The Game Theorist

Morgenstern Is Critical Of Economics As Practiced

By LEONARD SILK

The recognition of a scholar's greatness doesn't always come within his lifetime. It may take decades or even centuries before a person's contribution can be accepted—possibly because a field has not yet reached a point where a truly original contribution can be assimilated, possibly because the new work is too disturbing to the guardians of existing doctrines and methods.

Such was almost the fate of Prof. Oskar Morgenstern, who is most widely known as the co-author, with the late John von Neumann, of "Theory of Games and Economic Behavior," a book with truly revolutionary implications for economics and the other social sciences.

For many years Professor Morgenstern's contribution was overlooked because he had been regarded as the junior partner to one of the 20th century's greatest and most beloved geniuses, "Johnny" von Neumann, whose work ranged from pure mathematics to nuclear physics to computer science to chemical engineering to whatever other problem anyone wanted solved.

Happily, however, recognition of the wide-ranging and profound impact of the work of Professor Morgenstern, who celebrated his 75th birthday last month, has suddenly flowered. The Hebrew University in Jerusalem has just announced that it is establishing a Morgenstern-von Neumann Research Fund for Mathematical Economics and Game Theory, and named Professor Morgenstern an honorary fellow.

New York University has also just announced that it is establishing an Oskar Morgenstern Research Professorship, with Professor Morgenstern as the first occupant of the chair. He also received honorary degrees recently from the University of Basel on its 500th anniversary and the University of Vienna on its 600th anniversary.

President John Sawhill of N.Y.U., the former Federal Energy Administrator, said the Morgenstern chair would not only reflect Professor Morgenstern's interest in game theory but also would be "the nucleus of a thrust to increase the accuracy of measurement of economic statistics and of an accompanying effort to introduce people of other disciplines to the development and application of economic theory to real problems."

The New York Times/Frank C. Doherty

What lies at the heart of Professor Morgenstern's work is the recognition that economics, although a science of society and humanity, has modeled its mechanics on the physical sciences. Economics needs to develop models that truly reflect human behavior and to develop data that more accurately measure decision-making factors.

Achieving such a deep-going reformation of economics is one fundamental aim of Drs. Morgenstern and von Neumann's work on game theory, although game theory can be applied wherever the essence of a problem is that a decision maker is not in complete control of all the variables that affect the outcome.

Game theory recognizes that in the vast majority of human actions the decision-maker faces one or more other decision-makers who can either compete with or cooperate with him. In addition, all confront the uncertainties of nature.

The collaboration of Dr. von Neumann and Professor Morganstern was no pure accident, although it had chance elements. In 1928 Dr. von Neumann published a 25-page paper, "Toward a Theory of Games," in a German journal. But in the same year, Professor Morgenstern had published, in Vienna, his first book on business forecasting—a book clearly moving toward game theory.

Professor Morgenstern showed in his forecasting book that the economic decision maker was confronted with two kinds of variables —"dead" and "alive" in his view. The dead variables

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do not reflect decisions by other economic actors; the live variables do.

One of the most famous examples of the interaction of competing actors' dealing with "live" variables was published by Drs. von Neumann and Morgenstern in their collaborative work of 1944, "Theory of Games and Economic Behavior." It is an analysis of Sir Arthur Conan Doyle's tale of how Sherlock Holmes, seeking to escape Professor Moriarty, who has the power to kill him, flees to Waterloo Station in London and leaps aboard a train to Dover, to try to get to the Continent.

As his train is pulling out of Waterloo Station, Holmes sees Moriarty on the platform, and Moriarty sees him. Holmes knows that Moriarty is rich enough to hire a fast train to pursue and beat him to Dover—indeed, this is what Moriarty does.

But there is a stop at Canterbury en route to Dover. Should Holmes get off at Canterbury to escape Moriarty? But will Moriarty not guess that Holmes will do this and do the same? Will Holmes, thinking that Moriarty will think he knows what Holmes is thinking, not get off at Canterbury too, so Holmes ought to go on to Dover?

Drs. von Neumann and Morgenstern demonstrated that all this he-thinks-I-think-he-thinks kind of reasoning was a waste of time. Instead, they formulated the problem mathematically, in terms of a matrix, with specific payoffs, and showed the optimal strategy by which Holmes probably might escape Moriarty. (Arthur Conan Doyle himself chose the right answer: Holmes should get off at Canterbury, and Moriarty was more likely to go on to Dover in order to keep Holmes bottled up in England. However, Doyle exaggerated the definiteness of the solution.)

Professor Morgenstern first used the Holmes left Waterloo Station, he was book on economic forecasting, and Professor von Neumann first proved, in his 1928 paper, the "minimax theorem," which demonstrates how Sherlock Holmes (or any other decision maker) could minimize his maximum risk.

