

# A Brain-Focused Foundation for Economic Science

Richard B. McKenzie

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A Proposed Reconciliation between Neoclassical  
and Behavioral Economics

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*For*  
*Jack William Shelton*

## PREFACE

This small book takes its inspiration from British economist Lionel Robbins' small book, *An Essay on the Nature and Significance of Economic Science*, first published in 1932. In his book, Robbins posited that economics as a discipline was, at the time, being held in check by a lack of a unifying construction of the discipline broadly adopted by practicing academic economists. Robbins contended that economists seemed to be dealing with the same issues but were at odds over what was their core unifying concern. The problem, according to Robbins, was not a single definition, but a multiplicity of definitions, all of which he found wanting for assorted reasons and which I will consider in Chapter 2. He argued the discipline would be well served by an agreed-to definition, or just a methodological focus, that provided clarity of purpose for economists' disparate investigations. He concluded that *scarcity*, or the conflict between human wants and means, had to be at the core of the unifying definition. His construction of the discipline's methodological focus, was broadly adopted by textbook authors within two decades.

The discipline has marched on since Robbins walked the halls of the London School of Economics. As in Robbins era, the discipline is now fractured with competing visions of what economists do, and should be doing, or how they should be doing whatever they are doing—not always without crisscrossing barbs and at least some professional acrimony. I have written this book with the view that the profession has another “Robbins moment,” meaning an opportunity to rethink, in light of how much the profession has evolved since Robbins' day, the ultimate

foundation of the discipline. The short version of my central thesis is this: Robbins' construction of the discipline's organizing cornerstone, *scarcity*, and all that has been derived from it since Robbins' no longer generate general consent among economists. Moreover, economic "generalizations," which Robbins held out as the ultimate goal of all sciences, no longer attract general consent among academics who wear the disciplinary mantel of "economist," and the methodological divide among economists is growing.

Since Robbins' *Essay*, economists, and other social scientists, have learned a great deal about human decision-making and about the human brain, the lynchpin of human decision-making, which Robbins and his cohorts could not have imagined. I propose to do here for the modern era what Robbins did, to reimagine and reconstruct the foundation of economic science. I hold dear Robbins' concern for "scarcity," but with a radically different focus, enlightened by behavioral and cognitive psychology and neuroscience—which have given rise to counterparts, behavioral economics, and neuroeconomics—over the eight decades since Robbins found his unity in disparate investigations within the discipline.

I posit that the human brain is the ultimate scarce resource. The human brain must first optimize on itself before it (or humans) can optimize on the scarce resources available in the external world, the latter being Robbins' conceptual domain for scarcity. Economists in their investigations must do the same as their subjects, which is to optimize on their own scarce neuronal and energy resources to efficiently devise their generalizations of how an economy works, and can be predicted to work.

I posit that by starting with the scarcity of neurons (and other resources) in the human brain, which must cope with an immense inflow of sensory data and develop an equally immense number of internal and external decisions, there is the potential for a "unified field theory" that reconciles, albeit partially, many differences among divergent groups of contemporary economists, not the least of which are neoclassical (or mainstream) economists (who grew up intellectually on Robbins' construction of the discipline) and the newly established force of behavioral economists, with adherents taking their intellectual cues mainly from psychology and neuroscience. In short, I offer a brain-centric foundation for economic science.

As a practical matter, behavioral economists and neuroeconomists are right when they find faults (lots of them) with neoclassical economists?

premise that people are not only *rational*, they are *perfectly rational* (or can be assumed to be perfectly rational for modeling purposes). I acknowledge that perfect rationality is an evolutionary nonstarter. Perfectly rational humans, if they happened to emerge, would not likely survive for long in a world of scarce resources they confront internally and externally. This is the case because they would have to spend so much time refining their decisions that they would have starved to death for never making timely decisions, or they would have been eaten by, say, sabertoothed tigers before deciding to flee (*if* the standard for their decisions were perfection in considering all aspects of fleeing). Surely in a world beset with scarcity of everything, economists and their subjects would not go so far as place a valuation on all conceivable combinations of goods (and units of the goods within all possible combinations) that could be consumed (which is implicitly, if not explicitly, subsumed in economists' indifference-curve analytics in which every point on the graph, even those far beyond the budget line, which are unobtainable by design, are given a relative evaluation). Such analysis is patently self-contradictory, as well as representing decision makers as "hyperrational," to use a coined phrase of behaviorists, by the standards of the underlying analytics. Indifference-curve analytics assumes mental resources and decision time is unbounded in a world in which everything else is assumed to be scarce.

Perfect rationality (or hyperrationality) in an economy is no more likely than perfect efficiency in engineering, and for much the same economic reason: as perfection is approached, the added gains of added perfection would likely diminish while the added costs would likely escalate, at least beyond some point. Also, why would a rational person take the time to place valuations on unlimited combinations of goods that are far from achievable? The question answers itself.

