

VIII edición

Premios Fundación BBVA Fronteras del Conocimiento

BBVA Foundation Frontiers of Knowledge Awards

8th edition

### Frontiers of Knowledge Award in Economics, Finance and Management

## The BBVA Foundation Award goes to Robert Wilson for his pioneering analysis of economic interactions under information asymmetry, and his broadening of the field to include reputation-building as a spur to cooperation

- Wilson, a professor at Stanford University, broke new ground in the use of game theory, applying it to auction design and nonlinear pricing in sectors such as electricity
- He has led the field in tariff design research and produced what is now a classic textbook on the subject
- His refined game theory methodology allows to analyze the effects of information asymmetry in dynamic environments

**Madrid, February 16, 2016.-** The BBVA Foundation Frontiers of Knowledge Award in Economics, Finance and Management goes in this eighth edition to Robert Wilson for "pioneering contributions to the analysis of strategic interactions when economic agents have limited and different information about their environment". In the view of the jury, "his research on auctions, electricity pricing, reputation and dynamic interactions under such informational circumstances was groundbreaking and pervades economic analysis to this day".

Wilson is the author of major contributions in the field of microeconomics, with an emphasis on market architecture. Among his landmark contributions is his development, with David Kreps, of the notion of sequential equilibrium, introduced to the world in 1982. Sequential equilibrium is a game theory method that allows to analyze the effects of asymmetric information in dynamic environments. Crucially, it factors the beliefs of each player regarding the private information held by the others, such that a change in perceptions can alter the prevailing equilibrium.

This equilibrium concept has given rise to an array of applications in diverse economic areas, including industrial organization (price wars) and labor economics (collective bargaining and strikes). Another of its key insights turns on "reputation", the idea being that economic agents use the past actions of other agents to infer the private information in their possession and predict their future

actions. Wilson showed that this mechanism provides incentives for agents to invest in building a reputation, adopting strategies that may cause them short-term losses but that nonetheless alter beliefs about their private information, making them long-run optimal. For example, a monopolist seeking to deter potential market entrants, will be prepared to cut its prices to the extent of incurring substantial losses, not just to fight off existing entrants but also to dissuade future competitors, acquiring itself a reputation (perception shift) as an aggressive firm.

This model is used by antitrust authorities when analyzing cases of predatory pricing (prices below cost) with a view to imposing penalties in defense of consumer interests. The other extreme is represented by cases of multilateral conflict like the "repeated prisoners' dilemma", where the goal is to pursue a reputation for "cooperative" behavior.

"Reputation effects are most prominent in bargaining," remarked Wilson after hearing of the award. "For example, when a firm incurs the costs of a strike in order to convince the union that the marginal productivity of labor is not higher than it actually is, it is sending out a credible signal that sustains its reputation."

Robert B. Wilson (Geneva, Nebraska, 1937) graduated in mathematics from the University of Harvard. He went on to complete a master's degree at Harvard Business School (1961), where he also obtained his PhD with a thesis on sequential quadratic programming (1963). In 1964 he joined the faculty at Stanford Business School, where he remains to this day.

It was in the field of industrial economy that Wilson made another of his landmark contributions, in the area of tariff design and price discrimination.

Price discrimination is a standard commercial practice that involves selling a good or service at different prices depending on the consumer. It is a way to boost business revenues while expanding the customer base that would not otherwise have access to the product. Many of the prices we encounter daily are of a nonlinear nature, like air fares, electricity tariffs (with a fixed and variable component) or the bulk discounts on offer in almost all economic sectors.

Wilson has led the field of research into nonlinear tariffs and produced a classic textbook on the subject, *Nonlinear Pricing* (Oxford University Press, 1993), an in-depth exploration of the many ways in which companies can segment a market (price discrimination) using nonlinear prices.

His studies, and this advanced outreach publication, have enabled professionals in fields far removed from economics to optimize their "tariff menus", with the resulting improvement in both company profits and the wellbeing outcomes of regulatory agencies. An example of his numerous contributions in this area is the design of electricity tariffs that fulfill a dual objective: allowing utilities to recoup their investment in new capacity, while ensuring that consumers do not suffer power interruptions at peak demand times. The two-part tariffs that Wilson

proposed have found practical expression in the pricing systems used in electricity markets the world over, based on load size or service reliability.

### **Efficient auctions**

“All the research I have done has been motivated by practical considerations,” affirms Robert Wilson. He has put his game theory insights to work in improving market and auction design for sectors like energy, oil and telecommunications. The sale of offshore oil leases along the California coast provided the chance to be the first economist to study and design auctions in asymmetric environments. And he was also a pioneer in analyzing divisible goods auctions in which competing bidders have private information, such as those in use to auction money or in the setting of wholesale electricity prices.

Indeed it is in the power market where his influence has been most marked, and many features of today's deregulated markets – generation tenders, nonlinear tariffs, etc. – trace their origins to his work. Not only that, his contributions to auction theory and market design have enabled many governments to improve the efficiency of procurement procedures and strategic sectors, to the benefit of all members of society.

Wilson undertook part of his research into auction design with his disciple Paul Milgrom, winner of a BBVA Foundation Frontiers of Knowledge Award in 2012 for contributions in this and other domains.