The minimax strategy could not guarantee that Holmes would escape. As Professor Morgenstern put it, when Holmes left Waterloo Station he was "already 48 percent dead."

Game theory can be applied to an infinite number of cases in business, nuclear arms negotiations, war, medical practice and other fields. Professor Morgenstern has put game theory, and other mathematical theories, to work in a practical way through the company he founded and called Mathematica Inc., based in Princeton, N.J., where he lives with his wife, Dorothy, and daughter, Karin, 17. His son Carl, 26, is a mathematician at the University of Colorado.

Mathematica Inc. has worked on various studies for a variety of governmental and corporate customers, including the space shuttle, energy, state lotteries, health economics, unemployment and manpower programs, income maintenance, the New Jersey negative income tax, nuclear disarmament and national-defense strategy.

Professor Morgenstern presents a remarkable combination of qualities—vaulting imagination and earthy practicality, an austerity that some find forbidding combined with a charm that can be irresistible.

Professor Morgenstern's wife, Dorothy, whom he met in 1948 when she was pushing doorbells in Princeton to raise money for United World Federalists, thinks the explanation for his curious blend of pride and humility is that he is the son of an illegitimate daughter of Emperor Frederick III of Germany, the father of Kaiser Wilhelm.

Professor Morgenstern suggests that if his grandfather Frederick, a liberal who surrounded himself with scholars and artists, had lived, there might have been no World War I. But Frederick III reigned only 100 days, and died of throat cancer.

The Emperor made a substantial financial settlement upon the mother of his illegitimate child—she was the daughter of the man in charge of the imperial gardens. She then married the Mayor of Mefferstorf-Wiegendstal, a town in Silesia, Germany. But Professor Morgenstern's father was a poor businessmen and lost most of the family fortune in various business ventures.

He took his family to Vienna, where he went to work for an importer of coffee and tea, Julius Meinl, a daring and imaginative businessman who astounded Vienna by marrying a Japanese dancer named Michiko and staging a musical gala for her at the Opera House. He also befriended young Oskar Morgenstern and encouraged him to become a scholar. He started in the natural sciences.

Economists tend to be the children of bad economic times and Oskar Morgenstern is no exception. The post-World War I inflation and chaos in Austria drew him into economics. But it almost wiped him out—from starvation. He was rescued by the food mission of Herbert Hoover and the Quakers, who sent him to the United States.

His scholarly life oscillated between Austria and the United States until the Nazis took over Vienna in March 1938.

The Nazis immediately branded Dr. Morgenstern, by then a professor at the University of Vienna, as "politically unbearable" and dismissed him from the university.

Fortunately, he had just left for a visit to America, invited by the Carnegie Endowment for International Peace, and became an American citizen. Thus, it was the Nazi conquest of Austria that brought Professor Morgenstern together with John von Neumann in Princeton, N.J. Dr. von Neumann was already there at the Institute for Advanced Studies, and Dr. Morgenstern was offered a three-year appointment by Princeton University.

Neither he nor Dr. von Neumann could ever remember how or when they first met, but remembered only their second meeting. It took place at the Nassau Club, where Professor Morgenstern gave a talk on business cycles on Feb. 1, 1939. Dr. von Neumann came to hear him and invited him to tea with Niels Bohr, the physicist, that afternoon.

They talked for hours about games and experiments. The Morgenstern-von Neumann conversation never really ceased until Dr. von Neumann died on Feb. 8, 1957.

Professor Morgenstern's work has by no means been limited to game theory. He has investigated the accuracy—or rather the inaccuracy—of economic observations. For instance, he showed that the errors in specifying data about the gross national product were large enough to invalidate most of the purposes for which economists use the data.

He has subjected existing economic theories of demand, capital, competition and much else to withering criticism. He has reconstructed the concept of utility—the values people put on particular goods, services or events—as the central concept of economics, much as power is the central concept of political science. He showed how utility could be made numerical and thereby usable in the analysis of a host of economic and strategic problems.

His essay, "Thirteen Critical Points in Economic Theory," documents his and Dr. von Neumann's belief that centuries from now scholars will look back at the existing state of economic knowledge and regard it as laughable. Obviously, this view does not endear Professor Morgenstern to many of the other leaders of the economics profession today.

His latest book, published in 1976, is called "Mathematical Theory of Expanding and Contracting Economies," which he wrote with Prof. Gerald L. Thompson of Carnegie-Mellon University.

It is a complete development of an idea put forth by Dr. von Neumann in 1932; his idea was to show that the rate of expansion of a closed economic system would be equal to the "interest factor," that is, to the real interest rate.

This result was obtained from several assumptions, such as that goods are produced from other goods, that goods produced in excess will have zero price and that processes that are unprofitable will be abandoned.