Moreover, in repositioning the scarcity and rationality foundations of the discipline from the perspective of a neoclassical economist, I accept a number of tenets of behaviorists. Perfect rationality would likely be inferior to some lower, imperfect level of rationality, which accounts for the economy of the human brain that has far more to do than it can accomplish. This is to say that perfect rationality can come close to being its obverse, "perfect irrationality." The clinching argument is that if people were perfectly rational, economists would not have to tell their students that, nor would they have to draw out all of premise's implications. Students would know them (naturally?). Perfect rationality, in effect, denudes economics of any didactic purpose. Would perfectly rational

people (students) need economic instruction? If for some odd reason they did, why would economic instruction be as difficult as it is for many people on both sides of the lectern?

But alas, behavioral economists and neuroeconomists, in pointing to numerous ways people fall short of perfectly rational decisions—through so-called, at times, “biases” and “irrationalities” and, at other times, “anomalies”—they have saved neoclassical economics from such self-contradictions in what could be viewed as a wayward approach. With my brain-focused foundation for economics, I can explore five lines of argument that seem, on the surface, to be at odds with one another.

- First, the many (not all) identified biases, irrationalities, and anomalies in decision-making can be reconciled: they are to be expected when the human brain must first optimize on its own resources and even on its own level of rationality, given its evolutionary constraints and given its need for energy conservation to do all that it is called on to do. (And the human brain is a true physiological “gas guzzler,” given that it soaks up a fifth of all energy consumed by the human body.) Many of the so-called biases, irrationalities, and anomalies are no different than the inevitable “wastage” in production processes, and they, like production waste, can contribute to greater efficiency in decision-making and use of external resources than would otherwise be possible. They are also, in critical ways, similar to calculated “mistakes” that are bound to emerge from investment strategies devised to elevate risk-taking and increase a portfolio’s overall rate of return (even after accounting for the added risk costs).
- Second, if people were, in fact, perfectly rational, there would be little didactic value to economic instruction. There is nothing in economics that can improve (the efficiency of) decision-making and the use of external resources. With the acknowledged lapses in decision-making (e.g., as behaviorists have found, many people ignore opportunity costs, consider sunk costs, and discount future costs and benefits “defectively” and “inconsistently”), economics has a potentially efficiency-enhancing role, that of “improving” decision-making and, hence, the efficiency in the use of external resources.
- As will be argued, economics harbors the potential for slowing down decision-making, guiding students away from the pitfalls of “fast and furious” decision-making that novice students have likely

adopted, for evolutionary reasons, and toward avenues for more complete consideration of costs and benefits, both now and in the future. From my perspective, economics training, in its best form, is intent on showing students the value of key economic principles, which take the form of heuristics (ignore sunk costs and equate at the margin both) recommended for use in students' personal and commercial lives. These heuristics, even though flawed, can potentially improve the rationality of students' decisions and, thereby, potentially increase students' personal welfares and their firms' profitability. (From my perspective, it is far more instructive for "economic heuristics" to be substituted for "economic principles.")

- Third, in neoclassical economics, with its roots grounded in Robbins construction of the discipline's foundation, the rationality premise is imposed on the analytics. It is exogenous, and largely arbitrary (and if not arbitrary, made a necessity by the employment of mathematically precise analytics). The same could be said about behavioral economics in that behaviorists have sought to show how deficient human decision-making is, using perfect rationality as the standard, without a conceptual deductive framework for conceptualizing people's optimum rationality (at least from my reading of the behavioral literature). I seek here to develop the missing framework that allows economists to recognize that many (if not most) deficiencies in all forms of decision-making can be every bit as rational as farmers' decisions to allow vegetables to rot in their fields and car makers to plan for deficiencies in the performance of their cars.
- Fourth, in neoclassical economics, human rationality cannot be improved. The central concern is then directed to the efficiency in the allocation of external resources with no potential feedback effects on rationality. When rationality is optimized as the brain seeks to optimize on its own resources, rationality can, indeed, be improved by instructions, and an improvement in rationality can improve decisions on the allocation of external resources, which can have feedback effects on the brain's optimized rationality.
- Fifth, the limits of the human brain also place limits on how economics is done. The subject matter—human interactions in a variety of institutional settings, including markets, politics, and organizations—is extraordinarily complex, far too complex to be understood and appreciated in its totality. The core problem melds with Robbins' construction: Too much "data" and too few available

neurons. This means that those interactions *must* be considered in reduced, simplified form, in one way or another. Neoclassical economics concedes to the limits of people’s (and economists’) brain power through simplified models along with a founding premise, perfect rationality, that is far from descriptive of how people make—and must make—their decisions. Behavioral economists do much the same thing in a radically different way, by taking subjects into controlled and constrained laboratories that are also far removed from descriptive reality of the complex social and economic interactions that are at play outside their laboratories. The goal of both approaches is designed to gain insight that would not otherwise be accessible. By making economics brain-focused, rationality is made endogenous, which gives new meaning to “economic efficiency” and “welfare gains” from decision-making, even when they are flawed.

