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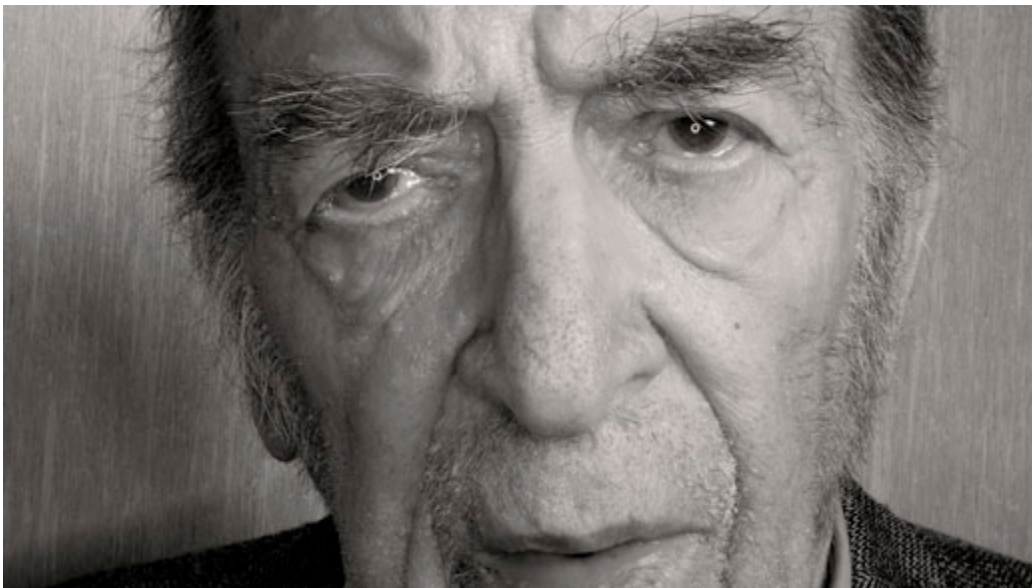
FEATURE

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## Leonid Hurwicz's Game

**Minnesota's latest Nobel laureate has brought an understanding of life's imperfections—and his own remarkable life—into the study and improvement of economic transactions.**

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“We very often assume the underlying arrangement is ‘perfect competition’ . . . . My question was, What other systems or mechanisms or variables are possible?”

Photograph by Raoul Benavides

Leonid Hurwicz lives on the sixth floor of an assisted-living complex in south Minneapolis with Evelyn, his wife of 63 years. He is hard of hearing, and requires dialysis twice a week. Today, he is dressed in gray sweatpants, a crisp cotton shirt, and a sport coat, weighing perhaps 120 pounds. Inside his and Evelyn’s double apartment, he shuffles among tall piles of books and files, childhood photos of his four children (now ranging in age from 54 to 61), a menorah, and prints and tapestries from the old country—Poland.

“The way I describe it is, there are two kinds of games in economics,” Hurwicz says. He inches his chair closer to the dining room table—which takes a full minute—and leans in like someone confiding a secret. At the age of 90, his voice is full of gravel and softness. “One is the game where people use only

legal moves. Then there is the true game, the one like real life, where the strategies and moves people make, some of them contain illegal gains. So you take into account when you write the rules of the game that the players will try to cheat.”

That’s the basis of “mechanism design,” for which Hurwicz (pronounced “HER-witch”), a University of Minnesota regents professor emeritus of economics, won the 2007 Nobel Prize in economics. Too frail to make the trip to Sweden, Hurwicz received the award from the Swedish ambassador to the United States in the university’s Ted Mann Concert Hall on December 10.

Mechanism design builds on game theory, which arose in the 1940s as a mathematical means of studying various interactions, including business negotiations and transactions. According to game theory, each “player” in an exchange will choose a strategy to better his own position based on the strategies that he believes others will employ. (Think of a blind auction: How do you bid on something so that you win the item but don’t pay too much for it?)

In business, there are many examples of “games” in which one player can increase his odds of winning by being less than up front. What Hurwicz did—along with Eric Maskin at Princeton and Roger Myerson at the University of Chicago, who both share the Nobel Prize with him—was invent a mathematical way to assess the effects of dishonesty or other imperfections and prevent a zero-sum game in which dishonest winners turn other players into undeserving losers. Since imperfect results can occur in the free market—monopoly power, hidden information (Enron’s off-the-books funds, for instance), pollution, disincentives to make product improvements—Hurwicz and his colleagues wondered, How can regulators (or other players) create incentives so that everyone wins and the efficiencies of a market economy aren’t lost?

“Leo’s research provided a way to categorize all the outcomes that are achievable in different economic settings,” says Narayana Kocherlakota, chair of the Department of Economics at the University of Minnesota. “He understood that people might not abide by the rules and thought about all the possible games and arrangements and policies that could result. The way economists worldwide think through problems is heavily influenced by Leo’s thinking even today.”

