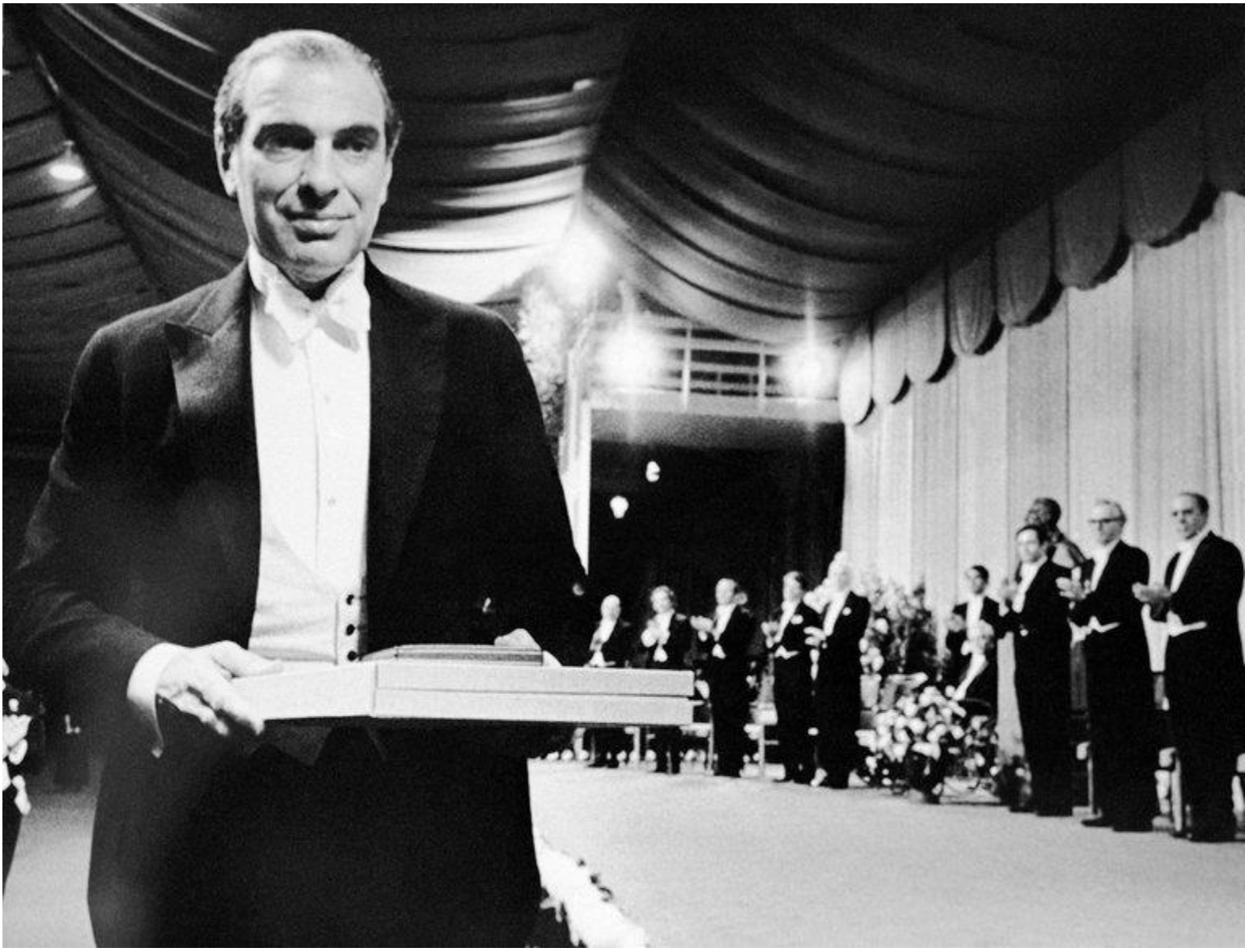
Kenneth J. Arrow died February 21, 2017. Arrow had visited the Ethics Center twice over the last few years and his most recent book, published this fall, was with the Ethics Center Director and one of the former Tobis Fellows, Nicholas Lampros. Ethics and Economics: Conversations with Kenneth Arrow is available in the Ethics Center Office.

Arrow was a lovely human being and an awe-inspiring intellect, and we shall miss him.

His obituary, from the NYT.

Kenneth Arrow, Nobel-Winning Economist Whose Influence Spanned Decades, Dies at 95

By MICHAEL M. WEINSTEIN FEB. 21, 2017



Kenneth J. Arrow receiving the Nobel Memorial Prize in Economic Science in Stockholm in 1972.CreditAssociated Press

Kenneth J. Arrow, one of the most brilliant economic minds of the 20th century and, at 51, the youngest economist ever to win a Nobel, died on Tuesday at his home in Palo Alto, Calif. He was 95.

His son David confirmed the death.

