

Behavioral Finance as Science: Implications From the Research of Paul Slovic

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In a seminal article published in 1951 by *The Journal of Finance*, University of Oregon Finance Professor O.K. Burrell proposed “scientific” study of psychological influences on investment behavior. For approximately twenty years Professor Burrell’s suggestions were largely ignored. Then in the late 1960’s, and again at Oregon, a small group of academics began conducting psychologically oriented investment research. The person at the center of the effort was Dr. Paul Slovic. The article by Professor Slovic, which follows this introduction, was the first academic study to bridge the gap between psychology and finance. Professor Slovic has noted that neither this paper, nor any of the others, brought any comment even though they appeared in major academic business journals. In hindsight, the lack of academic interest is not surprising. During this period financial theory was primarily normative, not descriptive, with focus on the concept of market efficiency and the then new Capital Asset Pricing model. Only with the rise of the “Anomalies Literature” in the last 15 years has behaviorally oriented financial research begun to lose its cottage industry status. With market efficiency and the neoclassical rationalist paradigm now under suspicion, Behavioral Finance, as it is now called, is losing its heretical reputation and is becoming an eclectic field of study drawing from disciplines such as experimental economics, cognitive psychology, decision science and neuroscience. Not surprisingly, the entrepreneurial spirit has motivated a number of academicians and investment advisors to begin offering portfolio management services based on psychological principles.

As might to be expected, the recent “Bubble” of interest in Behavioral Finance has created a backlash from the more traditional financial economists. While the specific criticisms vary, they have a common theme. Specifically, they suggest that Behavioral Fi-

nance is not scientific because it does not have a dominant paradigm; it draws from other disciplines in an ad hoc fashion; and it is focused on ephemeral and emergent phenomena.

Can Behavioral Finance represent good science? Is it destined to document a set of behavioral phenomena which at times appear to be inconsistent and anomalous themselves, and which appear to be justified ex post and ad hoc? It is this writer’s opinion that Behavioral Finance is currently in an early, but still scientific stage that has been common to all new sciences. As such, it is experiencing the same age-old criticisms that were previously levied against economics, geology, biology, and even physics before Isaac Newton. The appearance of a new discipline or the mitosis of an existing one is always unsettling because it threatens the peace of the status quo and imposes psychological and economic costs on those affected. Perhaps one of the most spectacular previous examples occurred in biology where for centuries a vicious debate wore on between the older “mechanists”, who believed that “life” could be explained by direct application of existing principles from physics and chemistry, and the “vitalists”, who postulated a new “life force”. Ultimately there was agreement that living things were different from nonliving because they had crossed a threshold wherein they had properties that could not be explained by existing laws of physics and chemistry. Life was said to be an “emergent” phenomenon. Might not the behavior of financial markets also reflect new emergent properties not directly explainable from a neoclassical “summing up” across individuals? It appears that Adam Smith might have had such a possibility in mind when he wrote of the “Invisible Hand” of the market. Similarly, on the individual level, there is an increasingly large body of psychological and neuroscientific evidence that human decision-making cannot be explained by computer-like, rule based mechanical processes, but instead is more analogical, intuitive and situation dependent.

But to return to the complaint that Behavioral Finance does not represent good science, we must first identify the core properties of science? While Philosophers disagree on other specifics, there is consensus that to be called a science, study of an area must involve application of the scientific method. In particular, statements or hypotheses must be potentially test-

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able and falsifiable. In other words, the core of a science is the way in which it makes statements or hypotheses, tests them, and makes claims to new knowledge. Different sciences may collect different types of data in different ways. But good science involves the surrender of the goal of absolute knowledge in exchange for the acceptance of permanent tentativeness and the opportunity of an improving understanding how things really work. While the arts and humanities may expand their knowledge, only the sciences can lay claim to improving the understanding of some area of inquiry.

Some finance theorists suggest that Behavioral Finance cannot claim to being scientific because it does not have a dominant paradigm, as does “modern finance”, with its internally consistent and connected Efficient Markets Theory and Capital Asset Pricing model. Their concern for having a “unified theory” stems from two perceived needs. First, there must be a common framework to ensure logical coherence and consistency. Second, there must be a common framework to guide the search for answers to questions that are deemed important. Students of the history of science, such as Thomas Kuhn, point out that the presence of such a paradigmatic requirement is often detrimental to the scientific enterprise because it too narrowly frames the search for new knowledge and discourages innovative ideas. They note that while so called “normal” sciences do have dominant paradigms; most budding sciences in their “non-normal” stage do not. For example, Physics before Newton, Biology before Darwin, and Electricity before Franklin were non-normal sciences without dominant paradigms. This does not mean that good science was not or could not be practiced in this non-normal phase. It only means that before common ground was found, that research topics were usually related to the personal agenda of the investigators and that writings tended to be more long winded and contentious as the lack of a well accepted vocabulary, as well as a common point of view, encouraged vigorous debate. Over time, non-normal sciences become normal ones as major themes emerge and evidence accumulates. Usually, it is best that this process be allowed to evolve relatively unhindered since a dogmatic and highly judgmental approach is in direct opposition to the spirit of open inquiry, which is at the heart of the scientific endeavor.

