

BEHAVIORAL ECONOMICS, ECONOMIC THEORY AND PUBLIC POLICY

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ABSTRACT

Behavioral economics is discussed in detail, focusing on its varied impact on economic theory, economic analysis, and public policy. Recent contributions related to the work of Kahneman and Tversky's heuristics and biases paradigm are critically assessed in the context of the broader behavioral line of research that specifies that the realism of one's simplifying assumptions matter for the construction rigorous economic theory. Such assumptions are not only psychological in nature, but also biological, sociological, and institutional. Moreover, behavioral economics is much more than consumer behavior and behavior on financial markets, a preeminent focus of contemporary behavioral economics. It is also very much concerned with theories of production, theories of the firm, household behavior, and institutions. Findings of behavioral economists tend to refute the notion that individuals behave neoclassically, giving rise to a literature and debate as to which heuristics and sociological and institutional priors are rational, which yield optimal economic results, and which tend to improve socioeconomic welfare. Although many contemporary behavioral economists argue that individuals are fundamentally irrational because they do not behave neoclassically, a forceful narrative remains that considers non-neoclassical behavior rational, yielding optimal economic results under particular conditions. A common thread running through behavioral economics is that modeling assumptions matter and that conventional theory is seriously wanting in this front with significant implication for economic analysis, theory and public policy.

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Introduction

Behavioral economics and economic psychology have advanced dramatically in public profile and academic publications over the past two decades. This has been fuelled to a large extent by the research paradigm advanced by psychologists Daniel Kahneman and the late Amos Tversky (2000).² The focus of their approach to behavioral economics, referred to as the biases and heuristics paradigm (or biases and cognitive illusions), is rooted in a particular worldview in cognitive psychology and evidenced by experiments in

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² See Altman (2004b) for a discussion on their specific contributions. See also Kahneman and Tversky (1979) and Kahneman (2003).

economic psychology and behavioral economics. This paradigm is not the only one afforded by behavioral economics; but it is clearly the dominant and most well known one, finding that individuals incur systematic errors and biases in their decisions. Therefore, individuals are said to be persistently irrational in their decision-making. They are irrational because their choice behaviors deviate from neoclassical norms of rationality. Because they are irrational, inducing rational cum neoclassical behavior becomes an issue of critical importance from the perspective of this paradigm.

One important alternative to the heuristics and biases perspective is that of rational non-neoclassical agency. In this case, rational choices are contextualized by physiological, psychological and institutional constraints such that individual's rational choices, and the process by which the choices are actualized, systematically differ from what is predicted by conventional economic theory. Moreover, the norms specified by conventional theory as ideal are often found to be inefficient and effectual. This approach was pioneered by economist Herbert Simon (1959, 1978, 1987; see also March 1978) and more recently by psychologist Gerd Gigerenzer (2001, 2007; see also Gigerenzer and Todd 1999). Economist Vernon Smith (2003, 2005) has also been important in this domain, but he is less concerned with how individuals behave as with the economic outcomes of their choice behavior.³ Moreover, unlike much contemporary behavioral economics, which focuses on issues related to individual choice outside of the realm of production, Simon's contributions have spawned research on the production side (for example, Cyert and Marsh 1963).

It is important to mention the independent contributions of Harvey Leibenstein (1966, 1979, 1982; see also Dean and Perlman 1998, Frantz 1997) whose core research program (x-efficiency theory) provides an alternative narrative of the firm. One should also note the contributions of Gary Becker (1996) in the realm of social and personal capital as determinants of rational choice; where these variables are typically given no play as underlying assumptions in conventional economic theory. Institutional economics (for example, North 1990) have emphasized the pre-eminent role of institutional design as a determinant of rational choice. Behavioral economics is not and has never been all about the details of presumed choice irrationality and its psychological underpinnings—the focus of current mainstream in behavioral economics. Behavioral economics has always been concerned about psychological as well as sociological and institutional variables as determinants of choice, which together lend themselves to a better understanding choice behavior in the realm of consumption and production. This has important implications for micro and macroeconomic outcomes.

Economic psychology has been largely the playing field of psychologists interested in applying psychological insights to explain economic phenomenon at both a micro and macro level. Much focus has been on describing and explaining micro-level behavior. Contemporary behavioral economics has been most concerned with applying such insights in engaging and modifying economic theory, although describing choice behavior in the experimental domain has dominated contemporary mainstream behavioral economics, just as it has dominated economic psychology. Both areas of scholarly endeavor have seen significant overlap. Both have employed experimental methods to bolster and inform their

³ See Altman (2004b) for a discussion of Smith's contributions.

arguments and test their hypotheses. However significant a role experiments have played in much of contemporary behavioral economics, it is important to note that behavioral economics is not the same thing as experimental economics. Experiments represent one tool by which to test and develop economic theories and their underlying assumptions. The behavioral economist's empirical toolbox include surveys, case studies as well traditional cross-sectional and time series data.

Behavioral economics, however, broadly defined, has had little impact of the teaching of economics, especially in terms of basic undergraduate training, but also in terms of graduate training. At best behavioral economics is an add-on; a possible special topics section or chapter to the core or foundations of what is taught. The focus of this article is to articulate some of the basic insights of behavioral economics and to illustrate how some of the principles of behavioral economics might be introduced into the core principles of economic instruction.

Some of the key points, critical to behavioral economics, to be addressed in this article are:

- Assumptions matter substantively for causal and predictive analysis, be they of a psychological, sociological, or institutional type. It is important to understand why people behave the way they do, with regard to both their cognitive abilities and their environmental constraints.
- It is important to understand how cognitive capacities, information flows, culture, learning, and institutions affect intelligent decision-making.
- A critical component of behavioral economics is building models that better reflect actual behavior. Such behavior can be both rational and intelligent without being neoclassical.
- Related to this, behavioral economists and economic psychologists run experiments and engage in empirical exercises to determine the choices people make and how these choices are made, and to ascertain to what extent these deviate from the conventional mainstream economic wisdom.
- Individuals tend to behave quite differently from what is predicted by the conventional wisdom.
- This suggests that economic theory needs modification from a causal and/or normative perspective.
- Some important concepts to be discussed are: the survival principle, multiple equilibria, bounded rationality, satisficing, fast and frugal heuristics, x-inefficiency, efficiency wages, prospect theory, framing effects, efficient market hypothesis, social and personal capital, capabilities, and, soft or benevolent paternalism.
- Modification of economic theory does not suggest that relative prices, opportunity costs, and incomes play no role in affected behavior—material incentives matter.
- Supply and demand analysis is enriched by the findings and methodology of behavioral economics.
- Introducing non-material variables into ones analytical framework, such as altruism and reciprocity, social and personal capital, relative positioning, capabilities and framing, enriches consumer theory.

- Introducing effort variability, non-material variables, organizational slack, capabilities and relative positioning enriches production theory.

Behavioral Economics: Assumptions Matter

A vital distinguishing feature of behavioral economics, often lost in the discourse of the biases and heuristics approach, is that the realism of assumptions matter for the accuracy of analytical predictions and causal analysis. This is in stark contrast to a critical assumption (often an implicit one) of contemporary economics that assumptions, be they behavioral, sociological, and institutional, do not matter in the construction of economic theory. What counts is the accuracy of the analytical predictions generated by the theory.

The assumptions don't matter approach follows from Milton Friedman's (1953; see also, Altman 1999; Reder 1982) classic paper on the methodology of economics. With regards to the non-importance of the realism of the assumptions of ones model, Friedman (1953, 14) argues: "...it is fundamentally wrong and productive of much mischief. Far from providing an easier means for sifting valid from invalid hypotheses, it [testing for the realism of assumptions] only confuses the issue, promotes misunderstanding about the significance of empirical evidence for economic theory, produces a misdirection of much intellectual effort devoted to the development of positive economics, and impedes the attainment of consensus on tentative hypothesis in positive economics." Friedman adds (1953, 14): "...wildly inaccurate descriptive representations of reality, and, in general the more significant the theory, the more unrealistic the assumption (in this sense)."

A key underlying assumption of this modeling approach is that the market forces individuals to behave in a manner that generates 'optimal' results. Thus, one has the survival principle, which ultimately yields the correct behavior either in the long or short run. Only optimal behavior and results are consistent with survival. In the conventional wisdom, survival and optimal behavior are assumed to be causally and strictly correlated at least in the long run (Alchain 1950, Reder 1982). The content of behavior is not important; only that this behavior is consistent with survival matters. This perspective, referred to as the ecological rationality, is reflected, for example, in the work for Alchian (1950) Gigerenzer (2001, 2007) and Smith (2003, 2005). But unlike in Gigerenzer and Smith, in the conventional economic reasoning, neoclassical calculating, intensive search, and monitoring behavior is typically assumed to be the appropriate normative behavior that yields optimal results and one can assume that individuals behave as if they are optimizing in this sense.

Friedman's and the conventional wisdom's methodological perspective on modeling and prediction is clearly illustrated in his examples of the expert billiard player and the optimizing firm (Friedman 1953, 21). Friedman argues that one can predict the optimal shots of the expert player and the outcomes of the optimal firm (and firm management) by assuming that the pertinent individuals behaved as if they knew and applied the mathematical formulas consistent with producing, on average, optimal outcomes. This behavioral assumption, although Friedman admits is wildly unrealistic, has high predictive powers. Billiard players who behaved differently would not be experts (could not survive in

the market for champions) and firm decision makers who behaved differently could not survive in the market place. More specifically, with regards to the firm, survivalists must be optimizers (Friedman 1953, 21), "...behave as if they were seeking rationally to maximize their expected returns...and had full knowledge of the data needed to succeed in this attempt; as if, that is, they knew the relevant cost and demand functions, calculated marginal cost and marginal revenue from all actions open to them, and pushed each line of action to the point at which the relevant marginal cost and marginal revenue were equal."

What this assumptions-do-not-matter methodological approach ignores is actual causal processes by which individuals become experts and decisions are made. Even if the results are optimal, to determine causality one has to understand the basics (a simple model) of actual of expert billiard playing and firm decision-making. Otherwise, one can confound spurious correlation with causation and presume a particular set of assumed neoclassical behaviors yield optimal results, when they may not. So, for example, it is not by learning and applying appropriate mathematical formulas that one becomes an expert billiard player or decision maker, but rather by developing the required skills, often learned in the pool hall and in the firm through learning-by-doing. A training program for billiard players and firm decision-makers, concentrating on math and engineering courses would, by itself, not produce experts. It might also be the case that presumed neoclassical calculating behavior yields sub-optimal results. Thus the simplifying assumptions of Friedman can yield predictions that are far of the mark, if the latter is defined as coinciding with optimal results.

Simon (1979, 509) makes the following point with regards to the importance of assumptions for economic analysis: "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."

Assumptions, Norms, Optimality, and the Survival Principle

In behavioral economics there are three schools of thought on the assumptions matters principle, with respect to the optimality of outcomes. One school maintains that individuals do not behave neoclassically, but that the outcomes of such behaviors are optimal, at least more often than not. Moreover, neoclassical norms for optimal behavior yield sub-optimal results. Thus neoclassical behavioral assumptions should not be the normative basis for optimal or 'rational' intelligent choice behavior.

This perspective is clearly articulated by Vernon Smith (2005, 149-150; see also Smith 2003): "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 non-profit-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 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?" This worldview is closely related to the notion of ecological rationality put forth by Gigerenzer (2007), in terms of individuals adopting fast and frugal heuristics (the adaptive tool box) as the best practice optimizing toolbox, given the environment within which decisions are made (see also Gigerenzer and Todd 1999). From this perspective, individuals *typically* behave non-neoclassically because it makes economic sense to do so. This is how really rational people typically behave.⁴ One could predict here that outcomes (long run) are optimal especially when choice behavior is not neoclassically, but rather ecologically rational.

A second perspective maintains that one cannot assume, a priori, that outcomes, even the long run, are somehow optimal. Thus the choices made by individuals, even if intelligent, need not generate optimal results. In this case, it is argued that the survival principle cannot be interpreted to predict that only optimal outcomes survive. Thus, not only would neoclassical behavior not generate optimal results, there is no good reason to believe that even the adaptive toolbox yields such results. This lends itself to the notion of multiple equilibria—that the survival principle is no guarantee of optimal decisions yielding optimal results.

Simon pioneered this perspective which combines the argument that neoclassical behavioral norms should be rejected as the basis for simplified modeling assumptions and for establishing norms for optimal behavior with the argument that one need not expect that only particular and unique outcomes will survive over time. With regards to the theory of the firm, Simon writes (1979, 509):

The presence of something like organizational slack in a model of the business firm introduces complexity in the firm's behavior in the short run. Since the firm may operate very far from any optimum, the slack serves as a buffer between the environment and the firm's decisions. Responses to environmental events can no longer be predicted simply by analyzing the "requirements of the situation," but depend on the specific decision processes that the firm employs. However well this characteristic of a business firm model corresponds to reality, it reduces the attractiveness of the model for many economists, who are reluctant to give up the process-independent predictions of classical theory, and who do not feel at home with the kind of empirical investigation that is required for disclosing actual real world decision processes. But there is another side to the matter. If, in the face of identical environmental conditions, different decision mechanisms can produce different firm behaviors, this sensitivity of outcomes to process can have important consequences for analysis at the level of markets and the economy. Political

⁴ Hayek's (1988, 1973) foundational perspective on ecological rationality evolved into an understanding that human choice behavior was almost always optimal, whatever this behavior might be.

economy, whether descriptive or normative, cannot remain indifferent to this source of variability in response.

To develop rigorous economic theory one must recognize that the survival principle does not guarantee unique or 'optimal' outcomes. One must also recognize that no matter the outcome, even if it is in some sense optimal, this should not be used to infer neoclassical behavior, since the latter is thought to typically generate sub-optimal results.

The most popular behavioral perspective on assumptions relates to the approach to economic psychology/behavioral economics developed by Kahneman and Tversky (1979, 2000; see also Kahneman 2003). They and their colleagues have presented a tremendous amount of experimental evidence that individuals' choice behavior is on average far removed from assumed neoclassical behavior. Thus their empirical contribution to behavioral economics/economic psychology is not much different from that of Vernon Smith and Gerd Gigerenzer and their colleagues.

But the Kahneman and Tversky school interprets its evidence by applying neoclassical behavior as the normative ideal or benchmark from which to measure economic rationality and optimality in results. This heuristic and biases worldview is in stark contrast to the perspectives of Simon, Smith, and Gigerenzer. Deviations from neoclassical norms indicate sub-optimal economic outcomes. But neoclassical assumptions and theories are found wanting because they fail as a descriptive theory of human action.

One particularly noted and sometimes controversial outcome of this research paradigm is given that individuals are prone to systematic errors and biases in their choices, other individuals should intervene to either nudge or drive individuals towards what they would choose if neoclassical norms prevailed in the decision making process. This approach is denoted as benevolent or soft paternalism. This perspective contravenes a basic moral tenant of contemporary economics of methodological individualism, which assumes that individuals typically make choices in their own best interest, where 'best interest' is something that only the individual decision maker can define. This is something quite apart from the possibility of market failure, well recognized in the conventional wisdom, which is a product of individuals behaving neoclassically, but not incorporating into their calculations the true costs and benefits of their choices.

Bounded Rationality, Satisficing, and Fast and Frugal Heuristics

Simon introduced bounded rationality and satisficing as analytical constructs to substitute for the unrealistic neoclassical assumptions of unbounded rationality and maximizing. Satisficing behavior is a function of individuals engaging in boundedly rational behavior. Simon argues that these alternative behavioral constructs, yielding better analytical predictions, are in line with how intelligent individuals actually behave and thus have a more powerful causal content. This approach to choice behavior does not assume that individuals are in any way irrational even though such behavior is expected to deviate substantively from neoclassical norms.