Mechanism design is commonly used now to set up transactional strategies. For individual consumers, one of the most familiar and recognizable examples is the open auction, where potential buyers and sellers determine how valuable an item is and set the best price based on all of the players knowing what’s being bid. But the same principles are at work in other situations—the federal government’s auction approach to selling cell phone bandwidth, for instance.

The basic premise underlying Hurwicz’s theory may seem obvious now. But when he began working on it in the 1960s, the idea of factoring in the self-interest of players in business transactions was considered cutting edge. He and his colleagues believed that incentives could encourage players to arrive at the best possible outcome not only for themselves but for the other players in the game.

Hurwicz says that he is simply a product of his history. He knows from experience how circumstances change when people don’t abide by the rules of the game.

**“I cannot tell you my life story and what I did without telling you about politics as well,” Hurwicz says.**

Leonid Hurwicz was born in Moscow in 1917. In early 1919, he and his family returned to Warsaw—his father’s home; his mother was also Polish—after the Communists came to power in Russia. “My father was convinced, I think rightly, that if he stayed in Russia, he would have trouble with Lenin,” Hurwicz says. “Of course, that’s not my memory; I was 14 months old. But I know we

traveled in various imperfect ways, such as horse-drawn wagon, to arrive in Poland.”

His father was a lawyer, with a degree from the Sorbonne in Paris. The Polish bar wouldn’t accept the French credentials, so he taught history instead. Hurwicz’s mother was a teacher as well, but after the move she stayed home with him and his younger brother, giving them lessons in reading, writing, and arithmetic. Hurwicz didn’t begin formal schooling until the age of nine, when he started at a private institution attended and staffed mostly by Jews.

It was a time of pogroms throughout Europe. Though he and his family were not swept up in anything so frightening, Hurwicz does recall strange, random attacks. One year, the university in Warsaw decided the Jewish community had not contributed its share of corpses to the medical school. When a group blocked Jewish students from entering their classrooms, the university president failed to intervene.

“I experienced harassment during this period,” Hurwicz pauses, as if remembering. “But I never was beaten or attacked personally. And with my professors, I felt no discrimination.”

He graduated from Warsaw University in 1938 with a degree in law, intending to follow in his father’s footsteps. However, beginning in his second year of law school, he’d taken economics courses and became more interested in this discipline than any other.

“I had the belief that many troubles you could observe on the European continent were due to politicians not understanding economic phenomena,” Hurwicz says. “Even if they had good intentions, they didn’t have the skills to solve problems.”

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Hitler was in power in Germany and Jews all across Eastern Europe were on guard—made to feel like intruders in their own countries, hearing hideous rumors about persecution they could not fathom but nevertheless feared. Hurwicz’s father, sensing the changing tides, suggested that his older son apply to the London School of Economics rather than set up a law practice at home.

Leo went to London in the fall of ’38, but due to unrest in Europe and a sudden surge in Jewish émigrés, the British refused to extend his visa. So Hurwicz went to France and then Switzerland. He arrived in Geneva on August 25, 1939—less than a week before Germany attacked and occupied western Poland, including Warsaw. Hurwicz heard the news, but didn’t know that his parents and brother had been arrested and taken to a labor camp in Arctic Russia. He spent months in Geneva, enrolled part time as a student, living off what little money he had left, and waiting for a letter from his family telling him what to do.

Hurwicz contacted a cousin in Chicago, whom his parents had told him would help if he needed to leave. In 1940, 23 years old and all alone in the world but for a cousin he’d never met who wired money and an address, Hurwicz booked passage on an Italian boat.

“In a month—no less—Mussolini joined Hitler,” Hurwicz recalls. His ticket was now worthless. “That was bad luck for me, because there was the question of how to get my money back. Also, even if I had money, how did I travel from Switzerland to some city which was not on Hitler’s side and could get me to America?”

He found a way. An airline opened briefly between Geneva and Barcelona, both neutral cities. Hurwicz was able to fly to Spain and take a train to Madrid, then Lisbon. He spent two months in a Portuguese

city “like Monte Carlo,” tutoring the children of wealthy Spanish and French families vacationing there. Then Hurwicz got word of a Greek boat sailing for New Jersey.

At Chicago, he hired, sight unseen, a young teaching assistant from Wisconsin named Evelyn Jensen. They were married in 1944; the first of their four children was born two years later.

He asked the harbormaster for help getting his money back from the Italian company, suggesting that the harbormaster could threaten to take the company’s license away, and that if he didn’t succeed, he would have Hurwicz on his hands for the duration of the war. With a refund and the little he had earned tutoring, Hurwicz booked passage on the Greek boat.