Currently Behavioral Finance appears to be a non-normal science. However, it is on the road to developing a paradigm of its own. Specifically, researchers have identified a few statements, which appear to have the potential to serve as structural members of a common framework. These are:

- Financial decision makers’ preferences tend to be multi-faceted, open to change and often formed during the decision process itself.

- Financial decision makers are satisficers and not optimizers.
- Financial decision makers are adaptive in the sense that the nature of the decision and environment within which it is made influence the type of the process utilized.
- Financial decision makers are neurologically predisposed to incorporate affect (emotion) into the decision process.

A second group of financial economists suggests that Behavioral Finance cannot lay claim to being scientific because it does not deal with topics and methods of experimentation that lead to the production of general “overarching” laws, such as the law of gravity or the law of natural selection. More specifically, these critics suggest that Behavioral Finance cannot claim to practice good science unless it fits the mold of what is called a Theoretical or Newtonian science. Physics, chemistry and biology are Theoretical sciences.

This argument ignores the fact that other “sciences” such as astronomy, geology, oceanography, medicine, and even economics are also limited in their ability to mimic the so called “hard” sciences. These “historical” sciences, as they are formally called, use the insights, models, and findings of the theoretical sciences to explain the specifics of local and particular behaviors and situations. While the subject matter and the complexity of these disciplines excludes answering mega questions, such as what was the origin of the universe, they do provide useful information about climate, the nature of disease and under what circumstances an economic recession is likely to occur. Most historical sciences, which include the social sciences, are of more recent origin than the theoretical sciences. From one perspective this is understandable in that investigation of the more complex historical sciences has depended upon prior development of the more basic theoretical sciences. However, the idea that Behavioral Finance must be like the theoretical sciences seems to imply a concept of hierarchy wherein Physics trumps Biology, which trumps Economics, which trumps Behavioral Finance.

Linking sciences together and applying scientific methods and theories to new disciplines do not mean that those new disciplines are subordinate. Nor does it mean that practical value is necessarily obtained by being able to explain all phenomena using overarching natural laws, principles, or constructs. For example, even if it were possible to identify general laws that connected the separate sciences, the utility or even the meaning of, say, a “quark level” explanation of market momentum is difficult to comprehend.

Also, it seems shortsighted that some financial economists should be bothered by Behavioral Finance borrowing from other disciplines. In particular, economists themselves have borrowed extensively from oth-

er disciplines. Notable examples include equilibrium from Physics, utility from Psychology, and agency from Sociology. At this time there is evidence to support the position that models of chaos and complexity, borrowed from Physics and Biology, may be very useful in explaining security prices and trading volume. The cause of science does not appear to be well served by ignoring these important developments.

Finally, as to the argument that to be scientific one must eschew consideration of ephemeral, difficult to measure and emergent phenomena, one only need to note the vigorous study of black holes, sub atomic particles, and the nature of human emotion. Although these may not be directly observable, as long as they can be subjected to scrutiny thru their indirect effects, their scientific study is legitimized.

This brief detour returns me to the title of this paper and to the question, what are the implications of Professor Slovic's research for Behavioral Finance as a Science? Simply put, the answer is that Professor Slovic's lifetime research into the nature of Risk from a new behavioral and scientific perspective serves as an outstanding example of how an old concept can be re-interpreted and made relevant to understanding investment behavior.

The study of risk in technology, engineering, and even finance had come to be focused on statistical probabilities and outcomes expressed in money or lives lost. While this normatively derived approach to risk dominated the professional literature, empirical evidence continued to show that individual's perceptions and reactions to hazardous situations were not highly correlated normative measures of risk, such as variance. To explain this normative/descriptive disconnect,

Professor Slovic developed a new theoretical framework and scientific approach to the study of risk, which is now known as the Psychometric Paradigm. It used a variety of psychometric scaling techniques to produce quantitative measures of perceived risk, benefits and other aspects of perception. Extensive testing of the paradigm across natural, technological and social hazards and across different cultures yielded a common set of results. These are:

- Risk is multi-attribute in nature. It involves such elements as feelings of control, dread, and knowledge.
- Risk perceptions are influenced by social and cultural factors such as trust, fairness, and democratic values.
- Risk always contains an emotional or affective dimension.

The most important conclusion to come from Professor Slovic's research is that risk is not objective, but always subjective. It does not exist "out there" as an independent attribute of a hazard. It is an emergent phenomenon that results from the uniqueness of a situation. It serves as an orienting device to help individuals deal with the uncertainty of life. From an investment perspective, Professor Slovic's research has helped to explain major risk related phenomena such as The Risk Premium Puzzle, and The Small Firm Effect. Behaviorally based scientific research has shown investment risk to be much more than Beta or standard deviation of return. In summary, just as investment risk has been scientifically studied from a behavioral perspective, so might many other Behavioral Finance phenomena.

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