions and others within networks. This, however, may require a better understanding of collective rationality and utility if they remain useful constructs.

In light of the recent, apparently global, economic downturn, one cannot help but consider how the information garnered by the various economic perspectives described here might help to understand how we got here or to determine where to go from here. How does considering factors such as subprime mortgages and mark-to-market accounting methods broadly blamed in the media help to explain current economic conditions? One could argue that individual wealth maximization strategies in this case violated the assumption of Smith's "invisible hand." Some in the media would have us believe that "we just got greedy," and that may be exactly the case. However, I suspect many externalities and information asymmetries also played a role so that the "Smith's invisible hand" theory remains intact and the adjustments we are experiencing are evidence of that. For example, owning a home on terms with the potential to easily escalate beyond an individual's means to pay the mortgage is not really wealth maximization. In fact it is the opposite. Given the biases we have and the systematic errors we make when we decide to purchase a home under certain conditions, we may have, collectively, made some gross assumptions that just do not match reality. The same idea holds true for overvaluing corporate goods. It may work on paper, but it succeeded in creating an illusory value of assets. And I am sure there are a variety of factors, perhaps internationally as well as domestically, that contributed to the current situation. Time and lots of smart people applying evolutionary economics techniques may figure out what actually happened and glean insights-psychologically,

behaviorally, and cognitively-that can be used to avoid future situations like this one. Contrary to all economic theory, we may be experiencing an economic Black Swan, a random, improbable event that could not' be anticipated (Taleb, 2007, p. xxvii). Or not.

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