In the mid-1990s, California telecom company Pacific Bell was preparing to bid in an auction called by the U.S. Federal Communications Commission. Wilson and Milgrom pointed out errors in the auction design that produced a worse outcome for both organizers and bidders and proposed an alternative method which the FCC agreed to try. Their innovation, known as the simultaneous multiple round auction (SMR), replaced the traditional sealed envelope with an open bidding format, in which each company could observe what the rest were offering, supplemented by rules to prevent monopoly pricing. The auction – of electromagnetic spectrum for what was then the new generation of cell phones and other wireless communication devices – raised the record sum of over seven billion dollars, and testified in the most practical way possible to the value of game theory in strategic decision-making.

Wilson is still engaged in research at Stanford University. He is currently studying “repeated interactions between two parties who can benefit from sustained cooperation,” a situation, he notes, that may be short-lived, since “not every kind of incentive encourages cooperation on a lasting basis.”

Author of over a hundred articles in international journals, he has consistently combined the construction of a robust theoretical framework with the search for practical solutions: “The value of theory is its usefulness in addressing practical problems, while, for the theorist, the problems encountered by practitioners provide a wealth of topics.”

This combination is a constant in his professional life, where he has alternated the presidency of the Econometric Society and associate editorship of journals like *Economic Theory* with advisory work for the United States Department of the Interior, the Electric Power Research Institute, the Federal Communications Commission, the Canadian Competition Bureau and sundry private corporations.

### **About the BBVA Foundation Frontiers of Knowledge Awards**

The BBVA Foundation promotes, funds and disseminates world-class scientific research and artistic creation, in the conviction that science, culture and knowledge hold the key to better opportunities for all world citizens. The Foundation designs and implements its programs in partnership with some of the leading scientific and cultural organizations in Spain and abroad, striving to identify and prioritize those projects with the power to significantly advance the frontiers of the known world.

The BBVA Foundation established its Frontiers of Knowledge Awards in 2008 to recognize the authors of outstanding contributions and radical advances in a broad range of scientific, technological and artistic areas congruent with the knowledge map of the late 20th and the 21st centuries, and others that address central challenges, such as climate change and development cooperation.

Their **eight categories** include classical areas like *Basic Sciences*, and other, more recent areas characteristic of our time, ranging from *Biomedicine, Information and Communication Technologies, Ecology and Conservation Biology, Climate Change* and *Economics, Finance and Management* to *Development Cooperation* and the innovative realm of artistic creation that is *Contemporary Music*.

The **juries** in each category are made up of leading international experts in their respective fields, who arrive at their decisions in a wholly independent manner, applying internationally recognized metrics of excellence. The BBVA Foundation is aided in the organization of the awards by the **Spanish National Research Council (CSIC)**. As well as designating each jury chair, the CSIC is responsible for appointing the technical evaluation committees that undertake an initial assessment of candidates and draw up a reasoned shortlist for the consideration of the juries.

**CSIC technical committee members** in the Economics, Finance and Management category were **José Antonio Berenguer Sánchez**, Coordinator of the CSIC Humanities and Social Sciences Area and Research Scientist at the Institute of Languages and Cultures of the Mediterranean and the Middle East (ILC-CSIC); **Alejandro José Caparrós Gass**, Research Scientist at the Institute of Public Goods and Policies (IPP-CSIC); **Adela García Aracil**, Tenured Researcher at the Institute of Innovation and Knowledge Management (INGENIO-CSIC); and **Luis Vicente Sanz Menéndez**, Research Professor at the Institute of Public Goods and Policies (IPP-CSIC).

## Economics, Finance and Management jury

The jury in this category was chaired by **Eric S. Maskin**, Adams University Professor at Harvard University (United States) and 2007 Nobel Laureate in Economics, with **Manuel Arellano**, Professor of Econometrics in the Center for Monetary and Financial Studies (CEMFI) of Banco de España (Spain), acting as secretary. Remaining members were **Pinelopi Koujianou Goldberg**, William K. Lanman, Jr. Professor of Economics at Yale University (United States); **Andreu Mas-Colell**, Professor of Economics at Pompeu Fabra University (Spain) and 2009 BBVA Foundation Frontiers of Knowledge Laureate in Economics; **Jean Tirole**, Chairman of the Foundation Jean-Jacques Laffont at Toulouse School of Economics (France), 2008 BBVA Foundation Frontiers of Knowledge Laureate in Economics and 2014 Nobel Prize in Economics; and **Fabrizio Zilibotti**, Chair of Macroeconomics and Political Economy in the Department of Economics at the University of Zurich (Switzerland).

## Previous laureates

A list of laureates in previous editions is available on the following link:

<http://www.fbbva.es/TLFU/tlfu/ing/microsites/premios/fronteras/index.jsp>

## UPCOMING AWARD ANNOUNCEMENT

CATEGORY	DATE
Development Cooperation	Tuesday, February 23, 2016

### LAUREATE'S FIRST DECLARATIONS AND IMAGES

A video recording of the new laureate's first interview on receiving news of the award is available from the Atlas FTP with the following name and coordinates:

Server: **213.0.38.61**

Username: **AgenciaAtlas5**

Password: **premios**

The name of the video is:

"PREMIO FRONTERAS DEL CONOCIMIENTO CATEGORÍA ECONOMÍA, FINANZAS Y GESTIÓN DE EMPRESAS PROF. ROBERT WILSON"

In the event of connection difficulties, please contact Alejandro Martín at ATLAS:

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