Simon (1987a, 266-267) notes that: “The term ‘bounded rationality’ is used to designate rational choice that takes into account the cognitive limitations of the decision-maker - limitations of both knowledge and computational capacity... Theories of bounded rationality, then, are theories of decision making and choice that assume that the decision maker wishes to attain goals, and uses his or her mind as well as possible to that end; but theories that take into account in describing the decision process the actual capacities of the human mind.” Individuals who are boundedly rational satisfice because, given the reality of their cognitive wiring and uncertainty and imperfection of information and knowledge, individuals fail to examine all available information and make choices based on a stopping (search) rule where a particular choice appears satisfactory given the objectives and concerns of the decision maker. Satisficing yields better (optimal) results than would neoclassical normative choice behavior (Todd and Gigerenzer 2003). Bounded rationality is not the same thing as optimizing under additional constraints; it is rather making optimal choices using non-optimizing heuristics, such as satisficing, which yield better results than if one followed neoclassical norms given the wiring of the brain and the information and knowledge environment in which one makes choices.

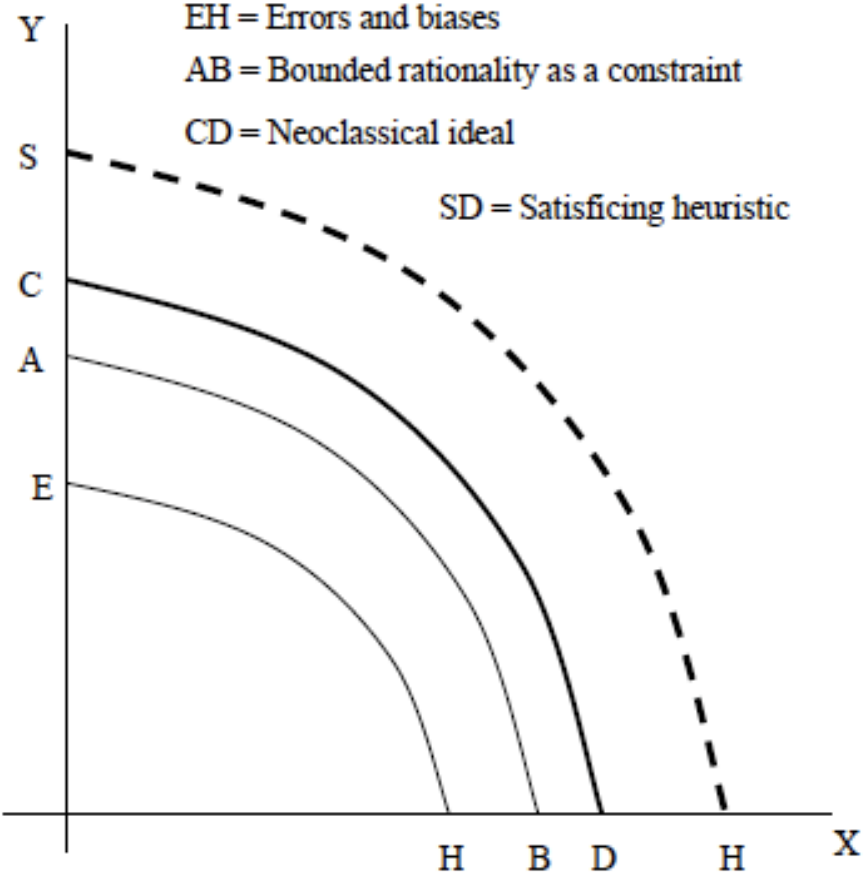
This approach to rational decision making can be illustrated using production possibility frontiers (PPF). In Diagram One, one has the standard PPF wherein CD represents the neoclassical ideal in terms of output. One interpretation of bounded rationality is that it represents an additional constraint on choice such as increasing the transaction costs of decision making which shifts the PPF inward to AB. This would be analogous to Stigler (1961) introducing information costs as a constraint which forces search costs upon the economic agent. Thus any reduction in transaction costs, *ceteris paribus*, shifts the PPF outwards towards CD. This representation of bounded rationality captures only a fragment of the bounded rationality narrative. What Simon in fact argues is that how one makes choices (process rationality) is a critical determinant of outcomes. Based on the logic of this argument and empirical evidence, one can argue that neoclassical-type calculating behavior, given humans’ limited and particular brain processing capabilities and given imperfect information and uncertainty, yields a PPF, such as EH, well to the interior of some ideal neoclassical PPF. On the other hand, applying what Gigerenzer (2001, 2007; see also Kurz-Milcke and Gigerenzer 2007) refers to as fast and frugal heuristics (non-neoclassical heuristics), developed over the millennia by the human animal, given its brain capabilities and environments, would yield a PPF such as SH, where the latter incorporates the satisficing heuristics proposed by Simon (see also Altman 2005b). Fast and frugal heuristics drawn from the adaptive toolbox is capable of generating more efficient outcomes than neoclassical heuristics. But as Gigerenzer points out, it is possible for individuals adopt less than optimal heuristics. Although there exists fast and frugal heuristics that yield better results than neoclassical heuristics, it is not a foregone conclusion that best practice fast and frugal heuristics will in fact be employed.

Overall, bounded rationality is much more than simply adding an additional constraint to the production function or to the objective function. It also incorporates the relationship between the content and the process of choice behavior (behavioral assumptions matter) and outcomes. The production side example employed here can be reconfigured to illustrate any choice scenario, wherein fast and frugal heuristics yield superior outcomes than neoclassical ones. In this particular exposition of bounded

rationality and satisficing the application of non-neoclassical decision norms is not sub-optimal. This in contrast to the assumption of the Kahneman-Tversky school, that individuals are plagued by cognitive biases, where the neoclassical PPF represents the normative ideal. Applying neoclassical decision norms yields superior results whereas fast and frugal heuristics yield, on average, outcomes in the interior of the neoclassical PPF. But the evidence appears to support the hypothesis that individuals don't behave neoclassically and such non-neoclassical behavior yields, on average, superior results.⁵

Diagram One

Bounded Rationality and Satisficing



⁵ Smith (2003, 2005; see also Altman 2004b) makes the case, based on experimental evidence, that neoclassical type optimal economic results, such as competitive market clearing outcomes, are a product of less demanding behavioral priors than one finds in the conventional wisdom. More realistic agents yield optimal results under specific incentive environments.

Behavioral Economics and Theories of the Firm

The production side of economics has not been the centerpiece of the new behavioral economics. But it is in the realm of production that behavioral economics presents some of its most important insights with some critical implications for causal analyses of the determinants of material welfare. X-efficiency theory and efficiency wage theory are central contemporary pillars of the behavioral theory of production, both concepts being pioneered by Harvey Leibenstein (1957, 1966, 1979, 1982; see also Frantz 1997), whilst efficiency wage theory has been significantly elaborated upon and further developed by George Akerlof (1970, 1982, 1984, 2002; see also Akerlof and Yellen 1986; Solow 1979; Stiglitz 1987). Both theoretical constructs begin with the behavioral assumption that effort, in both quantity and quality dimensions, is a discretionary variable for good psychological, sociological and institutional reasons. This is in stark contrast with the conventional wisdom, which assumes that effort inputs in both quality and quantity dimensions are fixed and are thus not affected by the socio-economic environment in which decisions are made.

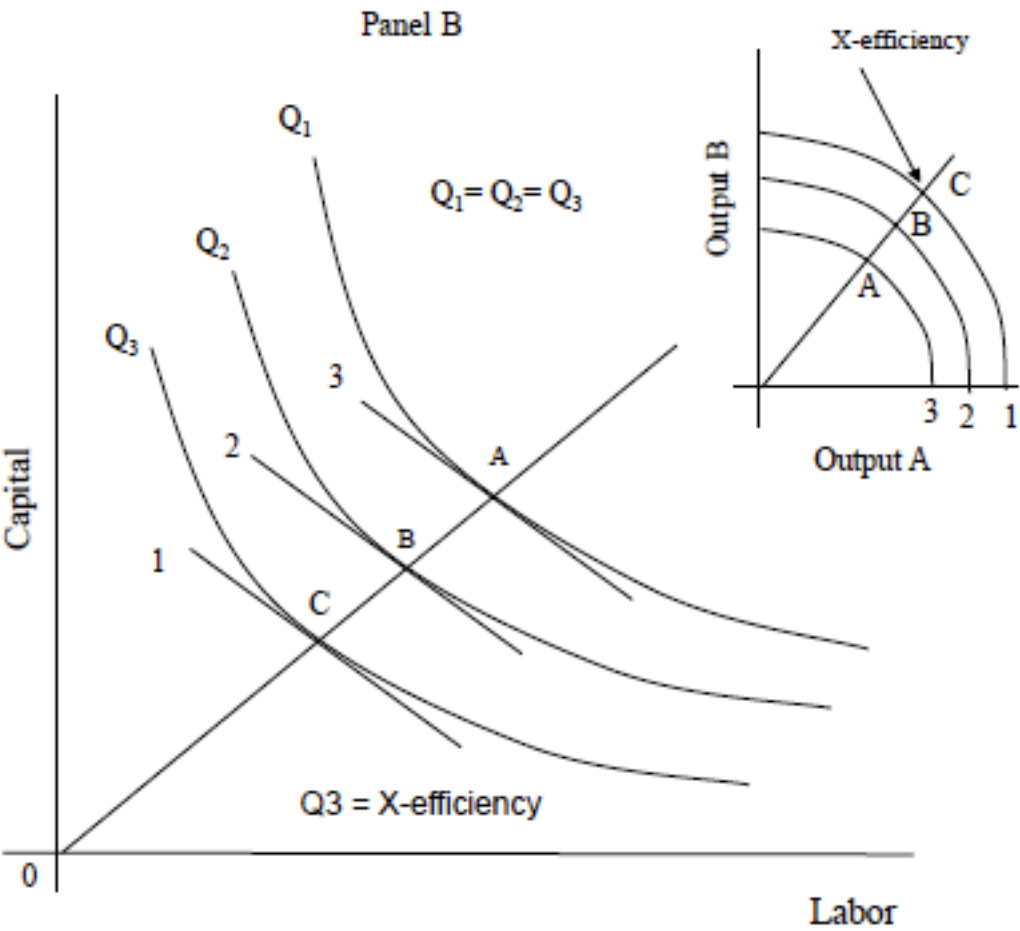
The original x-efficiency theory, developed by Leibenstein (1966), is predicated on the assumption that product markets are typically imperfect and therefore firms are provided with a certain degree of market power allowing them to manipulate product prices. It is concerned with possible managerial (and owner) behavior when product markets are not competitive, given the finding that firms producing similar products and applying similar conventional inputs produce at quite different levels of productivity. Firm decision makers might in some sense maximize utility. But this is not the same as effort maximization. Decision makers might value leisure over effort when they can get away with it—when product markets allow them to survive on the market in spite of not proffering ‘optimal’ levels of performance. Thus we have organizational slack and the survival principle cannot enforce economic efficiency in this instance. Given more reasonable objective functions of decision makers, the economic cost to society of imperfect product markets is not simply allocative inefficiency (which can be quite trivial), but also x-inefficiency. The latter is a measure of output being less than it might otherwise be, given conventional inputs, when effort inputs are not maximized. Textbook and even more sophisticated economic analyses simply assume that firms are x-efficient, that all economic outcomes are economically efficient, irrespective of market structure and the behavioral-objective functions of firm decision makers. Inappropriate assumptions direct economic inquiry away from locating potential sources of economic inefficiency (x-inefficiency).

One can illustrate the concept of x-inefficiency using production isoquants and production possibility frontiers as in Diagram Two (Panels A and B respectively). X-efficiency theory suggests that the probability of firms operating along production isoquant Q_1 at technically efficient point A is small. In standard analysis, producing along an isoquant translates into producing as much output as possible, given quality, for a given amount of factor inputs. But when x-efficiency exists, the firm is producing x-inefficiently at Q_1 since it can produce the same amount of output, Q_3 , using a lesser amount of factor input. This can be achieved at higher levels of effort input. In this scenario, only when the firm is producing at point C along isoquant Q_3 , is it both x-efficient and technically

efficient. In this case, the firm is producing along production possibility frontier 1. A lesser amount of effort in terms of quantity or quality shifts the PPF inward. Assuming effort to be at some maximum presumes that the firm is always operated along its x-efficient isoquant and production possibility frontier. But according to x-efficiency theory, x-efficiency should only be regarded as one possibility from a basket of choices that reasonable and intelligent firm decision makers can make. These other choices might be utility enhancing to firm owners and managers, but they are clearly sub-optimal from the perspective of maximizing society's level of material wellbeing. Leibenstein considers increasing product market competition as an important vehicle forcing firms into become x-efficient.

Diagram Two

Technical and X-Efficiency



From this perspective a more competitive market, *ceteris paribus*, yields not only an economy that is more allocatively efficient, but one which is more x-efficient, characterized by a higher level of consumer surplus. This point is illustrated through equation 1 and Diagram Three. In the conventional presentation of the theory of the firm's average cost is determined by input costs and average productivity as per equation 1, where for simplicity it assumed here that the only costs of production relate to labor:

$$1. \quad AC = \frac{w}{\frac{Q}{L}}$$

where AC is average costs; w is labor costs per unit of labor; L is labor input; and Q is output. Average cost is a function of input costs (w) *ceteris paribus*. If effort is reduced, productivity (Q/L) diminishes and average costs increase. If effort increases so does productivity, thereby reducing average costs. In the Leibenstein framework, organizational slack generates x-inefficiency, yielding higher average costs.

In Diagram Three, in the conventional model, the cost of imperfect product markets is simply allocative inefficiency. Instead of producing at Q_2 , where average product equals marginal product equals competitive product price D, the economy produces at Q_0 at price E, given by the marginal cost (DA) and marginal revenue product (FA) curves. One simply has a deadweight loss of A'AF. Of course product price is also higher and output lower than it would otherwise be. But this analysis assumes away the x-inefficiency effect of market structures that allow for or facilitate organizational slack. X-inefficiency serves to shift upwards the average and marginal cost curves to EA' generating a further deadweight loss of BB'G. There are also the x-inefficiency related losses that can be measured in terms of the increased cost of producing existing output. In reality, conventional theory examines a problematic, which might be illustrated by marginal cost curve EG which is assumed to be x-efficient, wherein it is determined that something akin to BB'G are the only losses to society. It draws attention away, using unrealistic assumptions, from the other losses and distortions in the economy potentially caused by imperfect product markets, such as additional deadweight losses and perhaps more importantly x-inefficiency-related costs (Altman 1900).

