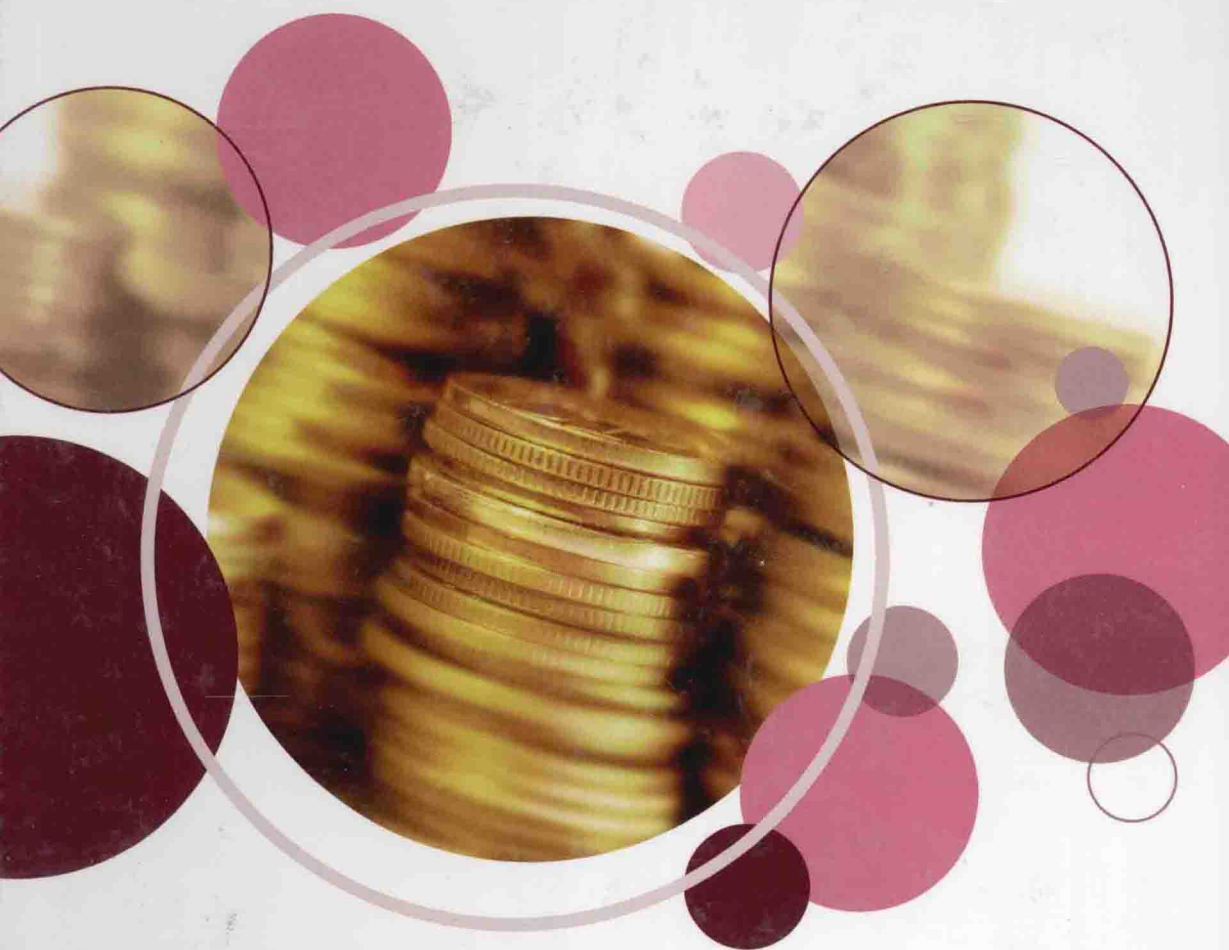


Volume 11

Herbert A. Simon, George J. Stigler and Ronald H. Coase



Edited by
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PIONEERING PAPERS OF THE NOBEL MEMORIAL LAUREATES IN ECONOMICS

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General Introduction

Howard R. Vane and Chris Mulhearn

The ‘Sveriges Riksbank (Bank of Sweden) Prize in Economic Sciences in Memory of Alfred Nobel’, popularly known as the Nobel Prize in Economics, was first awarded in 1969. At the time of writing (July 2010), over the 41 years since its inception there have been some 64 Nobel Laureates in economics. The Prize, like the Nobel awards in other disciplines, recognizes specific discoveries, achievements or breakthroughs in economic science, rather than outstanding economists or a person’s lifetime work.¹