Paul A. Samuelson, the first American to win the Nobel Memorial Prize in Economic Science, called Professor Arrow "the most important theorist of the 20th century in economics." When Professor Arrow received the award in 1972, Professor Samuelson wrote, "The economics of insurance, medical care, prescription drug testing — to say nothing of bingo and the stock market — will never be the same after Arrow."

Professor Arrow — a member of an extended family of distinguished economists, including Professor Samuelson and Lawrence H. Summers, the former Treasury secretary and adviser to President Barack Obama — generated work that was technically forbidding even to mathematically oriented colleagues.

But over the decades, economists have learned to apply his ideas to the modern design of insurance products, financial securities, employment contracts and much more.

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Markets and Majorities

The backdrop for Professor Arrow's influential early work was the centuries-long recognition that majority voting can produce arbitrary outcomes.

Consider a legislature choosing its leader from among three candidates: Alice, Betty and Harry. If the legislature were to vote first on Alice versus Betty, with the winner running against Harry, it could come to a different decision than had it first started by voting on Alice versus Harry. Because the order with which the legislature takes votes is arbitrary, the ultimate winner of this system of majority voting becomes arbitrary. That puts politics in an awkward corner.

In search of nonarbitrary outcomes, social scientists proffered different ways to conduct votes. For example, the legislature could run all three candidates in the initial round and structure some type of runoff. Or the legislature could give each member multiple votes to be assigned to the three candidates in proportion to the intensity of the member's preferences.

But no voting system, however cleverly designed, resolved the problems associated with majority voting. In a theorem of stunning generality, Professor Arrow proved that no system of majority voting worked satisfactorily according to a carefully articulated definition of "satisfactory" (which social scientists generally accept).

What Professor Arrow proved in his book "Social Choice and Individual Values" (1951) was far more sweeping. Not only would majority-voting rules prove unsatisfactory; so, too, would nonvoting systems of making social choices if, as was fundamental to his way of thinking, those choices were based on the preferences of the individuals making up the society. (Professor Arrow's rules did not allow for dictators.)

The Arrow "impossibility theorem" ricocheted around the social sciences, noteworthy for its use of abstract mathematical concepts to generate a conclusion of sweeping applicability.

Professor Arrow's research opened the academic field of social choice — a literature that ranges from a countries picking presidents to corporate boards picking business strategies. Having learned from him that no system works entirely well, academics turned to challenging follow-up questions, like whether some voting systems were better than others.

Professor Arrow's next major contributions, for which he shared the 1972 Nobel Memorial Prize in Economic Science with the British economist John R. Hicks, were published later in the 1950s. They took a bird's-eye, "general equilibrium" view of market economies, setting out equations to capture the interplay between consumers and producers.

The basic equations had been set out a half-century earlier by the French economist Leon Walras. But Professor Arrow and his co-authors extended the Walrasian system to capture important complexities, like the fact that markets exist well into the future, posing risk for consumers and producers.

Professor Arrow proved that their system of equations mathematically cohere: Prices exist that bring all markets into simultaneous equilibrium (whereby every item produced at the equilibrium price would be voluntarily purchased). And market competition puts society's resources to good use: Competitive markets are efficient, in the language of economists.

Professor Arrow's theorems set out the precise conditions under which Adam Smith's famous conjecture in "The Wealth of Nations" holds true: that the "invisible hand" of market competition among self-serving individuals serves society well.

Relevance Over Decades

As was true of his earlier work on social choice, the magnitude of Professor Arrow's theoretical insight was staggering. But, he made clear, his powerful conclusions about the workings of competitive markets held true only under ideal — that is to say, unrealistic — assumptions.

His assumptions, for example, ruled out the existence of third-party effects: The sale of a product by Harry to Joe was assumed not to affect the well-being of Sally — an assumption routinely violated in the real world by, for example, the sale of products that harm the environment.

The mathematics behind the general equilibrium proofs of Professor Arrow and his co-authors were daunting. Few economists mastered the details. But Franklin M. Fisher, who taught graduate courses on general equilibrium at the Massachusetts Institute of Technology, acknowledged in a 2013 interview with The New York Times that all academic economists were in Professor Arrow's intellectual debt. Professor Arrow proved that the economists' workaday tools of supply-and-demand equations are built on a logically coherent foundation.

His later research translated common-sense ideas into elegant mathematics. Once the ideas were translated, other economists could extend them in unanticipated directions.

Photo

President George W. Bush presenting Professor Arrow with the National Medal of Science at the White House in 2006. CreditPablo Martinez Monsivais/Associated Press

Take “learning by doing,” a notion that Professor Arrow examined in the early 1960s. The basic idea is straightforward: The more that a company produces, the smarter it gets. Decades later, economists incorporated this idea into sophisticated theories of “endogenous growth,” which have a country’s rate of economic growth depending on internal policies that promote innovation and education — the very forces that Professor Arrow’s writings anticipated.