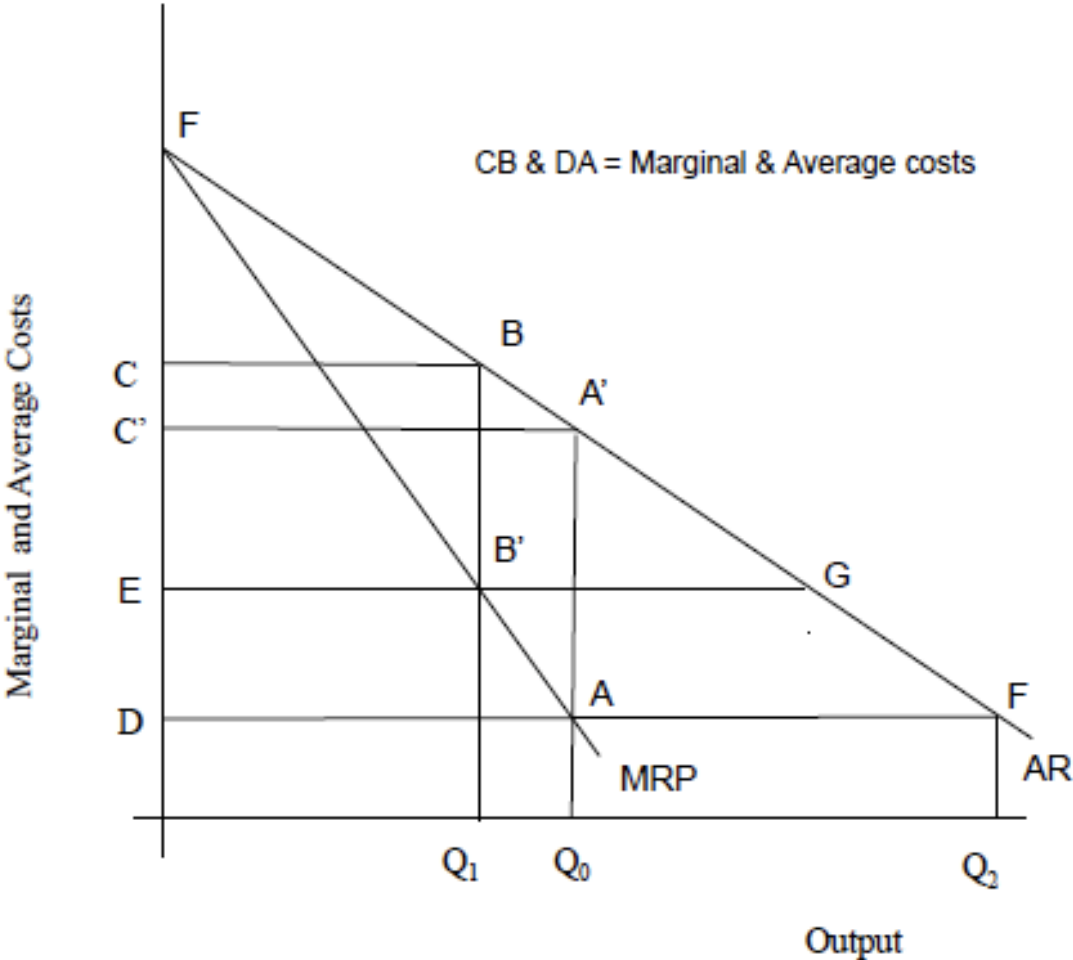
Another x-efficiency type model, which one can refer to as a x-efficiency/efficiency wage model, can be applied to situations where working conditions, inclusive of wages, the firm's industrial relationship system, and bargaining power help determine effort inputs by workers and firm decision makers. It also can be applied to scenarios where product markets are monopolistic as above or highly competitive. The latter remains a core assumption of conventional economics, especially when informed by Baumol's (1982) notion of 'contestable markets, wherein firms behave competitively to stave off potential domestic and international rivals.⁶ In the x-efficiency/efficiency wage model effort and labor costs, a proxy from wages, working conditions, and labor-

⁶ Kaufman (2007) makes a strong case for product market imperfections as a long run characteristic of the economy.

management relations are positively and causally related. As with the previous model, what happens in the black box of the firm matters substantively. This model was developed, to help explain the lack of economic convergence between high and low wage economies, the absence of negative economic shocks to the economy from higher wages (which can be caused by minimum wages, unions, or increased labor market pressures), predicted by the conventional wisdom, and the inability of superior (higher productivity) systems of labor management relations to dominate inferior ones (Altman 1996, 2001, 2002, 2006c, 2006d). Part of the causal narrative here is related to the concepts of fairness, reciprocal altruism and reciprocal punishment, to be discussed below.

Diagram Three

The Firm, Effort Discretion and Average Costs



Unlike in the organizational slack representation of x-efficiency theory, in this model, labor costs and effort input can change simultaneously. Of course, in standard theory as in the organizational slack model, any increase in wages is independent of effort inputs. From the alternative perspective, increasing wages need not increase unit costs, nor need falling wages reduce unit costs. Moreover, changes in effort inputs need not affect unit costs, as they must in the organizational slack modeling. As per equation 1, from the conventional perspective, any increase in labor costs (w) serves to increase unit costs (AC). But from the alternative behavioral perspective, increasing wages need not change unit costs if accompanied by a proportional increase in labor productivity, which can be driven by increasing the quality or quantity of effort inputs. And, a cut in labor costs need not result in lower unit costs when accompanied by a proportional fall in productivity, which can be a product of a diminution of effort inputs.

The change in productivity and thus in effort inputs need not be relatively as large in the more realistic scenario where labor inputs are only a portion of total costs. In this case, the percentage change in productivity required to keep unit costs constant is scaled down by the percentage share of labor to total costs. Thus, if labor contributes 20 percent to total costs, a 10 percent increase in wages requires a 2 percent increase in labor productivity (20 times 10 percent) to keep unit costs from rising. In this x-efficiency model, higher labor costs can contribute to higher levels of x-efficiency without causing unit costs to increase, whereas lower labor costs have the opposite effect without reducing unit cost. Firms need not become more competitive by cutting wages nor need they become less competitive as a consequence of labor costs increasing. When labor costs and productivity are tightly and causally correlated, with variations in effort inputs as the causal intermediary, competitive product markets are no longer a necessary condition for maximizing effort inputs and x-efficiency nor is imperfect product markets necessary for the realization of x-inefficiency in production.

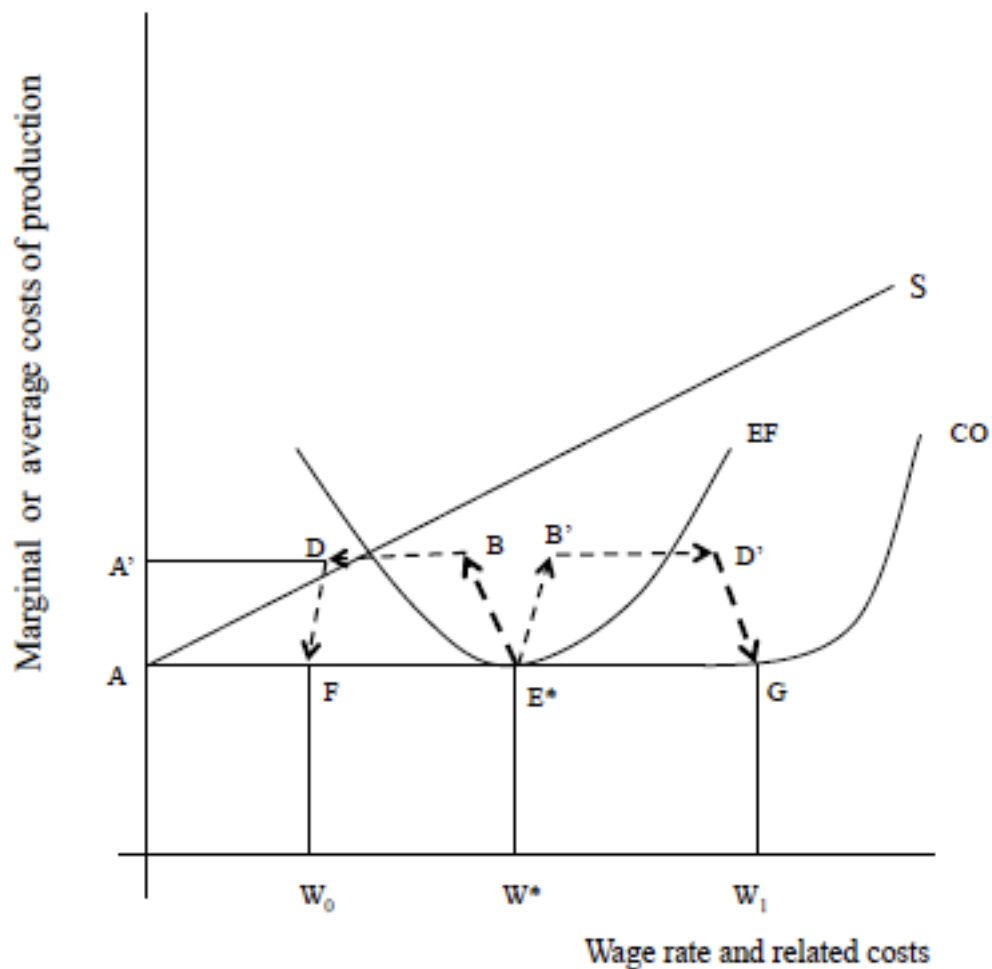
Some these points are further illustrated in Diagram Four which models possible relationships between labor costs and average costs. Of course, in the conventional model, increasing wages invariably yields higher units costs such as would be the case along cost curve AS. This follows from the assumption that effort is fixed. Increased labor costs has the same effect in the original x-efficiency model related to managerial organizational slack since here too effort inputs are perfectly inelastic with respect to changes in labor cost. In the alternative x-efficiency model, to the extent that productivity changes sufficiently to offset changes in labor costs, unit costs remain invariant to changes in labor costs. This is given by line segment AG where unit costs remain constant as wages increase from W_0 to W_1 , for example. When further increases labor costs (from A to A') cannot be met by sufficient increases in effort inputs, this yields increases in unit costs—we have diminishing returns to effort input. Firms are relatively x-efficient as one approaches point G of cost curve AGCO. Higher labor costs serve to spur increases in x-efficiency and visa versa. Along AG there is an array of labor costs consistent with a unique unit cost (A) and both x-inefficient and x-inefficient firms are cost competitive.

Unlike in the conventional model there is no unique unit cost coinciding with a particular wage rate. From this modification of conventional modeling it follows that:

- Low wage firms need not drive high wage firms out of the market.
- Increases in labor costs need not make firms less competitive if accompanied by sufficient increases in labor productivity.
- There is no market imperative for firms to converge towards a particular level of labor costs or x-efficiency.

Diagram Four

Labor, Production Costs and Effort Discretion



Although, labor secures material benefits in the high wage-high x-efficient firm environment, rational (utility maximizing) firm decision makers have no immediate material incentives to move towards an x-efficient organizational structure when unit costs are not reduced or profits increased. In this modeling scenario, movements towards more or

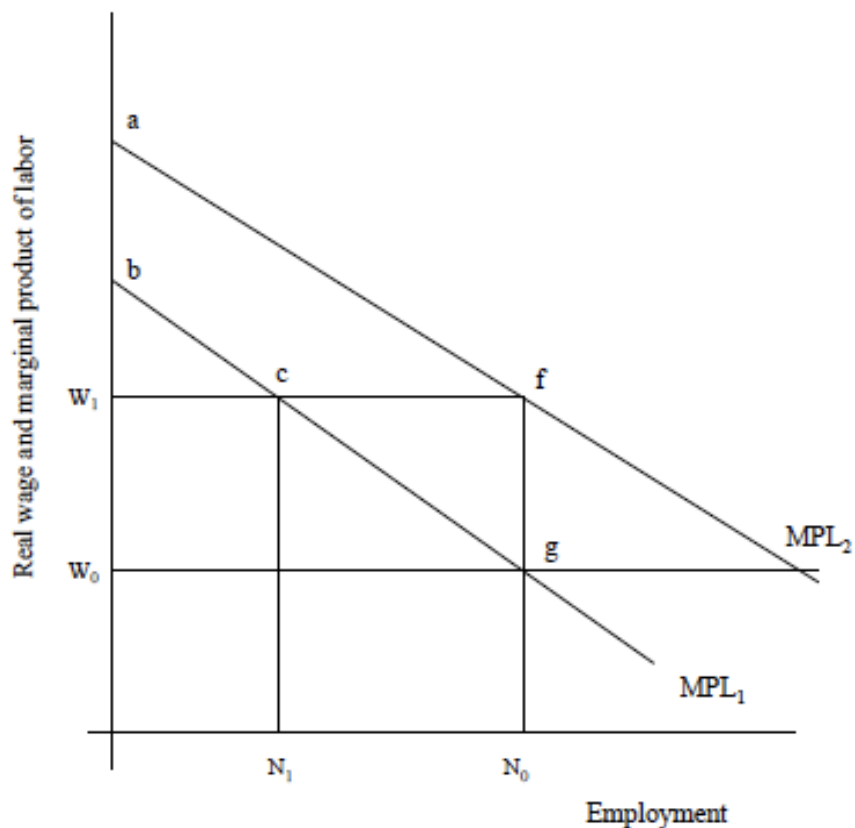
less x-efficient organizational forms depend on the preferences of decision makers (do they have moral sentiments towards the material wellbeing of workers?), the bargaining power of labor, and institutional variables such as minimum wages and aspects of a social safety net, which serve to increase the reservation wage of labor. Preferences on the part of decision makers can result in firms adopting either a low wage low productivity or a high wage high productivity strategy.

However, when there are short term costs to moving towards a higher or lower labor cost environment, one can expect that firm decision makers would be reluctant to move from a particular organizational configuration to another. The wage rate, for example, can be sticky, in the short run, that is over the course of a business cycle. Of particular importance, this modeling scenario helps explain the downward stickiness of wages during the downward portion of the business cycle, which is also of importance to the efficiency wage model of the labor market (Akerlof 1982, 1984, 2002; Akerlof and Yellen 1986; Bewley 1999). In Diagram Four, if one begins with wage W^* , a wage cut (W_0) causes unit costs to increase to A' from A as effort is cut substantively in response to the wage cut. As well there might be possible increases in job turnover. Eventually, unit costs return to A , following a path of E^*BDF . If a firm's capacity to cut wages is perceived to be short term—a product of the business cycle—it does not pay the firm to cut wages. Only if cutting wages is a longer run option might the firm pursue wage cuts, especially if it is hoped that unit costs will actually fall or if decision makers garner increased utility from improving their relative positioning with regards to workers as a consequence of permanent cuts to wages and working conditions. On the other hand, increasing wages might entail short term adjustment costs which might take the path $E^*B'D'G$. Given that firm owners and managers need not see any benefits from taking this path in terms of lower unit costs or higher profits, such a path cannot be expected to be voluntarily pursued unless firm decision makers have moral sentiments—increased their utility—with increases in the material wellbeing of workers. This would be especially the case, given a world of Knightian uncertainty, when there is little trust between labor and management and there is no guarantee that higher wages will be easily recompensed by higher productivity. Eventually productivity can be expected to increase given competitive pressures to do so. Otherwise, if unit costs are no longer competitive, higher wage firms would not be able to survive on the market place.

Firms can be expected to voluntarily move to high wage configurations, apart from when owners and management have moral sentiments with regards to their employees' material wellbeing, in worker cooperatives wherein the objective function of the firm contains an argument related to increasing the material wellbeing of all cooperative members (Altman 2006b; McCain 2008). Moreover, in the latter case sufficient trust exists between firm members to increase productivity as labor benefits increase. Unions can also serve the role of increasing trust between management and workers wherein unions serve to guarantee increasing productivity if labor benefits are increased. This facilitates management's acceptance of a higher wage system of firm governance. Clearly, what happens in the black box of the firm is critical to productivity outcomes (process rationality). Particular levels of conventional inputs do not guarantee particular levels of productivity when effort is a variable in the production function.

One interesting revision to the conventional model that follows from this x-efficiency/efficiency wage model of the firm is illustrated in Diagram Five. The conventional model predicts that increases in wages, such as from W_0 to W_1 yield a drop in employment from N_0 to N_1 , ceteris paribus. But this assumes that effort inputs are fixed, irrespective of the incentive environment of the firm. However, if increasing wages has the dynamic effect of increasing effort inputs, this serves to shift the marginal product curve from MPL_1 to, for example, MPL_2 . In this case, in a profit maximizing firm, there would be no fall in employment. If the shift in the marginal product curve is not as large, employment falls as wages increase, but not by as much as is predicted by the conventional model. The extent of the shift in the marginal product curve is an empirical question. But the realistic possibility of such shifts makes any analytical prediction pertaining to the relationship between wage changes and employment as put forth in the conventional modeling problematic.