The aim of this series is to bring together, in a number of volumes, *some* of the pioneering papers of the Nobel Memorial Laureates that have helped shape the development of modern economic thought. Because the work of the Prize winners spans a wide range of fields, it is possible to categorize the awards in a number of ways. However, as Lindbeck (1985; 2001) acknowledges, any chosen classification is going to be ‘rather arbitrary’ because of the ‘overlapping’ and, in some cases, ‘multidimensional nature’ of the Laureates’ contributions (see also Chapter 1 of Vane and Mulhearn, 2005). Wherever possible, we have sought to include in each volume Laureates working in the same *broad* area of study. In some cases, deciding which Laureates’ papers should be grouped together was relatively straightforward because the sub-disciplines were readily identifiable – for example, in the case of the pioneering game-theory papers of Harsanyi, Nash, Selten, Aumann and Schelling. For other volumes we have sought to identify a common link underlying the Laureates’ work. For example, in the case of the volume containing work by Friedman, Lucas and Phelps an initial unifying theme is their research in macroeconomics and, more specifically, their analyses of tradeoffs, most notably between inflation and unemployment. In some of the volumes where it is less clear that there is a single common thread, we have grouped together the papers of Laureates working in two or more fields.

In this general introduction to the series we would like to highlight six main points.

- First, in order to keep the length and cost (given copyright permission fees) of each volume to manageable proportions we have imposed an arbitrary limit of not more than six papers under each Laureate’s name per volume (with one exception, Paul Samuelson, whose influence on economics has been so profound and wide-ranging).
- Second, to avoid duplication across the series, no paper appears in more than one volume. For example, the joint papers by Franco Modigliani and Merton Miller in the field of financial economics appear only under Merton’s name and not in the volume containing papers by Modigliani.
- Third, the pioneering contributions of certain Laureates appear in book form rather than in papers. For example, some of Milton Friedman’s most influential work appears in his book *A Monetary History of the United States, 1867–1960*, co-authored with Anna J. Schwartz (Princeton: Princeton University Press, 1963). In cases such as this we have

sought to include some representative paper (e.g. Friedman and Schwartz's 1963 *Review of Economics and Statistics* paper on 'Money and Business Cycles'), or the Laureate's Nobel Lecture.

- Fourth, the impact of a Laureate's work is not necessarily confined to one field of study or, within one field, a particular topic or theme. For example, in the case of Robert E. Lucas Jr. his classic 1988 *Journal of Monetary Economics* paper 'On the Mechanics of Economic Development', in which he highlighted the importance of human capital accumulation and learning by doing, has (together with the work of Paul Romer) led to a resurgence of interest in the analysis of economic growth and, most notably, the development of endogenous growth theory. This important contribution might not be apparent to someone looking at the Prize citation for Lucas, which is 'for having developed and applied the hypothesis of rational expectations, and thereby transformed macroeconomic analysis and deepened our understanding of economic policy' (Nobel Foundation, 2010).
- Fifth, while the pioneering papers of some Laureates are easily identifiable, for others who have made numerous breakthroughs – such as Paul Samuelson, who has contributed fundamental insights into nearly every major area of economic theory – we need to stress that, at the margin, the selection of papers involves a degree of personal judgement. No doubt other economists would have preferences different from our own. In choosing the papers for each volume we have been guided, in part, by the Laureates' statements of their principal contributions to economics as *they* perceive them (see Blaug, 1999; Blaug and Vane, 2003), and in certain cases by Laureates who, in correspondence, have indicated which papers they wanted included under their name.
- Finally, it is important to stress that the rationale behind this series is *not* to produce either the *Collected Works* of individual Nobel Laureates or the *Collected Writings* of one or more Laureates on a particular topic. Instead our intention is to bring together in a series of volumes some of the pioneering papers of the Nobel Memorial Laureates that have shaped the development of modern economic thought and to set in context the selection of papers chosen for each volume by an editorial introduction to the Laureates' careers and main published works.

Note

1. The five original Nobel Prizes – in Physics, Chemistry, Physiology or Medicine, Literature and Peace – have been awarded annually since 1901.