Professor Arrow also created mathematical concepts by which economists could measure and analyze risk. William F. Sharpe, who won a Nobel in 1990 for analyzing the relationship between financial risk and return, credited Professor Arrow with helping to formulate the basis for modern theories of financial investment and corporate finance.

Professor Arrow, he said, belonged in the “pantheon” of investment management. His ideas have worked their way into the design of complicated financial securities, known as derivatives, like options (which give the owner the right, but not the obligation, to buy or sell a specified asset at a specified price on or before a specified date). Businesses buy and sell financial derivatives to protect themselves from financial turmoil, and investors buy and sell them to speculate on future movements of security prices.

Professor Arrow anticipated the modern analysis of markets in which buyers and sellers do not share accurate information (now known as markets with asymmetric information). In a strikingly prescient article published in the early 1960s, he teased apart the complexities that asymmetric information creates in the market for health insurance. He pointed to incentives for patients and their physicians to agree to medical procedures of questionable value when a third party, the insurer, pays the bills.

Professor Arrow’s work spawned the modern treatment of “moral hazard,” whereby the fact of the purchase of insurance systematically affects the behavior of the parties to the contract.

The problems that Professor Arrow flagged a half-century ago figured prominently in the design of the Affordable Care Act, President Barack Obama’s 2010 health care legislation, including its controversial “individual mandate,” which required everyone to buy coverage whether they expected to need medical care or not.

Joseph Stiglitz, who won the Nobel in 2001 for formalizing the study of markets with incomplete information, traces his work to Professor Arrow’s initial forays.

The upshot? The theorist who in the 1950s proved that perfectly competitive markets could exist as a matter of mathematical logic spent much of the rest of his career showing how far short of perfection actual markets fall.

A Lifetime of Learning

Kenneth Joseph Arrow was born on Aug. 23, 1921, in New York City. After graduating from Townsend Harris High School in Manhattan, he raced through City College, finishing with a bachelor’s degree in social science and in mathematics — what he called later “a paradoxical combination that was prognostic of my future interests.”

He did his graduate work at Columbia University, interrupting it to serve as a weather officer, rising to captain, in the Army Air Corps during World War II. His first published paper, “On the Optimal Use of Winds for Flight Planning,” drew on this experience.

Early in his career he worked at the RAND Corporation, the research and development organization in Santa Monica, Calif., in what he described as “the heady days of emerging game theory and mathematical programming.”

Professor Arrow spent the bulk of his career at Stanford University, except for a teaching stint at Harvard from 1968 to 1979. He also served briefly on the staff of President John F. Kennedy’s Council of Economic Advisers.

He retired from Stanford in 1991 but continued to accept short-term appointments in Europe and to serve on the external faculty and the science board of the Santa Fe Institute, a research center in New Mexico focused on the interplay of the social and physical sciences.

He led the American Economic Association, served on the Intergovernmental Panel on Climate Change and, in 2004, was awarded the National Medal of Science, the nation’s highest scientific honor, presented in 2006 by President George W. Bush.

“His politics are liberal, definitely,” said Robert M. Solow, a longtime friend and fellow Nobel laureate in economics. “With other people, this might rub the right half of the economics profession the wrong way, but it doesn’t with Kenneth.”

Professor Arrow's family members with ties to academic economics include his sister, Anita Summers, a professor emerita at the Wharton School of the University of Pennsylvania. Her husband, Robert Summers, who died in 2012, was also a noted professor of economics there.

Robert Summers was the brother of Paul Samuelson and the father of Lawrence Summers, who at 28 became a tenured economics professor at Harvard and later served as the Treasury secretary under President Bill Clinton, as well as president of Harvard and senior adviser to Mr. Obama.

Professor Arrow's wife, the former Selma Schweitzer, whom he married in 1947, died in 2015. Besides his sister and son David, he is survived by another son, Andrew, and a grandson.

Professor Arrow was widely hailed as a polymath, possessing prodigious knowledge of subjects far removed from economics. Eric Maskin, a Harvard economist and fellow Nobel winner, told of a good-natured conspiracy waged by junior faculty to get the better of Professor Arrow, even if artificially. They all agreed to study the breeding habits of gray whales — a suitably abstruse topic — and gathered at an appointed date at a place where Professor Arrow would be sure to visit.

When, as expected, he showed up, they were talking out loud about the theory by a marine biologist — last name, Turner — which purported to explain how gray whales found the same breeding spot year after year. As Professor Maskin recounted the story, "Ken was silent," and his junior colleagues amused themselves that they had for once bested their formidable professor.

Well, not so fast.

Before leaving, Professor Arrow muttered, "But I thought that Turner's theory was entirely discredited by Spencer, who showed that the hypothesized homing mechanism couldn't possibly work."

Robert D. Hershey Jr. contributed reporting.

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