Diagram Five
The Firm and Efficiency

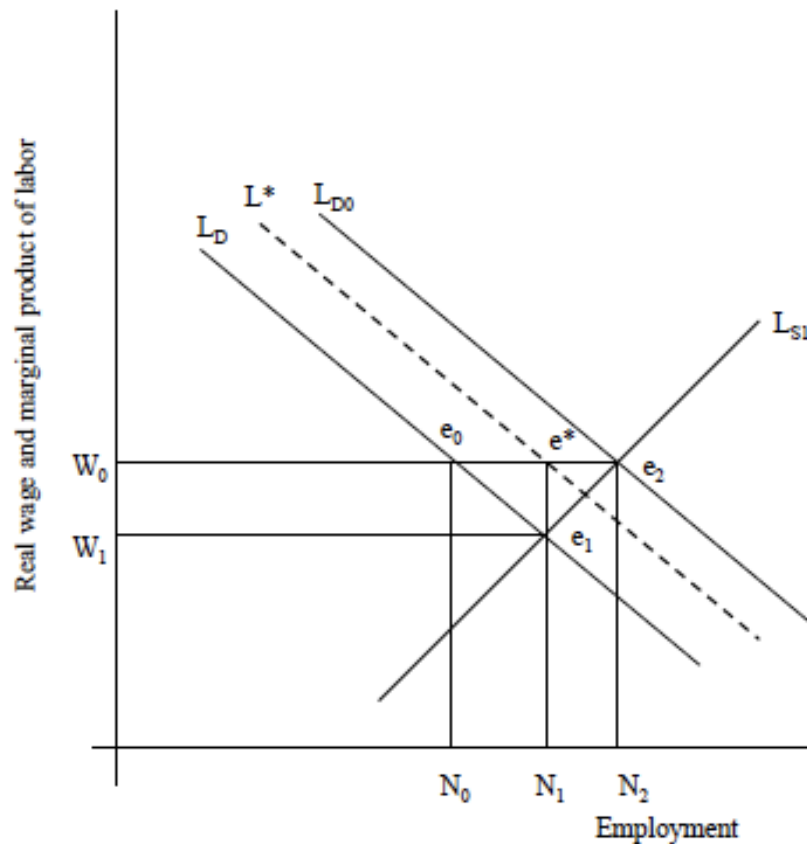


The efficiency wage model has been employed to explain the downward inflexibility of wages during the business cycle as well as equilibrium wages. The efficiency wage is considered to be a fair wage since it is above the market clearing reservation wage. Efficiency wage theory was pioneered by Leibenstein (1957) and further developed and refined by Akerlof (1982, 1984, 2002; see also Akerlof and Yellen 1986, Solow 1979, Stiglitz 1987). A key point of efficiency wage theory is that effort and wages are positively and causally correlated. This is also a key point of the x-efficiency/efficiency wage model discussed above. However, unlike in the latter model or in Leibenstein's original configuration of efficiency wage theory, there is a unique wage that minimizes unit costs through its particular effect on effort inputs and of effort upon productivity. This wage is referred to as the efficiency wage. This narrative is illustrated in Diagram Four by cost curve EF. The efficiency wage is given by W^* . Unlike the conventional model there is no equilibrium array of wage rates associated with ever higher unit costs. There can only be one unique wage rate consistent with minimizing unit costs and maximizing profits. Profit maximizing firms will not pay higher or lower wages, even if this is the preference of decision makers, since this results in higher unit costs. A unique efficiency wage is given by the assumed payoff function with regards to the relationship between effort, productivity and unit costs. This is in contrast to the assumed payoff function in the x-efficiency/efficiency wage model where there is an array of wage rates consistent with a unique unit cost.

Of special concern to Akerlof (2002; see also Bewley (1999) and behavioral macroeconomists is modeling an equilibrium downward rigidity of wages consistent with profit maximization and neoclassical rationality. This, it is argued, can explain involuntary unemployment, which is attributed to real wages being too high in equilibrium. Diagram Six illustrates some of the key macroeconomics points flowing from the efficiency wage literature. Full employment is given by N_1 (equilibrium e^*). This requires a real wage of W_1 . However, the efficiency wage is W_0 yielding employment N_0 . There is excess labor supply at W_0 ($N_0 > N_2$) but efforts to cut real wages simply result in a reduction in effort input—workers retaliate against employers effort to cut real wages (a form of altruistic punishment)—which in turn causes productivity to fall and unit costs to rise.

In Diagram Six, wage cuts shift the labor demand curve to the left (from L_D) as productivity diminishes. Profit maximizing firms have no choice but to keep real wages above the market-clearing wage even though there are workers willing to work for lower wages. Real wages cannot be bid downwards for efficiency wage reasons. Thus, unlike in the classical or new classical economics, one can have equilibrium levels of involuntary unemployment for good economically rational profit maximizing microfoundations-based reasons. For full employment to be realized, Akerlof argues, aggregate demand must be of the correct dimensions. But on the supply side, one must find the means to cut real wages. This can be achieved through mild inflationary policy given that workers suffer from money illusion at low rates of inflation. This behavioral model requires one assuming that workers suffer from quasi-irrationality and can be fooled even in the long run with regards to the impact of inflation upon real wages.

Diagram Six
Real Labor Market



The x-efficiency/efficiency model also provides an explanation for downward wage rigidity without reference to a unique efficiency wage—one simply assumes short term costs being incurred when firms cut real wages (Altman 2006e). However, persistent involuntary unemployment can be reduced here without reference to money illusion. In this model there is no efficiency wage per se. Increasing real wages if matched by sufficient increases in effort-related increases in labor productivity will result in full employment if there exists adequate aggregate demand for the increased output. For example, if a wage increase from W_1 to W_0 is accompanied by an increase in the level of x-efficiency yielding a shift in the labor demand curve from L_D to L^* there would be employment of N_1 . What becomes critical here is for labor productivity to match real wage rates such that full employment can be achieved. There is no reason for workers to be fooled into accepted real wage cuts.

The fair wage hypothesis has been developed by Fehr and associates (see, for example, Fehr and Gächter 2000). It is predicated upon efficiency wage theory and experimental evidence on the relationship between effort inputs and wage rates. The key point of this hypothesis is that workers can retaliate against employers for paying them, what they perceive to be, an unfair wage. This retaliation takes the form of reducing effort inputs and represents a form of altruistic punishment. Higher wages are rewarded with increased effort inputs. Given an assumed efficiency wage effort-productivity-average cost function, there is only one wage that is cost minimizing. This equilibrium wage is the efficiency wage, which lies above the reservation wage. Profit maximizing firms have no incentive to pay wages that are lower or higher than the efficiency wage. Rational firms are predicted to pay relatively high wages in a world of effort discretion. This model, given its reliance on effort variability, contravenes the conventional predictions pertaining to equilibrium wages. However, unlike the x-efficiency/efficiency wage model, it cannot explain the lack of convergence of wage rates and working conditions and the simultaneous existence of a spectrum of low to high wage firms. Nor can it explain the preference in the long term of many firm owners and decision makers for low wage configurations. In the Fehr model, by assumption, altruistic punishment yields equilibrium high wages (wages above the reservation wage).⁷ Moreover, the Fehr model suggests that higher effort levels are generated through punishment heuristics—this is an important testable hypothesis generating a large interdisciplinary literature.

X-efficiency, Efficiency Wages and Effort Heuristics

In paying particular attention to what might transpire in the neoclassical black box of the firm, behavioral economics opens the door to a discourse on possible routes towards increasing productivity in a manner consistent with economic efficiency. This discourse is of particular importance given the assumption, consistent with the evidence, that firms do not maximize effort automatically, irrespective of market structure or investment environment. In effect, behavioral economics is especially concerned with productivity heuristics to close the productivity model. Quick mention should be made of two approaches to the productivity problem.

Fehr (Fehr and Gächter 2000) and collaborators argue that effort inputs are improved through the capacity of management and employees to punish each other when either party does not deliver a fair wage or effort level. Of particular importance is the capacity of employees to punish unfair employer practices by withdrawing effort and thereby reducing productivity. Such punishment elicits fairer wages and higher levels of productivity than could otherwise be realized in a world of effort variability. Given effort variability, rational profit maximizing firms pay employees an efficiency wage.

What I would refer to as the cooperative heuristic provides another possible resolution of the productivity problem wherein it is cooperation amongst economic agents predicated upon a certain level of trust that yields maximum productivity. Altruistic punishment might play a role here in so far as defectors or free riders are brought into line

⁷ On altruistic punishment see Fehr and Gächter (2002) and Boyd, Gintis, Bowles, and Richardson (2003).

through punishment. But in the cooperation heuristic trust becomes as important as punishment in generated maximum productivity—trust is a necessary condition for maximizing productivity. Altruistic punishment can serve to reinforce cooperation especially in repeated game scenarios. It can also serve to initiate a certain level of cooperation in one shot game scenarios, especially in larger organization, analogous to anonymous one shot game scenarios. The cooperative heuristic applies to situations where agents are initially characterized by conflicting preferences—one has principle-agents problems. This is, in effect, assumed in Fehr’s efficiency wage narrative. In other words, unlike in the neoclassical black box of the firm, productivity (x-efficiency) is not automatically maximized and unlike the efficiency wage scenario profit maximizing firms do not converge to some unique efficiency wage as a consequence of altruistic punishment.

Leibenstein, when discussing the firm’s productivity problem in terms of a Prisoner’s Dilemma (PD) scenario, elaborates upon the cooperative heuristic. Adversarial relationships yield PD solutions and this is especially the case when the determination of productivity is of concern. When objective functions are in conflict, absent some intervention, agents choose a Prisoner’s Dilemma solution to the productivity problem where x-efficiency is minimized as opposed the Golden Rule solution where x-efficiency is maximized. The PD solution is optimal for each agent given that the negative expectation that each agent has of the other’s behavior. Employees and employers strategically chose the private maximization option, in the hope that the other will choose the Golden Rule option and with full knowledge that if the other party also chooses the private maximization option he/she is better off doing the same. In the latter case one is simply minimizing one’s losses. Only if the Golden Rule option is chosen by all agents simultaneously (the cooperative solution) is the economic pie maximized, while the PD solution minimizes pie size. Although, Leibenstein does not speak to repeated game scenarios, if the employers choose the PD solution and employees, the Golden Rule, in the next round of play one would expect employees to retaliate with a PD option (analogous with tit-for-tat results).

The PD solution is avoided if one introduces institutions that allow for and facilitate trust amongst agents such that each will choose the Golden Rule solution. Workers will opt for effort maximization if they believe that management will treat them fairly and management will opt for treating employees as employees prefer and expect to be treated if management expects effort maximization from employees. Leibenstein (1982, 96–97) argues:

At any specific time the latent prisoners' dilemma possibilities are held in abeyance by conventions, institutions, and laws, involving trust, enforcement of contracts, etc. . . . If the adversarial portions are absent, then the mutual choice is the optimal position on the cooperative diagonal. Adversarial portions of the payoff table may be made essentially nonaccessible through nonmarket conventions, such as trust, honesty, fairness, legal recourse for misunderstanding or fraud, emphasis on reputation for fair dealings, etc. Thus, a convention of honesty in contractual relations eliminates adversarial behavior in which both sides attempt to cheat the other. Similarly, an effective low-cost system of laws which enforces contracts may minimize the inducement to use other types of adversarial behavior.

Leibenstein (1978, 206) makes the additional point that x-efficiency can best be realized when firm members "...interpret their jobs in such a way that they made effort choices which involved cooperation with peers, superiors, and subordinates, in such a way as to maximize their contribution to output." Moreover, (Leibenstein 1983, 838): "The main general point is that merely obtaining an acquiescent nonshirking effort is of limited value. Freely offered effort, inclusive of attentiveness and caring about the quality of effort, in return for what is viewed as a good deal (in the long run) is likely to result in higher productivity."

When effort is a discretionary variable one needs to go beyond monitoring and threats to elicit maximum effort in term of quality and quantity. One needs to develop conventions based on trust that become self-enforcing via peer pressures, norms, and self-regarding preferences (do unto others what you expect them to do unto you). Cooperation predicated on trust yields Golden Rule solutions to the productivity problem. Where one lies along the PD-Golden Rule nexus is a function of institutional and cultural variables. Much depends upon the system of industrial relations developed and embedded in the firm. The workers cooperative provides one such system (Altman 2006, McCain 2007). There are also less hierarchical and more cooperative systems within the parameters of privately owned firms (Altman 2002; Gordon 1996; Leibenstein 1982). There is no unique resolution to the productivity problem as there is in conventional black box economics (x-efficiency always obtains) and in contemporary efficiency wage theory (firms are constrained into choosing efficiency wage solutions).

Leibenstein's narrative does not discuss how different vehicles to resolve the productivity problem impact on unit costs and therefore upon the viability of PD versus Golden Rule-type approaches. He implicitly assumes that higher cost approaches are protected through imperfect product. With regards to the Golden rule-type firms, it is important to note that they are more costly to operate given the incentives required to develop, foster, and maintain the cooperative heuristic in the firm, although such firms yield higher levels of productivity as per the Golden Rule. This helps explain why Golden Rule firms often do not dominate even though are more x-inefficient and why PD-type firms are so very common although they can only achieve very low levels of x-efficiency.

Some of these thoughts are illustrated in Diagram Four. From the perspective the x-efficiency/efficiency wage theory, Golden Rule firms need not dominate when higher costs neutralize the gains generated by higher productivity along C_0 from W_0 to W_1 , for example. But in the Golden Rule scenario material welfare is maximized. On the other hand, along cost curve CO , PD firms need not dominate in spite of low costs, as one moves from W_1 to W_0 for example, given sufficiently low levels of productivity. Golden Rule firms are a function here of power relationships between workers and management, preferences amongst decision makers, and exogenously imposed institutional constraints such as minimum wages, collective bargaining rights, in-firm labor rights. Golden Rule firms would dominate when productivity is such that unit costs fall below the costs of those firms that fall outside of the Golden Rule domain—Golden Rule solutions yield downward shifts in the unit cost curve, CO . In the conventional model, the black box yields Golden Rule results, by assumption. Behavioral economics pays particular attention to what might transpire in the black box of the firm—the level of x-efficiency is contingent upon how the

firm is managed. Indeed, super calculating neoclassical behavior overlain with significant monitoring can be expected to generate x-inefficiency in production.

Fairness, Altruism, Ethics, and Ultimatum Games in Economic Theory

The introduction fairness, altruism, and ethics as important determinants of human behavior is a significant component of behavioral economics and has some significant implications for economic theory. Although some behavioral economists argue that behaviors based on fairness, altruism, and ethics are both irrational and undermine economic theory because they are inconsistent with conventional theory and with the norms of textbook economics; non-material maximizing behavior might simply suggest important modifications to current microfoundations. A key point made in the fairness-altruism-ethics narrative is that individuals and firms are not necessarily material maximizing agents. Other things are also of importance. Moreover, being fair, altruistic or ethical has been found to be consistent with the findings of evolutionary biology. Building teams and communities, that are found necessary for survival and growth of species or groups within a species, requires a much broader definition of self-interested behavior than is found in the conventional economic wisdom. Success is often marked by fairness, ethics, and altruism on the part of the individual (Field 2001; Ridley 1996; Shermer 2008).⁸ At a minimum a fairer society tends to be a more productive one.⁹

One important contribution to behavioral economics is the finding that individuals might not behave (in the short run at least) in a materially maximizing fashion with regards to price determination, at least in consumer product markets. In other words, firms might not charge the relatively highest price that the market can bear and thus firms are not maximizing profits per se. Moreover, such self-restraint in price determination limits the extent to which markets determines prices and impedes the ability of markets to clear and respond to market signals (Kahneman, Knetsch, and Thaler 1986). In mainstream theory, especially in perfectly competitive markets, individuals charge the market price, no more and no less. One implication of this perspective, which fits into the Kahneman and Tversky narrative of regarding conventional norms as the benchmark for rationality and efficiency, is that fairness in economic behavior yields sub-optimal economic results, ones which economists should incorporate into the core of their analytical framework. The argument here is that fairness results in the upward stickiness of product prices and thus impedes market-clearing movements in supply and demand that would otherwise take place in the absence of fairness in the behavioral or objective functions of firm decision-makers.