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Part I

Herbert A. Simon

Introduction to Part I:

Herbert A. Simon (1916–2001)

Herbert Simon was born in Milwaukee, Wisconsin, USA in 1916. He studied political science at the University of Chicago, where he obtained a BA in 1936 and a PhD in 1943. His early posts included a position at the International City Managers' Association in Chicago from 1938 to 1939. Subsequently he became Director of Administrative Measurement Studies at the Bureau of Public Administration of the University of California at Berkeley from 1939 to 1942. In 1942 Simon returned to Chicago, where he was appointed initially as an Assistant Professor of Political Science at Illinois Institute of Technology, before becoming a full professor in 1947. In 1949 he moved to Pittsburgh, where he was Professor of Administration and Psychology at the Carnegie Institute of Technology (later renamed Carnegie-Mellon University) from 1949 to 1955, and Professor of Computer Science and Psychology from 1955 until he retired in 1988.

Simon's many offices and honours included: the Distinguished Scientific Contribution Award of the American Psychological Association in 1969; the A.M. Turing Award of the Association for Computing Machinery (with Allen Newell) in 1975; a Distinguished Fellowship of the American Economic Association (1976); the James Madison Award of the American Political Science Association in 1984; the award of the National Medal of Science in 1986; the John von Neumann Theory Prize of the Operations Research Society of America and the Institute of Management Sciences in 1988; the Research Excellence Award of the International Joint Conference on Artificial Intelligence in 1995; and the award of numerous honorary degrees from universities around the world. In 1978, Simon was awarded the Nobel Memorial Prize in Economics 'for his pioneering research into the decision-making process within economic organizations' (Nobel Foundation, 2010).

In economics Simon is best known for his important contributions to the field of behavioural decision making, especially in large organizations. His pioneering research in this area can be traced back to his PhD thesis on decision-making processes in administrative organizations, which was published (in revised form) in 1947 in his first major book entitled *Administrative Behaviour*. Central to this work is the idea that human decision making results in satisficing, rather than optimizing, behaviour. The traditional theory of the firm is based on the assumption of an omniscient, fully rational, profit-maximizing entrepreneur. In Simon's approach, the single entrepreneur is replaced by a constellation of decision makers whose rationality is limited and who cooperate to find satisfactory solutions to the problems they face. In consequence, firms are unable to maximize profits. He argued that, in reality, people in large organizations cannot obtain or process all the information needed to make fully rational decisions. Instead, due to limitations of knowledge (for example, about the uncertain future) and the capacity to process information, people 'satisfice' by making decisions that result in acceptable outcomes. In other words, people make decisions that are 'good enough', settling for certain aspiration levels that they adjust occasionally (either upwards or downwards) when outcomes do not

match targets. In his book he rejected the idea of 'economic man' who 'optimizes', instead introducing the concept of 'administrative man' who 'satisfices'. This view of human decision making, based on 'limited' rationality, or what he subsequently called 'bounded' rationality, results in 'satisficing', not optimizing, behaviour.

A central aim of Simon's research was to investigate human rationality. In another influential book entitled *Models of Man* (Simon, 1957), he presented a collection of essays on rational human behaviour in a social setting. This work combined economic with philosophical and psychological perspectives specifically addressing: causation and influence relationships; social processes; motivation; and rationality and administrative decision making. In a series of books published with others in the 1950s and 1960s (Simon et al., 1950; 1960a; March and Simon, 1958; Simon, 1960b; 1965) he developed the ideas first put forward in his classic book, *Administrative Behaviour*. His interest in human decision making also led him to undertake research in the disciplines of political science, psychology and computer science. In the last case, for example, from the mid-1950s onwards he undertook research with Allen Newell to program computers to simulate human problem-solving behaviour using heuristics based on bounded rationality. This research led to the pioneering idea that computers can exhibit an 'artificial intelligence' that mirrors human thinking (Simon, 1969; Newell and Simon, 1972a) and to the 'information-processing revolution' in cognitive psychology. His extensive knowledge of, and research in, political science, economics, psychology and computer science allowed him to make insightful links between the disciplines. This led him to make important contributions to a number of fields, most notably human cognition, artificial intelligence and management science. Furthermore he explored the implications of this wide-ranging research for economics (see Earl, 2001). While he will be remembered in economics, first and foremost, for his analysis of decision making and its applications, he also undertook work in other areas of the discipline. For example, he made important contributions to mathematical economics, including a theorem concerned with the existence of a solution to an input-output process (Hawkins and Simon, 1949).