In Chicago, he lived with his cousins deep in the Polish section of town—sleeping on their couch and auditing courses at the University of Chicago. Finally, he got an offer of a job at the Massachusetts Institute of Technology “from someone who is very well known: Paul Samuelson. The job was teaching and being a research assistant for only one semester—a term no self-respecting graduate student would accept,” Hurwicz says. “But I had no other offers. In fact, it was a miracle I had this one.”

He moved to Massachusetts and began working under Samuelson, who would win the Nobel Prize for economics in 1970. At MIT, Hurwicz tested a hypothesis about how businesses arrive at prices for their goods and services. He returned to Chicago in mid-June, by now a more desirable candidate for academic appointment.

### **Again, world events dictated his course.**

After Pearl Harbor was bombed in December 1941, Hurwicz went to his statistics professor and asked how he could help the war effort. The professor, engaged in research on a brand new invention called radar, brought him onto the project. This led to an appointment with the Institute of Meteorology at the University of Chicago, where Hurwicz taught prospective Army and Navy inductees how to analyze weather data.

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Hurwicz had a short academic stint at Iowa State University then at the University of Illinois. But in early 1951, with McCarthyism rampant on college campuses, his politically liberal colleagues in the economics department were targeted, and Hurwicz resigned in protest. Soon afterward, he heard from an Iowa friend who had moved north and thought Hurwicz should consider joining the economics department at the University of Minnesota. Within a couple of months, Hurwicz moved his family to Minneapolis, where he would develop the idea that would win him the Nobel Prize.

“When you talk about the economic process of a society, sometimes we separate it into two stories,” Hurwicz says. “One is about monetary variables. But then, we very often assume the underlying arrangement, the other variable, is ‘perfect competition,’ which means people do whatever they are supposed to do. But actually, there is usually some chapter, not too long, which tells you there are different mechanisms that operate in a particular economy . . . . My question was, What other systems or mechanisms or variables are possible?”

Hurwicz not only pondered the question, but used mathematics to create working economic models. He developed mechanism design to help businesses and other organizations arrive at solutions that combine truthfulness, individual rationality, and social welfare.

Here’s a simplified example from Hurwicz’s work. An old coal-burning energy plant is spewing pollutants. In the not-so-distant past, the response would be for a government regulator to simply

demand that the utility reduce emissions or be shut down. But there are problems with this approach. It might not be a simple matter to cut emissions—the cost may be prohibitively high. Or the owner may try to finesse the “game” by hiring an attorney who knows ways to keep the issue bottled up in court. He may also have influence with local legislators, who don’t want to lose the jobs (and electricity) the plant produces.

Mechanism design shows how to attain more efficient outcomes while taking into account the two sides’ different motivations. One possible scheme: A “cap-and-trade” system that creates financial incentives to reduce emissions by assigning a cost to polluting. The government establishes a cap to limit emissions. The emissions allowed under the new cap are then divided up into individual permits that give producers the right to emit that amount. Companies are free to buy and sell these permits. Those who can reduce emissions at a low cost do so, then sell their permits at a profit to companies that continue to pollute. Those high polluters thus have an incentive to reduce their own emissions.

In this case, mechanism design uses government regulation to create a market solution when the market, on its own, doesn’t work very well. Such Hurwicz-inspired mechanisms may be useful in creating innovative solutions to some of the thorniest problems in public policy—reducing the inequities in the U.S. health care system, or regulating the ever-expanding telecom industry.

**Hurwicz translated the lessons of oppression into a now global belief system that is equal parts economics and philosophy, and that helps solve specific problems in the real world. Among the many things he’s learned: People can rise above their self-interest.**

In his 1988 paper called “But Who Will Guard the Guardians?,” Hurwicz wrote: “Somewhere at a finite end in the chain of guardians, there may be guardians (individual or collective) who are in sympathy with the rule (game-form) that makes certain behavior illegal, e.g., whose ethical standards rule out corrupt behavior, and who have the ability (through power, financial assets, personal charisma or status, combined with the population’s respect for it), as well as the inclination to act so as to discourage improper behavior of the guardians of lower order.”

He describes how, in a truly democratic society, corrupt politicians can be halted by concerned and selfless voters—he calls them “intervenors”—who act to right the system. The same is true, Hurwicz postulates, in business, where a handful of righteous individuals can rebalance an equation thrown off kilter by dishonest peers.

“Just as despair can come to one only from other human beings,” proclaimed Elie Wiesel, who was interned at Auschwitz during World War II and won the Nobel Peace Prize in 1986, “hope, too, can be given to one only by other human beings.”

Both Hurwicz and Wiesel, in their own ways, are saying something similar.

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