⁸ Interestingly, Hayek (1948) and Smith (1904), both very strong advocates of free market economics, make a similar point. See also McCloskey (2006) who makes a detailed contemporary argument for morals as key to successful capitalist economics. This point is central to Zak (2008) as well.

⁹ This is a key point of the x-efficiency/efficiency wage theory of the firm, discussed above, wherein the cooperative heuristic yields higher levels of productivity. But more cooperative type firms and societies (which are typically based on private ownership) need not be more competitive than the less fair or ethical firms when the former costs more to operate than the latter (see for example, Altman 2005a, 2005d)

However, many economists have noted the importance of fair behavior as part of the maximizing or satisficing toolbox. Given that consumers might punish firms deemed unfair, rational firm decision makers should avoid behaving unfairly and invest in fair behavior to build reputational capital. *Ceteris paribus*, in the long run, firms behaving fairly would be doing better than firms perceived as behaving unfairly. One example of this would be not charging relatively much higher prices for flood control supplies during an unanticipated flood emergency—taking advantage of a extreme conditions. This buys consumer loyalty. Such a modeling narrative assumes that firms' demand curves are not perfectly elastic and that elasticity of demand can be affected by decision makers' behavior on the market.

One may argue in the tradition of Simon that, given a world of imperfect and asymmetric information plus the far from perfect computational capacity of individuals, fairness and reputation building are important to the firm as well as to the consumer as signaling devices. For the consumer such signals save on transaction costs and thus can increase consumer surplus. Given the reality of information flows and processing constraints, fairness might simply be a rational and economically efficient heuristic that need be recognized as such by conventional economics. Related to this, it is an empirical question whether or not fairness actually impedes long run adjustments in supply and demand, given that the evidence suggests that consumers will not strive to punish firms that simply adjust prices to costs (Kahneman, Knetsch, Thaler 1986). Moreover, fairness cannot compromise the capacity of firms to remain competitive on the market. One needs to integrate fairness with the survival principle and an understanding of heuristics that fit into the real world of bounded rationality.

Behavioral economists have also identified tipping behavior as challenging the conventional wisdom of selfishness as the key motivational force of human behavior. The evidence on tipping is unequivocal. Individuals tip even in restaurants where they expect never to return. And, they tip in such restaurants even when there are no friends or colleagues about. In other words, where tipping is the norm, individuals tip even if they know that servers cannot retaliate for poor or zero tips on return visits and even when no friends or colleagues are present who might frown upon non-tipping behavior. Individuals are actually willing to reduce their level of material welfare and thus are not the selfish material maximizers modeled by conventional economic theory. They are being altruistic. But individuals might still be maximizing their utility (from a satisficing perspective). They simply include non-material arguments in their behavioral or objective function. One non-material argument is related to what Andreoni (1990) refers to the 'warm-glow' effect. Individuals make material self-sacrifices when these make individuals feel good about themselves. Economic theory can be revised to incorporate such altruistic behavior. Economic theory can also be revised to explain tipping in frequented restaurants as an effort to purchase good service and tipping in the company of associates as a means to avoid social reprimand or as investment in reputation building. A similar argument can be made for charitable giving, where individuals are making material self-sacrifices. When charity is not anonymous such giving can be a means of purchasing reputation or avoiding social reprimand, for example (as with tipping). But much individual charitable giving is anonymous and thus relates to the warm-glow effect.

The ultimatum game (developed by Werner Guth; see Guth 1995 for example; see also Eckel and Grossman 1966) and dictator game also provides much evidence that individuals are willing to engage in self-sacrificing behavior and punish, at their own expense, behavior which is deemed to be unfair. Simple versions of these experiments can easily be conducted in ones class. These games have generated a flurry of publications in recent years. The ultimatum game has a proposer who makes a real or hypothetical material offer and a responder who can accept or reject it. Rejection means that both parties get zero income. According to conventional selfish materially maximizing-type economic theory, any positive offer should be accepted by the responder as this increases her/his material wealth. Typically, the average and median results contravene such a prediction. Offers are rejected unless the offer approaches 40 percent of the proposer's economic pie. Some responders, however, do behave neoclassically. Responders, on average, are willing to sacrifice expected increases in income to punish perceived unfair behavior on the part of proposers. Responders are not material maximizers of the type predicted by conventional economic theory. Outcomes are affected by the extent of anonymity of the experiment and by whether responders believe that the proposer's pie is obtained fairly.

The dictator game results are even more telling. In this type of experiment, a rejection of the proposer's offer does not translate into the proposer getting nothing. Rejection only means that the responder loses out. In the dictator game, one would expect, based on conventional economic theory, that the proposer should make offers equal to or approaching zero. Contrary to this type of analytical prediction, 'dictators' make offers that on average or at the median approach 10 to 40 percent of the economic pie. This does not mean that there are not those dictators who behave as conventional neoclassical theory predicts. On average, however, dictators are not behaving in a materially self-sacrificing manner. Rather, they are behaving altruistically. Outcomes are affected by the extent of anonymity in the experiment and by the extent to which the dictator is sympathetic to the responder. Economic theory needs to incorporate the fact that utility is affected by how an individual perceives her or his choices impact upon others in the context of how the individual feels about the other—in other words, what is the extent of moral sentiment of one individual to the another and under what circumstances does an individual have more or less sympathy for others. Of course, the notion of moral sentiments is central to the overarching contributions of Adam Smith.

As a footnote to this discussion, the narrative on the socio-economics of altruistic behavior is been influenced by and has influenced the literature on reciprocal altruism. The basic premise of the latter is that individuals behave in what appears to be an altruistic fashion when there is the expectation that this act of altruism will be reciprocated some time in the future. Thus reciprocal altruism involves some risk that reciprocity will not be forthcoming. Such reciprocity need not be directed to the particular agent executing an altruistic choice. It might be directed to members of her/his family or community. Defectors might exist, but they need not destroy the system of reciprocity if there is an adequate percentage of reciprocators in the relevant population. However, unless norms of reciprocity dominate, there is an incentive for defectors or free riders to become dominant and for a Prisoner's Dilemma situation to arise causing the breakdown of altruism as a dominant social behavioral trait. Reciprocal altruism becomes dominant when defectors from the altruistic norm can be easily identified and punished, analogous to tit for tat game

theoretic strategies. The expectation that free riding does not pay, helps enforce altruistic behavior and norms. Here we have a form of altruistic punishment. This can take the form of an individual willing to incur punishment costs against defectors that exceeds any expected return (Fehr and Gächter 2002). Overall, altruistic punishment becomes more difficult (for example, in terms of transaction costs) as the size of the community of potential and active altruists increases. Reciprocal altruism is not 'pure' altruism since the individual is expecting to get something in return. In this scenario, altruism breaks down if it is evident that reciprocity will not take place.

Ethics and altruism can easily be introduced into conventional theory, but requires an appreciation of how ethical behavior and altruism can be linked to conventional assumptions pertaining to relative prices and income dominating the determination of choice behavior. It is also of importance to distinguish between ethics and altruism from the perspective of the individual outside of the firm and that of firm decision makers. Finally, it requires re-thinking the normative dimension of the conventional wisdom which remains dominated by the view that narrowly selfish behavior is optimally rational yielding economic efficiency. This perspective is also adhered to by many contemporary behavioral economists for whom selfish behavior serves as the benchmark for rationality.

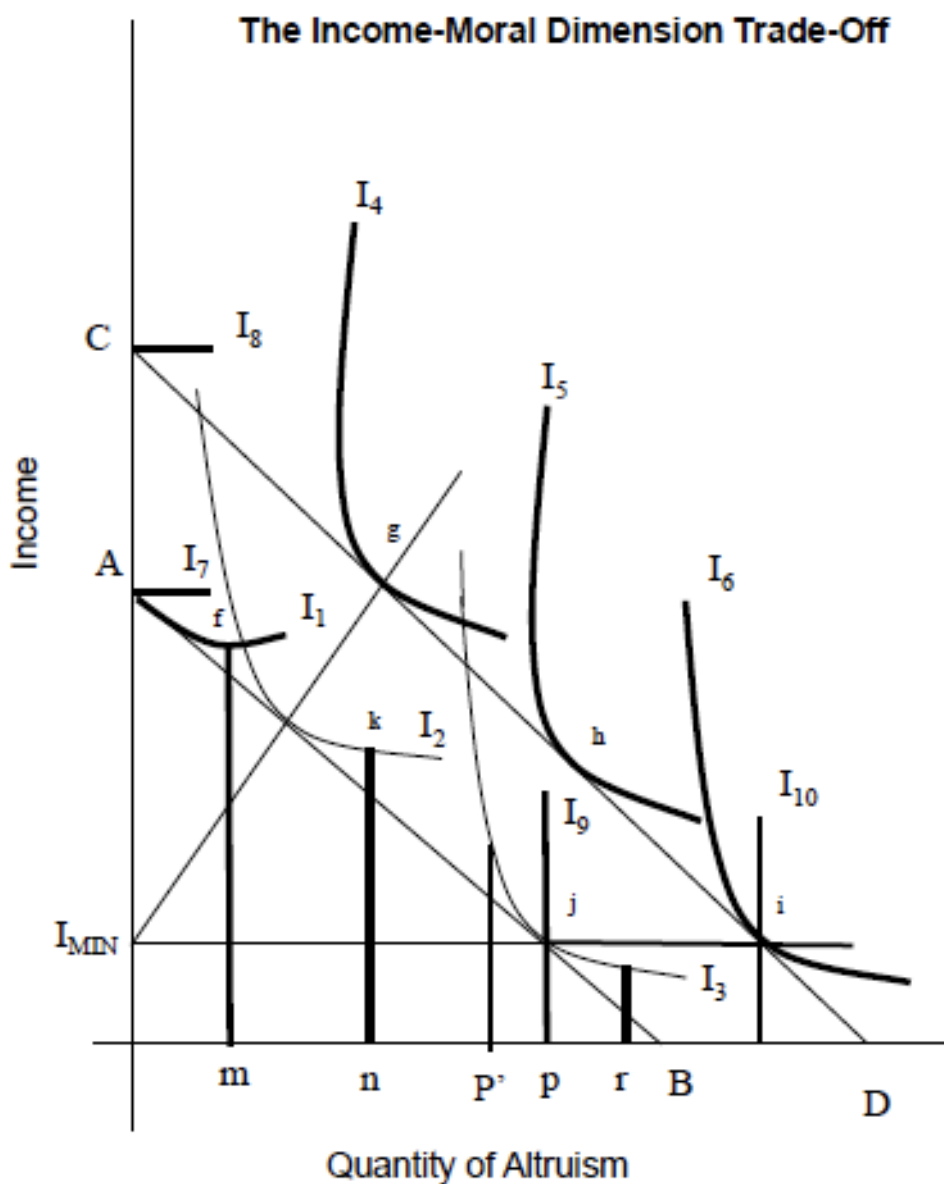
With regards to individual choices that are not specifically firm-related, a very basic revision to economic theory is derived from and extends Becker's (1996) notion of utility maximization that incorporates non-material variables (Altman 2005, 2006). This perspective can also be easily situated in the behavioral narrative of satisficing.

First, it must be noted that non-materially maximizing behavior outside of the firm need not pass the survival test of the market. This is not the case with choices made inside the firm. More specifically, if firm decision makers make choices that are fair or altruistic and these cause firm costs to increase (a typical prediction of conventional economics), these decisions cannot persist in the long run. They fail the survival test. But outside of the firm, non-material maximizing individuals face no such test. Fair and even purely altruistic individuals can survive in both the short and the long run even within the context of a highly competitive market economy. Reducing one's material welfare voluntarily does not make one subject to predatory behavior and extinction.

Reciprocal altruism can be explained in terms of individuals investing in their future, albeit future returns are uncertain in terms of time, quantity and quality. This comes at some cost in the present. Returns need not only be material. And altruistic behavior is affected by the cost imposed by others on cheating or free riding behavior. One would expect that reciprocal altruism would increase as net returns increase, *ceteris paribus*. Such non-maximizing behavior makes eminent good sense from a more realistic behavioral perspective. Pure altruism based on the warm glow effect, for example, can also be explained once one appreciates that wellbeing or utility is not simply materially generated. But a core assumption of conventional thinking still remains intact here—that choices are influenced by income and relative price. But in a revised model the quantity of altruistic or fair choices supplied is also a function of non-economic factors such as an individual's social networks, family, education, affinity to particular causes or organizations, feelings of moral sentiment and warm glow. This yields individuals' indifference curves, which can

vary across individuals. The modeled equilibrium core supply of altruistic acts is given by the position and slope of the price-income line relative to the indifference curve. Identical individuals in terms of their altruistic or fairness-related indifference curve can be expected to supply different amounts of altruism given different incomes and relative prices. And, different individuals might supply the same amount of altruism given different relative prices and income. A rich person might appear to be more altruistic than a poor one as revealed by the supply of altruism whereas the latter might simply be a reflection of income, not of different preferences (Altman 2005, 2006).

Diagram Seven



Some these points are illustrated in Diagram Seven where indifference curves are constructed with respect to income and the quantity of altruism (which can also be read as moral acts or fairness). This analysis can be broadened to incorporate volunteer work as a form of charitable giving where one sacrifices other non-market activities, inclusive of leisure, and possible income generating opportunities. Along each price level, AB and CD, we have different indifference curves to reflect individuals' core preference for altruism. The textbook neoclassical individual is given by indifference curves I_7 and I_8 , where the individuals prefer to supply zero altruism at any income level and at any relative price. Only increases in income generate more utility. I_{MIN} is the minimum amount of income required by the individual for basic needs. Thus I_9 and I_{10} are indifference curves for extreme altruists—all income is given away except what is essential. Both types of individuals can survive in society inclusive of a competitive market economy. Minimum income can be read as physiological basic needs or ones that are sociologically and psychologically determined. If the latter increases then extreme altruists can be expected to supply less altruism. There are the in between individuals whose preferences are characterized by indifference curves I_1 , I_2 , I_3 , I_4 , I_5 , and I_6 . Such individuals' supply of altruism is affected by relative cost or price in the expected manner, given income. As costs increase, a unit of altruism requires larger sacrifices in income, one would expect the supply of altruism to fall. Thus, when altruism is cheap, one would expect such altruism to be in big supply. As income increases (from AB to CD for example), ceteris paribus, the supply of altruism increases. The extent of increase is a function of whether altruism is a normal or superior good and this depends on individual preferences as well as the basic needs of individuals. One would expect that reducing the cost of altruism to the supplier and increasing income generate more altruism. Economic variables cannot affect core altruism, but can have substantial effects on supply nevertheless, given the predetermined sociologically and psychologically core. None of the intermediate or extreme altruistic-related preference types have any apparent survivalist advantage over another. And, all types do exist in the real world simultaneously contributing to market phenomenon that standard theory has difficulty explaining or in explaining as rational events.

The above behavioralist model contributes to an explanation of the survival and even prosperity of ethical firms, even when ethical behavior generates relatively higher costs than the unethical choices made by competing firms. Ethical firms can charge higher prices to cover higher unit costs even in the competitive long run if there are individuals willing to pay these higher prices (they are thereby making material self-sacrifices) because in so doing they are increasing their utility. An ethical cup of coffee is not the same thing as a regular cup. It has an additional characteristic that yields a higher level of utility for particular individuals. Ethical consumers provide a market for higher priced ethical firms. Given the above model, one would expect this market to increase with income given the prevailing set of preferences for altruism. Of course, if ethical firms produce at the same unit cost as unethical firms, then even more ethical products would be sold and ethical firms could dominate the market place.