As should be evident from this brief overview, Simon was a truly remarkable and talented individual. Over the course of a long and distinguished career he held professorships in political science, administration, psychology and computer science. Through detailed and wide-ranging research he made lasting contributions to a number of disciplines and fields. The common theme running through all his work is human decision-making and problem-solving processes. Many of Simon's most important papers have been gathered together in six volumes: *Models of Discovery* (Simon, 1977), a collection of his papers on the philosophy of science; *Models of Thought* (Simon, 1979a), a two-volume collection of his papers in psychology; and *Models of Bounded Rationality* (Simon, 1982a; 1982b; 1997), a three-volume collection, containing more than 80 articles, of his papers in economics. Given Simon's prolific output of published papers, many of which have appeared in the world's top-ranked academic journals, the six papers chosen to appear in this volume are both among his most heavily cited and convey the basic tenor of his views in relation to economics. In chronological order of publication:

- Simon (1955 – paper 1) considers a behavioural model of rational choice in which he sought 'to replace the global rationality of economic man with a kind of rational behavior that is compatible with the access to information and the computational capacities that

are actually possessed by organisms, including man, in the kinds of environments in which such organisms exist' (p. 99);

- Simon (1959 – paper 2) critically surveys developments in theories of decision making in economics and behavioural science;
- Simon (1962 – paper 3) considers complex systems 'made up of a large number of parts that interact in a non simple way' and argues that 'hierarchy ... is one of the central structural schemes that the architect of complexity uses' (p. 468), while 'in their dynamics, hierarchies have a property, near-decomposability, that greatly simplifies their behavior' (p. 482);
- Simon (1972b – paper 4) is a summary paper on theories of bounded rationality which Simon wrote for a *Festschrift* held to honour Jacob Marschak, a Russian-born economist who helped pioneer the development of economic theories of information, organization and decision under uncertainty, and who was Professor of Economics at the University of California, Los Angeles from 1960 until his death in 1977;
- Simon (1978 – paper 5), the Richard T. Ely Lecture, in which he emphasized rationality as a process of choice and as a product of thought; and
- Simon (1979 – paper 6), his 1978 Nobel Memorial Prize Lecture, in which he considered rational decision making in business organizations, concluding that 'we do understand today many of the mechanisms of human rational choice. We do know the information processing system called Man, faced with complexity beyond his ken, uses his information processing capacities to seek out alternatives, to calculate consequences, to resolve uncertainties, and thereby – sometimes, not always – to find ways of action that are sufficient unto the day, that satisfices' (p. 511).

The legacy of Herbert Simon in economic analysis is considered in a two-volume collection of 50 papers (Earl, 2001).

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[1]

A BEHAVIORAL MODEL OF RATIONAL CHOICE

By HERBERT A. SIMON*

Introduction, 99. — I. Some general features of rational choice, 100. — II. The essential simplifications, 103. — III. Existence and uniqueness of solutions, 111. — IV. Further comments on dynamics, 113. — V. Conclusion, 114. — Appendix, 115.

Traditional economic theory postulates an “economic man,” who, in the course of being “economic” is also “rational.” This man is assumed to have knowledge of the relevant aspects of his environment which, if not absolutely complete, is at least impressively clear and voluminous. He is assumed also to have a well-organized and stable system of preferences, and a skill in computation that enables him to calculate, for the alternative courses of action that are available to him, which of these will permit him to reach the highest attainable point on his preference scale.

Recent developments in economics, and particularly in the theory of the business firm, have raised great doubts as to whether this schematized model of economic man provides a suitable foundation on which to erect a theory — whether it be a theory of how firms *do* behave, or of how they “should” rationally behave. It is not the purpose of this paper to discuss these doubts, or to determine whether they are justified. Rather, I shall assume that the concept of “economic man” (and, I might add, of his brother “administrative man”) is in need of fairly drastic revision, and shall put forth some suggestions as to the direction the revision might take.

Broadly stated, the task is to replace the global rationality of economic man with a kind of rational behavior that is compatible with the access to information and the computational capacities that are actually possessed by organisms, including man, in the kinds of environments in which such organisms exist. One is tempted to turn

* The ideas embodied in this paper were initially developed in a series of discussions with Herbert Bohnert, Norman Dalkey, Gerald Thompson, and Robert Wolfson during the summer of 1952. These collaborators deserve a large share of the credit for whatever merit this approach to rational choice may possess. A first draft of this paper was prepared in my capacity as a consultant to the RAND Corporation. It has been developed further (including the Appendix) in work with the Cowles Commission for Research in Economics on “Decision Making Under Uncertainty,” under contract with the Office of Naval Research, and has been completed with the aid of a grant from the Ford Foundation.