This theory probably is ahead of its time.

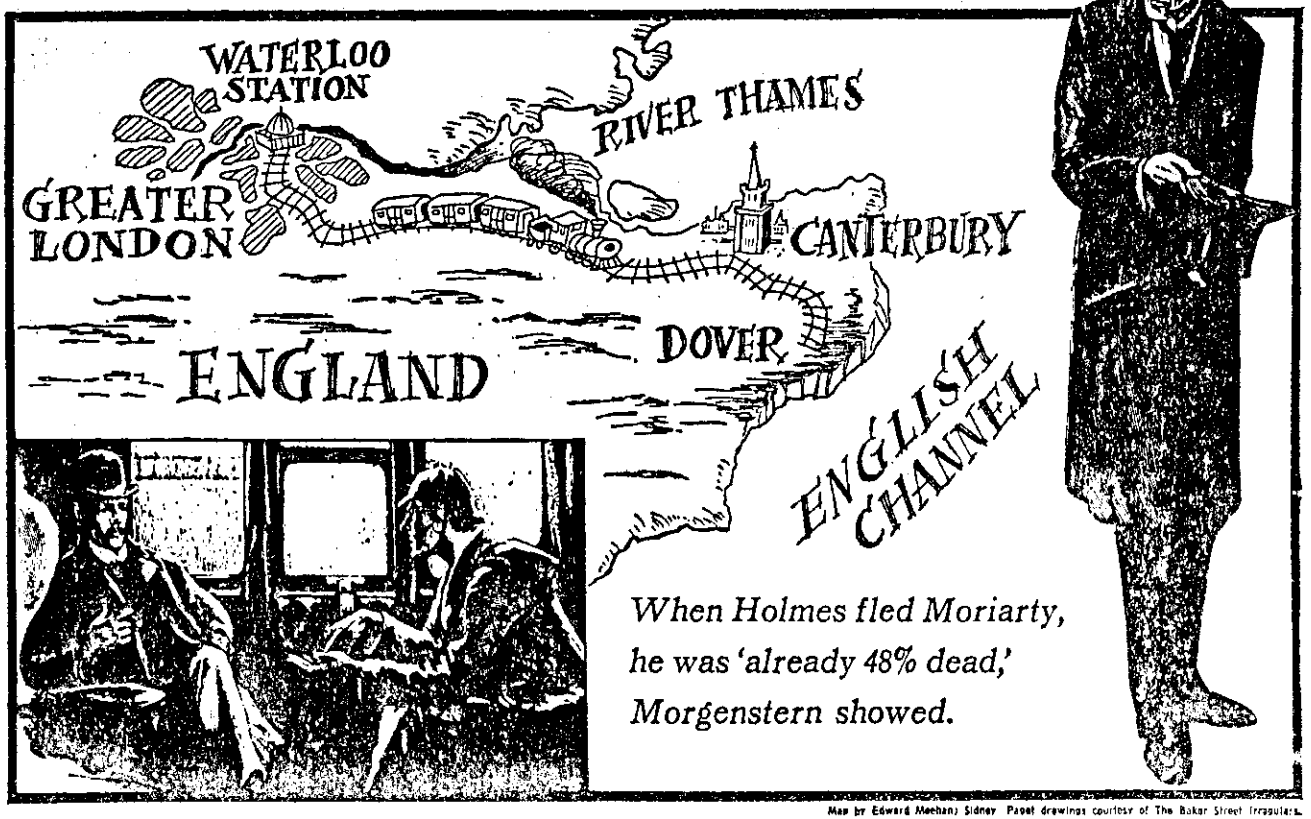
Professor Morgenstern turned Dr. von Neumann's growth theory around and made it into a theory for contraction of economics as well. He demonstrated how it might be applied in a world of tightly constrained or shrinking resources in order to minimize the economic disruption and hardship of contraction, or, as he called it, "compression."

Professor Morgenstern's style is to hold nothing back, to develop an argument wherever logic takes it, with each element firmly and clearly in place, no matter how complex and enormous the development may be. But it is all carried forward with zest, lightness and purity.

In this he has a Mozartean flair. When Mozart's opera, "The Abduction From the Seraglio," was first produced in Vienna, Emperor Josef II said to the composer, "My dear Mozart, your music would be very fine if there were not such a monstrous number of notes in it."

Mozart replied: "Not a note too many, Sire."

Oskar Morgenstern, too, has tried to spell out exactly the mathematics of reason and life, and the learned world has begun to recognize his achievement.



When Holmes fled Moriarty, he was 'already 48% dead,' Morgenstern showed.

Map by Edward Meehan; Sidney Paget drawings courtesy of The Baker Street Irregulars.