This speaks to a related issue that can be addressed by a behavioral-type model of the firm discussed above. To the extent that ethical behavior in the firm generates cost

offsets in terms of higher productivity (higher levels of x-efficiency), ethical firms need not produce at higher unit costs than unethical firms. In this case, one can be ethical without having to be altruistic—without having to make material self-sacrifices as consumers to do what one perceives to be the right thing. Also, from this modeling perspective ethical behavior can be productivity enhancing, unlike in the conventional wisdom. Finally, if altruistic consumers sustain the higher priced ethical products and other ethical products come at no premium, ethical stock portfolios can be expected to yield the same long run rate of return as unethical portfolios. Thus ethical investment need not require altruistic behavior on the part of investors.

From a broader utility maximizing or satisficing framework, being altruistic, fair or ethical cannot be deemed irrational. Individuals are not simply narrowly selfish material maximizing machines. Other factors are typically of considerable importance to the individual. That the ethical and altruistic individual is utility maximizing does not in any way imply that individuals are not affected by economic incentives. The ethical and altruistic individual can still be expected to reduce consumption of a product when price falls. One would also expect the supply of altruism, ethical behavior, and fairness to be affected by economic incentives; but not only by economic incentives. Being narrowly selfish and material maximizing is not a necessary condition for economic incentives to be of analytical importance or for individuals to be intelligent. Normatively, one cannot make the case, as would many educated in the conventional wisdom that narrowly materially selfish behavior is optimal and the only smart and rational way of behaving. Moreover, such behavior is also no guarantee for economic efficiency since reciprocal altruism, altruistic punishment, trust (related to altruistic punishment) and ethical behavior can contribute to higher levels of x-efficiency, higher utility work systems and to new products and product types yielding higher levels of utility. This perspective is quite consistent with Adam Smith's focus upon the importance moral sentiments to successful market economies and Hayek's on individualism and freedom of choice, as well as with a core hypothesis of ecological rationality that individual free choice (which can be altruistic, fair and ethical), absent market failure, is rational and yields the highest possible levels of socio-economic welfare.

Biases and Cognitive Illusions

The most pre-eminent contemporary incarnation of behavioral economics/economic psychology, which has attracted most scholarly and public attention and scrutiny, relates to the contributions of Kahneman and Tversky (1979, 2002; Kahneman 2003) and associates and related research. Largely through laboratory experiments, this particular stream of behavioral economics finds that individuals' behavior is inconsistent with neoclassical norms and is therefore irrational. Neoclassical behavioral norms are assumed to be a plausible benchmark for achievable rational behavior. Thus the neoclassical normative framework is retained in contrast to the approach of for example, Simon, Smith and Gigerenzer. The use of sub-optimal heuristics which generate biased choices or decisions are said to be a product of the cognitive wiring of the human brain and the fact the decision making takes place in the context of uncertainty. Such 'biased' or 'deviant' human behavior is also thought to generate sub-optimal economic outcomes from the prevue of

conventional economic reasoning. This research is focused largely on consumer choice and financial markets.

Kahneman and Tversky offer Prospect Theory (PT) as an alternative to Subjective Expected Utility (SEU) to describe decision-making under risk and uncertainty, where SEU theory remains the norm for rational behavior. Thus Prospect Theory does not replace SEU theory as a normative theory. Rather it is an explanatory device that is said to provide a much better description of biases in human behavior, where biases are a function of the type of heuristics used in decision making, given the uncertainty and the cognitive limitations of the human brain. Prospect Theory is the foundation for a variety of descriptive propositions pertaining to so-called persistent biased decision-making under risk and uncertainty. The underlying empirics of Prospect Theory have been well documented. However, the assumption of Kahneman and Tversky and those following their research program, that the non-conventional behavior mapped out by Prospect Theory is biased has been challenged by some, most pre-eminently by Gigerenzer and Smith. Needless to say the Kahneman and Tversky worldview (biases and cognitive illusions) is now the conventional wisdom amongst many behavior economists and conventional economists perceive this iteration of behavioral economists to be the essence of this field. It is interesting to note that Kahneman and Tversky's 1979 paper on Prospect Theory is the second most cited paper in the prestigious economics journal, *Econometrica*.

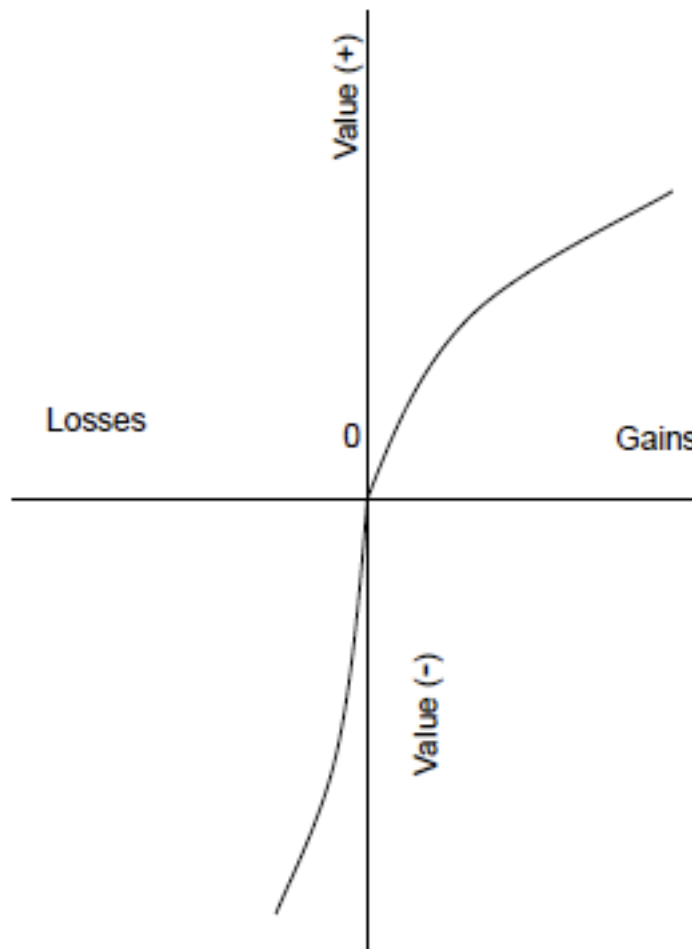
Some key distinctions between SEU and PT theory is that the former treats gains and losses as equal with regards to utility and assumes that individuals estimate their utility in terms of states of wealth (additive utility functions), which is subject to diminishing returns. In PT theory losses are weighted more than gains, thus adding a \$1 lost and a \$1 gained yields a negative value or utility whereas in SEU theory one would get a value of 0. Related to this, gains and losses are evaluated in terms of separate mental accounts. Also, in PT theory, individuals assess gains and losses from a reference point. Reference points serve to frame the decision parameters. Thus gains and losses are evaluated both separately and relatively as opposed to simultaneously and in terms of absolute values or final states of wealth in SEU theory. Also in PT the probability weights of SEU theory attached to prospects are replaced by decision weights that filter and thus re-calibrate the probabilities of SEU theory. Low probability events are given a zero weight. Moreover, individuals under weigh outcomes or prospects that are probable relative to certain prospects. Overall, in SEU theory rational agents should choose prospects that maximize expected utility as opposed to expected value. This increases utility over that achieved by the individual's initial state of wealth. This prediction does not match typical choice behavior, giving rise to the Prospect Theory.

Some of the key characteristics of Prospect Theory are illustrated in Diagram Eight. As compared to SEU theory, we have a value function and this is characterized by both positive and negative domains and is drawn to reflect changes in states of wealth from some exogenously given reference point as opposed to the origin being an individual's original state of wealth. The value function is concave in the positive domain (as it is in SEU theory) and convex in the negative domain, yielding an S-shaped value function. Thus, the value function retains the SEU theory assumption of diminishing returns to wealth and risk adversity at least in the positive domain. But individuals are assumed to be

risk seeking with respect to losses (loss aversion). The slopes of the two components of the value function are also drawn to reflect the assumption that the disutility from losing some value is always greater than the utility from gaining an identical value. This is to illustrate that a monetary gain exceeding a monetary loss might still yield a net loss in utility leading an individual to reject such a prospect where it would not be rejected in SEU theory.

Diagram Eight

Kahneman-Tversky Value Function



In PT Individuals might reject prospects of net positive material worth because of the emotional pain suffered from a prospective loss. Individuals therefore do not behave as

simple wealth maximizers. This rather accurate prediction of average behavior across individuals flies in the face of the analytical predictions of SEU theory and is thought to be one of Prospect Theory's key contributions. Although the Kahneman and Tversky worldview (and that of conventional wisdom) suggests that this is irrational, it may not at all be, given that the individual is still trying to maximize utility (or satisfice). But in the real world more money is not everything, given a probability of loss, especially in a world of Knightian uncertainty. Closely related to this reality-based assumption of PT theory, one has the certainty effect where a certain outcome (particular state of wealth) is preferred over a gamble (uncertain outcome) with an equal or greater expected monetary value. For example, if the sure thing is \$700 (option one) and the expected value of the gamble is $0.90 * \$1,000 + 0.10 * \0 or \$900 (option two), the risk adverse individual chooses the sure thing even though it yields a lower expected monetary value. The utility of the sure thing (no gamble) exceeds the utility of the uncertain but higher expected monetary value. To accept a gamble requires an even higher return to offset the disutility of engaging in the risky prospect. Also, if one reduces the probability of gain equally across both prospects, the choices shifts from option one to option two. Moving marginally from certainty to uncertainty has a big effect given the high level of utility that individuals have for certainty. In contrast, risk-seeking behavior refers to a situation where a certain outcome is rejected in favor of a gamble yielding an equal or lower monetary expected value. Thus if there is choice between a sure loss of \$700 or a gamble of $0.90 * (-\$1,000) + 0.10 * \0 , or, negative \$900, the individual might choose the latter option since there is a possibility that the result will be no losses. Once again this behavior is considered to be irrational, but it need not be from the perspective of the utility maximizing or satisficing individual.

Kahneman and Tversky also argue that a preference for certainty allows individuals to be manipulated by frames (framing effects), creating the illusion of certainty thereby generating choices that cannot be justified on grounds of SEU rationality. But Smith (1985, pp. 268-269) argues that although individuals can be fooled given our brain construction, imperfect information, and uncertainty, one would expect (and experimental evidence suggests this to be the case) individuals to learn (adaptive expectations) what is and is not a cognitive illusion produced by a particular frame. Thereafter individuals make choices based on their preferences that may include SEU rational preferences for certain events. But framing generates real effects, an understanding of which needs to be incorporated into economic analysis. As well, it is of importance to understand how individuals work through cognitive illusions sometimes caused by frames.

It is also important to appreciate that individuals make use of frames in their decision making process for far from irrational reasons (which is not incorporated into the conventional wisdom). Albeit for this very reason, they can make choices that they will later regret and then revise. This can be a product of framing an event as certain or in relatively positive terms. Kahneman and Tversky find that when events are framed positively individuals tend to choose this prospect over the same events framed negatively. This should not happen when the different frames have no substantive effect on events. Individuals are subject to a perceptual or cognitive illusion. One should note that it is not clear that differential framing will affect choice when prospects are substantively different. But the point made by Gigerenzer (2007, pp. 99-100) is that in a world of bounded rationality (the real world) rational individuals cannot be expected to use non-neoclassical

heuristics to make their choices. Frames can signal information about the event, which is important in a world of imperfect information and uncertainty. When an event is positively or negatively framed, individuals read between the lines, attempted to extract surplus information from the frames. A positive frame is read as suggesting that it is a better choice than the negatively framed event. This is a judgment call that might prove to be incorrect. But it is a rational choice in a world of bounded rationality and uncertainty.

Related to the notion of the certainty effect and Prospect Theory, Kahneman and Tversky introduce the notion of loss aversion and aversion to a sure loss. Since individuals are more sensitive to losses than to equivalent gains they are more likely to engage in risky behavior to avoid sure or highly probable losses. This causes individuals not to ignore sunk costs and to throw good money after bad (failed investments). Such behavior contravenes the conventional norm that rational agents will ignore sunk costs. Once again, this behavioral reality can easily be introduced into conventional theory. An important question remains as to when, from an individual point of view, in a world of bounded rationality, is it rational to take sunk costs into consideration given inferior options available to the individual.

A few other important examples, should be noted, of behavior deviating from the conventional norm uncovered in the Kahneman and Tversky related research program. From the perspective of this worldview the following behavior is irrational.

- Overconfidence and optimism: individuals over-estimate their decision-making capabilities. This results in individuals engaging in risky behavior in activities beyond the objective capacity of the individuals to succeed in.
- Herd behavior: Tendency of individuals to mimic the behavior of others. This can result in cascades of particular choices. Herd behavior occurs even when other individuals' behaviors are error-prone in the long run.
- Confirmation bias: Individuals overweight evidence that supports their views and underweight evidence that runs contrary without engaging in an objective assessment of the evidence.
- Anchoring: Individuals tend to anchor their choices to reference points that are not objectively relevant to the decision at hand. This relates to what is referred to as the recognition heuristic.

All these particular behaviors are not consistent with conventional norms. They might result in sub-optimal choices even from the perspective of the individual or society. All this must be factored into a reconstruction economic theory. But an important question raised by Gigerenzer is whether these and other heuristics are sensible in a world of bounded rationality. People might follow the crowd because they have no better information to go by. Individuals might use an anchor because this is the best reference point available. Investors might be ex post objectively overconfident (and thus not ignore sunk costs) because they cannot ex ante predict future outcomes. And this leads to risk taking which underpins dynamic capitalist economies. In a world of bounded rationality individuals have no choice but to use heuristics and to adjust them through learning by doing. Moreover, as Gigerenzer points out, using neoclassical tools to engage in choice behavior often yields sub-optimal results. Nevertheless, rational individuals can employ inappropriate heuristics

in the first instance. Evidence suggests that individuals, on average, learn from their mistakes, where the willingness to learn is a key component of scholars across disciplines define as rationality.

Biases and Cognitive Illusions and Behavioral Finance

Evidence that human choice behavior substantively deviates from neoclassical norms (whether or not one takes this as evidence of irrationality) has had a major impact on financial economics giving rise to the field of behavioral finance.¹⁰ The basic assumption of behavioral finance is that financial markets are inefficient in the short run, where short run events such as bubbles and crashes negatively impact human welfare. Behavioral economics provides empirically based reasons for non-neoclassical behavior, referred to by many behavioral economists as irrational because it deviates from neoclassical norms. An important component of behavioral finance is concerned with explaining how individual behavior can generate persistent short term inefficiencies on financial markets. This literature pays special attention to loss aversion, overconfidence, herding, confirmation bias, anchoring, and framing where overconfidence and herding are of particular significance (Schwartz 1998). Another line of research suggests that these heuristics are not individually irrational and human behavior changes to more efficiency consistent behavior through learning, more accurate frames and improved information (see, for example, Smith, Suchanek, and Williams, 1988). Yet another line of research emphasizes how certain non-neoclassical heuristics yield higher returns than would benchmark neoclassical heuristics (Gigerenzer 2007).