In neoclassical economics, external efficiency is the core concern, as noted. The extent of market competitiveness (or market power) and government regulations, for examples, can only affect the efficiency of external resource allocations. From my perspective, such market forces can affect the level of rationality adopted by the brain, which can, through sensory feedback loops between the external world and the brain (which can result in adjustments in mental algorithms and heuristics), efficiency in the allocation of external resources can be enhanced beyond what is conventionally thought and taught in neoclassical economics. Indeed, from my perspective, specialization of resources and trades aren’t simply innate propensities of humans, which reduce production costs, as Adam Smith and every economist since have argued, they are means of relieving demands on people’s mental resources and processes, enhancing mental rationality, and thereby further improving economic efficiency. If competitive pressures and feedback loops are denied, as they often are in behaviorists’ sterilized laboratory experiments, no one should be surprised if findings of irrationalities abound, at least more so than in the real world beyond the walls of laboratories.

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With that said, I begin my inquiry into the “nature and significance of modern economic science,” starting with a brief evolutionary history of economic methodology. My goal is daring, to develop economic

generalizations by starting with an economic theory of how the human brain works. Because the interactions of the human brain could be as complex as the interactions of the normal domain of economics, the economy, I will simplify, mainly by assuming that the human brain (or “mind”) seeks to optimize on the body’s limited physiological resources (including energy intake and reserves, as well as the internal forms of chemical and electrical communication systems and “memory” available in the brain and elsewhere, say, muscles). That task requires the brain to optimize use of its own limited cognitive resources (e.g., neurons, glia cells, and electrical and chemical communication systems) available for decision-making. I emphasize the evolutionary origins of the brain, among the many forces that constrain what and how the brain’s performance is constrained, as I also stress the extent to which the brain cannot possibly absorb the enormous inflow of sensory data or make with intensive care all the decisions it is called upon to make. This means that the brain must find ever-evolving ways of economizing on—or seeking as best it can to optimize on the use of—its resources.

As noted, in neoclassical economics, rationality (most often, perfect rationality) is superimposed on economic models. From my brain-centric view of the discipline, rationality, whatever its level, is endogenous, which means it is an outcome of the brain’s economizing processes. I posit that the brain seeks an *optimum rationality* (or rational rationality), given its admirable capacity to cope with a multitude of physiological constraints, grounded in evolutionary forces which shape the boundaries of how the brain must operate internally, as well as the ever-evolving external forces that shape the incoming sensory data with which the brain must cope.

In behavioral economics and psychology, uncovered biases, anomalies, and flaws in decision-making are often treated as evidence of the limits of predictive value of neoclassical economics, and even as evidence of that paradigm’s intellectual bankruptcy, and irrelevancy. From my perspective developed, such “flaws” are expected, or predicted, and the consequence of a “meta-rationality” that transforms (at least, potentially) “flaws” into sources of greater efficiency in decision-making, which can imply greater efficiency in the employment of limited internal and external resources to satisfy human wants.

Readers should note that my coverage of various literatures—evolutionary biology, neuroscience, neoclassical economics, behavioral economics, and psychology—is not intended to be exhaustive,

as if complete coverage were possible, given the breadth of the literatures and my intention to contain the length of this book. My goal is to cover only enough of the relevant literatures to convince readers that many economists in modern times use radically different methodological approaches and draw radically different “generalizations,” which are often at odds with one another. I seek only to persuade readers that it is time to seek a new methodological foundation, one that harbors a chance of unifying economists’ disparate investigations and conclusions. I seek to reconcile, partially, the competing methodological perspectives of neoclassical and behavioral economics, mainly by retaining the deductive methods of neoclassical economics organized around the constructs of scarcity, maximization/optimization, and equilibrium and providing rational explanations for many, if not most, of the inductive findings of behaviorists. I suggest my approach can be best crystalized as “brain-focused neoclassical microeconomics (or just economics).”

In writing this book, I have sought to extend themes in my earlier work on methodology, *Predictably Rational? In Search of Defenses for Rationality in Economics* (Springer 2010). I have drawn on that work liberally but always with revisions, updates, and upgrades in the analysis, and always with the goal of devising a new way of thinking not considered in the earlier book. Also, readers will notice that key themes and arguments in the book are often repeated. This is the case partially not only because of the conventional need to tie the arguments in the different chapters together but also because the chapters of the book will be made available for download separately.

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