Conventional wisdom assumes that although some individuals might behave irrationally, on average, the crowd yields efficiency on financial markets as rational agents will always bid prices up or down to their fundamental values. Behavioral finance implicitly assumes that enough individuals behave non-neoclassically to generate persistent financial market inefficiencies. The efficient market hypothesis is central to conventional financial economics. It is assumed that the prices of traded assets such as bonds and stocks incorporate all known and relevant information and therefore asset prices reflect the intrinsic or fundamental value of the economic assets which bonds and stocks are representations of on the market. This perspective was pioneered by Fama (1970; see also Malkiel 1996). Behavioral economics has empirically challenged the hypothesis that markets are efficient in the short run (Shiller 2001). Share prices can deviate substantively from the true value of the assets which they represent, the consequence of which are bubbles. Only when bubbles burst and stock markets are given time to recover, are asset prices in line with share prices. To correct for these inefficiencies, in it is sometimes argued that agents need to be behave more in line with neoclassical heuristics. But if this is not possible given the nature of the human brain and environmental constraints, changing human behavior is not a realistic option if one wishes to reduce the volatility of financial asset prices and thus reduce the extent of bubbles and crashes. This perspective in behavioral economics suggests improving the environment in which choices are made so

¹⁰ An important forerunner of modern behavioral finance is Keynes (1936). See Walsh (2007) for detailed discussion of behavioral finance, financial economics and the positioning of Keynes in this literature.

that choices are more in line with market fundamentals. Also, of importance would be varying forms of government interventions to affect the stock market investment to help curtail herding, for example.¹¹ Behavioral finance opens the door to an understanding of why and how financial markets are not short run inefficient. Individual irrationality is not a necessary assumption here, albeit it remains the dominant one amongst behavioral finance scholars. What is critical is that the heuristics individuals adopt on average yield social outcomes that differ markedly from what is predicted by the conventional wisdom.

Conventional economics also suggests that agents behave as if they apply complex neoclassical heuristics to select an investment portfolio which optimizes the returns on ones investment and thus engage in an exercise of optimal asset allocation. Conventional economics also suggests that this is how rational individuals should behave. What is of considerable interest to this narrative is the striking finding that the simple heuristic of the 1/N rule—allocate ones funds equally across each of N funds—outperforms complex heuristics, such as Harry Markowitz’s Nobel Prize winning formulation. Moreover, Markowitz applies the 1/N rule as his own investment heuristic as opposed to uses his award winning heuristic (Gigerenzer 2007, 26-30). Complex heuristics perform better only ex post, when one already knows what the market returns are. Simple heuristics perform best when uncertainty and imperfect and asymmetric information dominate the decision making process. This is an example of how non-neoclassical heuristics can be more sensible from a long run rate of return perspective. This, however, does not imply that the 1/N rule, or other such fast and frugal heuristic, is a normative one. Thus individuals who are well informed about firms, such as would be the case with Warren Buffet and John Maynard Keynes, would use more complex heuristics to earn relatively high rates of return. Once again these heuristics are not of supra-calculating neoclassical type (Walsh 2007).

Hyperbolic Discounting, Inconsistent Preferences and Preference Reversal

Hyperbolic discounting refers to an individual having a higher rate of discount on income in the present (present bias) and earlier periods of ones earning life-cycle than towards the end. There is conflict between present and future selves. The new behavioral economics assumes that this type of time inconsistency and preference reversal is quite typical and is evidence of irrationality—one has preference reversal (see for example, Ainslie 1991; Laibson 1997; Lowenstein and Thaler 1989). Moreover, this results in very real life-time saving dilemmas in that the present self behaves in a manner inconsistent with the objectives of the future self who prefers to save more for retirement (low rate of time discount), but too late along the individual’s earning life-cycle continuum. Life time savings objectives, given by the future self are not met leading to regret and inadequate pensions at the end of one’s earning life-cycle. It is argued that in the conventional model rates of time discount are consistent over time—there is no present bias—and related to this, the rational individual’s revealed preferences for income and savings yield aggregate savings levels that are consistent this individual’s preferred preferences. With hyperbolic

¹¹ Those who argue that bubbles are a product of attracting investment funds, and thus serve a positive role in dynamic market economies, argue for government intervention to prevent financial market cycles from damaging the economy (Gross 2007).

preferences, it is argued, outside parties need to intervene to assist irrational individuals to reconcile present and future selves with regards to savings decisions.

But although individuals earlier on in their earning life-cycle prefer to save less than when they are older, this is not necessarily evidence for inconsistent preferences. An individual changes over her/his lifetime both with regards to learning and circumstance. The inexperienced income constrained younger individual is not the same as the wiser possibly less constrained individual who is approaching the end of her/his earning life-cycle. Historical time impacts on the individual. The present self is not the same as the future self. Thus one has heterogeneous preferences across two distinct selves. In this case, when one introduces historical time into the analysis, there exist different and conflicting preferences between two different selves.¹² This is not the same as preference inconsistency. And both selves are rational. But if the future self prefers a reasonable pension, one that could have been obtained had the present and intermediate selves saved sufficiently, whether government intervenes becomes a matter of political economy and socio-economic justice. In a democracy, government might be obliged to provide base line pensions, by taxing the younger and intermediate selves, to maintain basic levels of wellbeing for all of its citizens, even for those whose earlier selves did not save sufficiently, where income constraints could have played a role in limiting pension related saving. The rationale for government intervention in the provision of pension need not rely on preference inconsistency and irrationality. However, conventional theory pays little heed to the possibility of either preference inconsistency or different and conflicting preferences over historical time and the implication of this for economic analysis.

Another classic case for potential preference reversal and thus irrational behavior (using neoclassical benchmarks) is provided in the endowment effect literature (see for example, Kahneman, Knetsch, and Thaler, 1990; Knetsch 1989). This represents a type of reference dependence and status quo bias wherein individual value an identical good differently with insignificant changes in frames. For example, an individual would offer a certain amount of money for a mug, but demand a larger sum to give up the same mug. It is argued that only reference points or frames have changed. The individual regards the giving up of the mug (even for a price) as a loss whereas the acquisition of the mug is regarded as a gain. In terms of Prospect Theory, equivalent losses are weighted more than equivalent gains; hence such results that are inconsistent with conventional theory.

But an alternative explanation for such apparently aberrant behavior, consistent with rationality, can be located outside the domain of the conventional wisdom. Just as selves change over historical time, as they acquire different experiences and capabilities, commodities attain different attributes or characteristics after they are acquired. This point

¹² An important insight into the development of different selves is provided by Sebastain Faulks (1999, 471) in the novel *Charlotte Gray*: "...there was no such a thing as a coherent human personality. When you are forty you have no cell in your body that you had at eighteen. It was the same...with your character. Memory is the only thing that binds you to earlier selves; for the rest, you become an entirely different every decade or so, sloughing off the old persona, renewing and moving on. You are not who you were...nor who you will be."

is made by Becker (1996, 128) in his discussion of the endowment effect. In both instances historical time impacts preferences. The product one is willing to purchase is not the same thing as the one that one has already purchased and possessed. Individuals who change their valuation for a particular good as a consequence of a change in frame is therefore not flipping preferences and behaving inconsistently or irrationally. Even valuing a good differently as a consequence of loss aversion is not irrational since intelligent people can place a greater weight on losses than on equivalent gains. But loss aversion is not necessary to explain what appears to be preference reversal. Valuations might be changing as a commodity takes on different attributes. Conventional wisdom could incorporate this narrative into its core of choice theory recognizing the impact that history tends to have on choice behavior.

Social and Personal Capital and Behavioral Economics

An important potential area of research in behavioral economics relates to the recent contributions of Gary Becker (1996) on preference formation. He maintains that the focus of behavioral economists on cognitive limitations and ‘irrationality’ although of some importance misses the bigger picture. Becker (1996, 22) argues that both behavioral and conventional economists as well as economic psychologists assume that individual’s preferences do not depend on past experiences and social interactions, when in fact they do and that “childhood and other experiences, and the attitudes and behavior of others [as well as culture and habits], frequently place more far-reaching constraints on choices than do mistakes and distortions in cognitive perceptions.” This is the case even if individual choice behavior is perfectly neoclassically rational, which Becker (1996, 23) defines as forward-looking, maximizing, and consistent.

In Becker’s revised model, preferences and constraints no longer have independent influences on behavior since past experience and social variables are additional constraints that operate through preferences. And, unlike in the conventional model, preferences are not formed independent of other individuals. This point has been elaborated upon by Leibenstein (1950) and more recently by Frank (1999). Becker (1996, 4) introduces the concept of personal capital that “includes the relevant past consumption and other personal experiences that affect current and future utilities,” and social capital that “incorporates the influence of past actions by peers and others in an individual’s social network and control system.” Personal and social capital are part of the individual’s human capital stock and affect the preference functions of individuals. What appears irrational from the prism of the conventional wisdom is quite rational from Becker’s modeling perspective. Moreover, one cannot understand current choice behavior without understanding an individual’s past experiences and past and current social circumstances. In contrast to traditional behavioral economics, Becker makes the case that assumptions matter and conventional assumptions, in this instance, are seriously wanting. Conventional micro theory needs to be revised accordingly since the alternative set of assumptions provides better explanations for a variety of events.

Becker makes the case that a richer (better assumptions) theory of preference formation can better explain and even predict a variety of events that include:

- Types of addictive behavior that are rational based on past choices and circumstances and current social realities.
- Rational preferences and choices for which one has regret. Preferences are in part formed based on past circumstances over which one has little control. Preferences can change, but this requires significant investment (costs), including emotional, that may not outweigh anticipated benefits.
- Endowment effect type results wherein individual preferences are affected by new attributes that commodities acquire over historical time.

In addition to the above, the reality that preferences are affected by others should impact on ones modeling of demand—a point made by Leibenstein and Frank. When demand is influenced by the demand of ones peers, for example, the individual demand curve might be below or above where the demand curve might otherwise be. The demand curve for goods that improve one’s relative positioning in society or amongst peers would be above the standard demand curve and would be less price elastic. Also if commodities have non-material attributes attached them, such as ethical production, the demand curve for such a product would be above the standard demand curve and would be less price elastic. Demand analysis in terms of analytical prediction and causality can be significantly affected by introducing personal and social capital into ones analysis.

Capabilities and Preference Formation and Realization

Another perspective in economics which questions a core set of assumptions in the conventional wisdom, in this case with regards to the formation and actualization of preferences, is the capabilities approach pioneered by Amartya Sen and Martha Nussbaum. One important dimension of this approach is the re-assessment of the proposition that the revealed preferences of individuals represent their preferred preferences. In some ways the capabilities approach overlaps with research focusing on the importance of institutional variables, inclusive of power, gender and power relationships, in the determination of preferences and, more generally, economic outcomes (Altman and Lamontagne 2004; Nussbaum 1999, 2000; Sen 1985, 1990, 1999, 2000). A core argument here is that the conventional assumption that revealed preferences always or almost always reveal individuals’ preferred preferences is incorrect (see also Altman 2005c, 2006b; George 2001; Kuran 1995).¹³ Revealed preferences are therefore often not good welfare indicators. For revealed preferences to reflect individual welfare individuals must possess the capabilities that allow them to construct and realize their preferences as they define them.

This approach is consistent with the assumption of rational choice and methodological individualism. Rational individuals deprived of adequate capabilities cannot engage in welfare maximizing choices. Also, rational individual can make choices

¹³ George (2001) presents an interesting modeling framework wherein rational individuals make choices (revealed preferences) that are not their preferred ones. George argues that individuals’ revealed preferences, their first-order preferences, often dominate their preferred second-order preferences, even when the former are not the individuals preferred preferences. George argues that markets can generate impediment to individuals’ capacity to realize their preferred preferences.

that they regret and which are sub-optimal for reasons of capabilities deprivation; this as opposed to inherited personal and social capital attributes as in Becker. For example, women in oppressive environments may prefer to have three life children as opposed to their revealed preference for six. If women are endowed with the capabilities of having effective voice with regards to the preferred number of live children and are thus provided with more effective bargaining power with their partner, there is a better chance that their revealed preference will be their preferred preference. Thus, institutional constraints can prevent individuals from realizing their preferred preferences. Such constraints (which can for example affect bargaining power, access to information, and education) also impacts on preference formation. Preferred preferences can only be constructed under specific circumstances.

Related to the realization of preferred preferences, freedom of choice can only take place under particular conditions. Thus Nussbaum (1999, p. 49) argues for the importance of developing the appropriate institutional setting, encompassing the necessary capabilities, wherein free choice can both exist and be sustained: “Government is not directed to push citizens into acting in certain valued ways; instead, it is directed to make sure that all human beings have the necessary resources and conditions for acting in those ways. By making opportunities available, government enhances, and does not remove, choice.” Changing capabilities sets allows for individuals moving towards their preferred preferences and making choices predicated upon the latter. The objective here is not for the state to manipulate preferences or choices. It is assumed that individuals are capable of engaging in rational preference formation and choices.

Labor Supply Theory and Behavioral Economics

An interesting example of how behavioral economics can impact of economic theory relates to the theory of labor supply where the conventional wisdom assumes that the supply of labor is determined by a preference function for income relative to non-labor time (‘leisure’) and the relative price of the latter. Price is given by the opportunity cost of consuming non-labor time, the proxy for which is the wage rate. The substitution effect always yields a positive relationship between price and labor supply while the income effect yields a negative relationship since it assumed that ‘leisure’ is a normal good. It is assumed that the substitution effect dominates the income effect, up to a point, yielding a positively sloped labor supply curve. Eventually the income effect dominates yielding a backward bend to the labor supply curve. However, this theory has difficulty in explaining why, when, and up to what point, the substitution effect should dominate. Nor can this theory explain why one should assume that individuals should withdraw labor supply as wages fall.

Evidence suggests that individuals are heavily motivated by target income and the latter changes over historical time for sociological and evolutionary reasons. Typically target income increases over time. If an individual has a target income that can only be achieved at the current wage, *ceteris paribus*, the individual’s labor supply would increase as wages drop so as to maintain the target income (which in many economies is not far removed from the physiological minimum). A drop in wages would certainly not reduce labor supply, as predicted by the conventional wisdom. If the target income increases, as it

has over historical time, this shifts the labor supply curve outward. In this case, labor supply increases given the prevailing real wage. Increasing wages serve to reduce labor supply from what it would otherwise be if the increased wages allows for target income to be realized with fewer hours worked. There is no expected decrease in labor supply if individuals cannot realize target income even with higher wage along the old labor supply curve or when target income increases, shifting outward the labor supply curve. Labor supply is a function the number of hours required to achieve the target income. A fall in labor supply occurs if target income can be earned with fewer hours. This has been the case in developed economies where hours worked per week have diminished dramatically over the past 100 years. Higher wages cannot be expected to reduce hours worked per week if such wages yield an income that remains below the target income. Individuals with low target incomes will not enter the labor market, irrespective the wage if this low target is covered by outside parties such as the state.

On the margin one can expect labor supply to be affect by substitution and income effects. But given the importance of target income to individuals' preference function, the relationship between target income and wages can be expected to be key determinants of labor supply. And, this relationship can yield robust predictions and causal insights relative to what can be gleaned from the conventional model which is not informed by more nuanced behavioral consideration (Altman 2001). The type of individual and aggregate labor curves generated by this type of behavioral modeling depends on the relationship between wages and target income, changes in target income over time, and the marginal income and substitution effects. One can still end up with an aggregate labor supply curve that is positively sloped. But micro-foundations and its causal underpinnings would be more complex and salient than what underlies the conventional model (Altman 2001).

Defaults, Soft and Benevolent Paternalism, and Institutional Design

Conventional theory provides a rich narrative, relating to externalities, pertaining to when government might intervene in the economy. This is apart from the discourse most recently led by Douglass North (1971, 1990, 1994; Schmid 2004) and the New Institutional Economics as to the importance of governments setting the rules of the game which affects the course of micro and macro economic behaviors.¹⁴ In terms of the new behavioral economics there is another type of literature emerging, based on the notion of human irrationality and bounded rationality, which argues for government intervention in the economy. An important sub-set of this literature is referred to as soft or asymmetric paternalism. Here a case is made for altering preferences so that they better match what would be considered welfare maximizing from a neoclassical perspective. Another, literature is emerging which argues for interventions that facilitates individuals realizing and actualizing their preferred preferences irrespective of whether or not these match neoclassical predictions. Some aspects of soft paternalism overlap with the latter, which is more geared to improving information and capabilities (see for example, Camerer,

¹⁴ See Williamson (1975), on a related narrative on a theory of the firm built upon transaction cost analysis where the latter is a critical component of the New Institutional Economics.

Issacharoff, Loewenstein, O'Donoghue, and Rabin 2003; Loewenstein and Haisley 2008; Thaler and Sunstein 2008).

Hard paternalism would attempt to impose taxes or legislate bans or restrictions on choices that the expert deems irrational even when such choices have no negative externalities on other members of society. This assumes that non-neoclassical behaviors, which typify human agency, cannot be consistent with the individual's effort to maximize her/his own utility. Hard paternalism further assumes that the expert can determine what is in the best interest of the individual even where each individual can differ markedly in preferences with regards to similar choice sets. The expert intervenes to regulate choice because it is assumed that the expert knows better than the individual what is 'objectively' in her or his best interest. If, however, it is the case that non-neoclassical behavior is optimal or that boundedly rational behaviors can be consistent with utility maximization, then the foundational arguments of hard paternalism are substantively weakened even on its own terms.

Somewhat related to hard paternalism is soft paternalism wherein it is argued that the state should intervene to gently encourage or nudge individuals to behave more rationally, albeit it is noted that such interventions negatively impact the welfare of those who behave rationally. This literature however has a distinct similarity with arguments related to asymmetric and imperfect information. One argument here is that individuals make irrational choices because of imperfect or misleading information. Thus, companies and suppliers (including physicians) should be mandated to disclose adequate information pertaining to the products and services supplied. But this has nothing to do with irrational behavior. If boundedly rational individuals have improved information about products, for example, using their non-neoclassical heuristics they will make different and welfare improving choices. If one wishes to purchase fair trade coffee, this can only be done if proper labeling is available. One cannot manage the riskiness of one's stock portfolio without appropriate information. One can make disastrous mortgage decisions without appropriate information about expected future payments. More and higher quality information results in more informed choices.

The suggestion that government should intervene to improve information flow can easily be integrated into conventional theory as can the fact that non-neoclassical heuristics are required to maximize utility in many instances. The same can be said of the suggestion of mandating time lags for the purchase of certain products so as to provide individuals with the time to rationally deliberate over their prospective purchases. But this suggestion is much more controversial and costly to implement and monitor. Some might also argue that non-coercively determined intuitive choices are welfare superior to ones subjected to legislated deferments (Frantz 2006; Kaufman 2006).

What has received much more press is the suggestion of mandating defaults with regards to particular choice sets. This is sometimes referred to as choice architecture. It is pointed out that defaults are always present. It is then a matter of choosing between a set of available defaults. Given bounded rationality and the related transaction costs involved in decision-making, it is argued that many current defaults can result in individuals making choices that they do not prefer (or have no strong preference for). In the conventional

wisdom, defaults, like other frames, should not affect choice behavior. But when default frames make a difference, a public policy question develops as to whether the state or the market should be the prime determinant of default. This raises questions such as: Which set of defaults is most consistent with the preferred preferences of individuals? How does one determine optimal defaults when preferences are heterogeneous across individuals?

Two particular choice issues have received considerable attention. One relates to organ donations at death; the other to contributions to savings plans. Individuals, on average, will not donate their organs on death, if there is no default specifying organ donations. In other words, if one has to fill out and sign a form authorizing organ donations, most people will not donate. However, if the default is to donate, the vast majority will. It is argued that this suggests that individuals' preferred preference is to donate, but the transaction costs of so doing outweighs the benefits. Introducing a different default facilitates individuals realizing their true preferences. But such a default would contravene the preferred preference of others. Since one must have one default or another, it is argued that one should implement a default that matches the preferred preferences of the majority. A moral question arises as to what the majority rule should be. Also, how does one facilitate the realization of the preferences of the minority, especially if transaction costs are quite high and the capabilities of individuals to deal with these transaction costs are quite low? Moreover, as Gigerenzer (2007) points out, frames are treated as signals. And, one might argue that defaults are frames. A positive default sends out a signal that donating organs is the good and proper thing to do. This can affect preferences. It also signals that certain choice options are easily and readily available. This too can artificially affect choices. Thus defaults must be carefully chosen and constructed since they can influence preferences. It is important, if freedom of choice to be maintained, that individuals be provided by the state with the forms and information which will allow them to easily opt-out of a particular default arrangements. Otherwise the danger remains that individuals will not be realizing their preferred preferences, at least not in the short run.

It has been documented that if the default for a savings plan is to be enrolled automatically, the vast majority of employees enroll, and will therefore not choose to fill out the forms allowing them to opt-out. If the default is not to participate in a savings plan, the vast majority will not, and will therefore not choose to fill out the form to opt in. It is maintained that this suggests that the preferred preferences of the average individual is to participate in savings plans (Thaler and Sunstein 2003; Thaler and Benartzi 2004). Of course, this contravenes the argument underlying hyperbolic discounting. As with the organ default scenario, savings defaults signal that participating in a particular savings plan is the right thing to do (and in this case even a relatively safe, low risk option). It is therefore a moral imperative that if opting-in is the default option that the state ensure that employees aren't unwittingly opting into high-risk savings plans. It is also important that employees are provided with reasonable opting out mechanisms.

Another example of soft paternalism is to mandate how food is listed on menus or lined up in cafeterias. It is argued that the 'ordering' of items affects choice. If healthy foods are listed first, this increases the probability that they will be ordered first. This improves the health status of the individual without depriving her/him with the option of choosing unhealthy food. But this now requires the state intervening at the micro-micro

level so as to affect consumer choices, assuming that there is a representative consumer with a representative optimal choice set which can be identified by the expert. Heterogeneity amongst agents and imperfect and asymmetric information makes such intervention difficult and costly. A more libertarian economist might ask if such intervention is necessary. Do such interventions erode basic freedoms? Given bounded rationality, should the soft paternalism be limited to facilitating the realization of preferred preferences, which might include eating chocolates, potato chips, and pop? If individuals have strong preferences for particular goods and services, why should they not purchase them if they have the means to do so and information problems are corrected? Cannot the market take care of the sorting out the optimal placement of goods on the shelves?

Moving away from interventions designed with respect to bounded rationality, other types of interventions are suggested by the institutional economics, personal and social capital and capabilities literature. This follows from the behavioral argument that institutions matter for economic outcomes and that optimal institutions do not arise automatically like manna from heaven. Getting behavioral assumptions right from both a positive and normative perspective is not the be all and end all of behavioral economics. Institutional assumptions are of core significance, as important as one's psychological assumptions (Simon 1978).¹⁵ The question is which type of institutions will be designed and implemented and what will be their expected economic effects?

Unlike much of the traditional literature, default institutions need not be optimal and those constructed under authoritarian regimes typically advantage those with the most bargaining power. Indeed, North (1994, 360) argues that a critical flaw of conventional theory is an underlying assumption that, "...not only that institutions are designed to achieve efficient outcomes, but that they can be ignored in economic analysis because they play no independent role in economic performance." He finds that rational individuals with power, operating in non-democratic environments where there are no effective rules and laws relating to accountability and transparency, often behave in a rent-seeking as opposed to a productivity enhancing manner. Behavior is affected by the economic and social incentives molded by institutions.

Critical to the New Institutional Economics is government intervention to provide for appropriate private property rights to allow for sustainable economic development (North 1991, 1990, 1994). From the capabilities and related literature flows suggestions for integrating gender and, more broadly, human rights, to allow for the construction of preferred preferences and for their realization given income and relative price constraints. Labor rights are suggested as a means of balancing out the bargaining power between employees and employers. Anti-discrimination laws are recommended to facilitate the

¹⁵ Simon (1978, 499) writes: "The principal forerunner of a behavioral theory of the firm is the tradition usually called Institutionalism. It is not clear that all of the writings, European and American, usually lumped under this rubric have much in common, or that their authors would agree with each other's views. At best, they share a conviction that economic theory must be reformulated to take account of the social and legal structures amidst which market transactions are carried out. . . . The name of John R. Commons is prominent—perhaps the most prominent—among American Institutionalists."

equality of opportunity across gender, race, ethnic and religious lines. Consumer rights (which include anti-fraud legislation, content and labeling laws, warranty rules) are suggested as a means of correcting for information asymmetries. From the Beckerian-type social and personal capital literature might flow suggestions for interventions which will facilitate individuals overcoming the costs of transitioning from unpreferred to preferred preferences given that the former can be a function of inherited attributes over which one might have had little control, based on family, neighborhoods, and culture and even family household income during childhood. Related to this might be interventions that better equalize basic capabilities across individuals.

If one assumes that human behavior is always optimal or best or even second best irrespective of institutional design than different types of government or related exogenous interventions, barring externalities, can be viewed as unnecessary interventions. Behavioral economics (incorporating insights from institutional economics), broadly defined, suggests differently. An important issue is when should intervention take place and which type of intervention best serves to maximize human welfare. Especially given preference heterogeneity amongst agents, this is a big question. A large divide exists, however, in terms of potential policy recommendations between those behavioral economists who argue that a large array of preferences are irrational and thus require modification and those who argue that preferences are largely rational even if subsequent choices are inconsistent with neoclassical predictions. For the latter, what is of critical importance is the extent to which the objective circumstances exist that allows individuals to construct and realize their preferred preferences.

Conclusion

Critical to behavioral economics is constructing and testing economic theories built upon simplified yet relatively realistic modeling assumptions. This is in direct contrast to the conventional wisdom. The assumptions matters perspective is important for constructing models that generate robust analytical predictions as well as rigorous causal analyses and thus better explain socioeconomic outcomes. Of significance are not only the psychological assumptions made, but also the relevant institutional and sociological assumptions. This is the case since what impacts individual behavior and related economic outcomes are both psychological-physiological and environment variables. Thus, economic psychology, although important to behavioral economics, represents only one component of this approach to economic analysis.

Speaking to causality, of critical importance to behavioral economics is providing reasonable narratives for the best practice heuristics used to achieve optimal results given the preferences of individuals. This provides substance to the neoclassical black box of human agency in general and more specifically with respect to the firm and household behaviors. There tends to be no presumption underlying behavioral economics that there is one unique set of heuristics yielding any particular outcome such as maximizing productivity or the level of utility or satisfaction. One classic argument in behavioral economics is that alternative heuristics might best serve the realization of individuals' preferences. Such alternative heuristics would therefore be rational even when quite inconsistent with neoclassical behavioral norms. Moreover, there might be instances where

non-neoclassical heuristics (such as satisficing) yield optimal economic outcomes. Thus it is important to illustrate how behavioral economics provides, in many instances, better explanations and predictions of socioeconomic phenomenon. Significant advances in this direction have been made with respect to the theory of firm and household behaviors. Moreover, institutional analysis provides important insights into those conditions that push and pull individuals to behave rationally; behaviors that are often far removed from neoclassical assumptions and predictions.

More recently, with regards the Kahneman-Tversky approach to behavioral economics, attention has been focused upon examining the extent to which individual behavior deviates from neoclassical norms and providing descriptive theories which best characterizes and predicts such deviant behaviors. In this approach neoclassical norms remain the benchmark for rational and economically optimal behavior. Economic theory has been revised somewhat to accommodate these findings so as to better explain average human behavior, although neoclassical theory remains dominant. Prospect theory is pre-eminent amongst these revisions. However, this documented unconventional behavior need not be taken as evidence of irrationality; but rather that rational individuals tend not to behave neoclassically. It remains uncertain whether rational agents could behave on average much differently given bounded rationality.

The fact that firms are typically x-inefficient, contrary to the conventional wisdom, does not imply that 'firms' are irrational and not maximizing some specified function that is reasonable. The survival principle does not guarantee x-efficiency (effort inputs need not be maximized). Much depends on market structure and the preferences of decision makers, workers, the level of trust between firm members, and the power relationship between them as well as the wage rate. In addition, contrary to the conventional wisdom, firms are not constrained not to behave 'fairly' or 'morally'. Indeed, such behavior can generate cost offsets, contrary to the conventional wisdom.

Preferences are not formed in isolation. Individuals take into consideration the preferences of others, social context, culture, past behaviors of themselves and significant other individuals. Moreover, individuals' preferences are affected by historical time as new information and experiences impact on preferences. Also, revealed preferences need not represent one's preferred preferences and preferred preferences need not be constructed if individuals do not have the capabilities in the past and present to construct such preferences. This reality impacts upon our understanding of the welfare implications of revealed preferences. It also demands a carefully reconsideration of demand-side analysis since the position and elasticity of individual demand curves are a function of a much more complex set of variables than the conventional wisdom suggests. But this does not at all vitiate the relevance and importance of demand-supply analytics. The analytical predictions from a behavioral perspective, however, might be quite different from what is generated from the conventional wisdom. More generally, institutional assumptions matter in terms of impacting the incentive environment in which preferences are formed and choices made. One cannot simply assume that 'efficient' or 'optimal' institutions will be self-generating. A necessary prior to rigorous economic analysis is an understanding of the institutional context of the economic problem at hand, be it of a micro or macro nature.

Common to different approaches to behavioral economics is the suggestion for government or expert intervention in the economy and even in the decision making process that typically goes beyond the externality-based narrative of the conventional wisdom. From the Kahneman-Tversky perspective, to the extent that neoclassical norms remain the normative ideal, intervention is recommended to facilitate changing behavior towards the neoclassical ideal. However, if one finds that non-neoclassical behavior is rational, but is distorted by poor information, frames, capabilities, or institutional parameters, intervention is suggested to fix these parametric problems that prevent individuals from realizing their preferred preferences. Or, interventions are suggested that incentivize individuals to engage in productive as opposed to rent-seeking behavior—the essence of the New Institutional Economics. Behavioral economics also emphasizes the context in which revealed preferences are not the ideal ones assumed in the conventional wisdom. Economic theory can incorporate such insights into its corpus, strengthening its capacity to contribute constructively to causal analysis and to public policy.

The evidence demonstrating that individuals do not behave neoclassically does not undermine economic theory, although some would argue that this is the case. Rather the empirics suggest important retuning of economic theory in both its positive and normative dimensions to take into consideration the implications of the evidence for model building, analytical predictions, and public policy. Behavioral economics does not refute a key behavioral assumption that individuals respond to incentives, are concerned about opportunity costs, are interested in advancing their material wellbeing, and are significantly motivated by self-interest. But this is not the whole story. Incentives matter; but not only material incentives. Utility maximizing individuals are self-interested, but largely in the context of groups and communities. And the supply of altruism often depends on its opportunity cost and the income of the supplier. Moreover, not only do incentives matter in general, they matter specifically in the firm and in the household. This point tends to be neglected in the conventional wisdom, giving rise to x-efficiency and efficiency wage theory. In addition, incentives are affected by institutional parameters. Different institutions (and institutional assumptions) yield different incentives and different analytical predictions.

Behavioral economics demands a fundamental re-visiting and revision of economic theory, even though much of the core remains. The implications of the insights from behavioral economics for economic analysis, however, varies dramatically depending upon ones psychological, biological, sociological, and institutional assumptions that contextualize human agency. Nevertheless, these implications can be drawn out and students and practitioners of economics should be aware of the failings of the conventional wisdom and the implications of behavioral economics for improvements in causal analysis and economic prediction. These can be revealed and elaborated upon using many of the familiar economic modeling tools. This is an evolutionary, not a revolutionary, adjustment process, with revolutionary analytical and often public policy consequences.

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