



CAN WE CALCULATE THE FUTURE?

THE TROUBLED RELATIONSHIP BETWEEN MATH AND ECONOMICS

By IMD Emeritus Professor Stéphane Garelli

IMD
Chemin de Bellerive 23
PO Box 915,
CH-1001 Lausanne
Switzerland

Tel: +41 21 618 01 11

Fax: +41 21 618 07 07

info@imd.org

www.imd.org

The recent death of Kenneth Arrow, one of the greatest economists of our time, is a reminder that most of the Nobel Prize winners in economics were also brilliant mathematicians. In addition, a number of other Nobel winners, such as John Nash, were scientists whose work became relevant to economic theory.

The Freudian concept of "narcissistic injury" applies well to economists. They have always suffered because their discipline is not regarded as a genuine science. To acquire the status of science, economic facts should be expressed in equations. Therefore, many economists turned to mathematics.

In 1997, the Nobel Prize in economics was awarded to Myron Scholes and Robert Merton for a new method of calculating the price of derivatives. They joined the board of the Long-Term Capital Management hedge fund. In 1998, however, the fund lost \$4.6 billion and went into bankruptcy two years later. Why? According to Karl Popper, and Franco Modigliani (another mathematician who won the Nobel Prize in economics), economists interfere with the events that they study. "If they forecast a fall in prices, their prediction will contribute to the trend that they anticipate," Popper said.

Modern economics is increasingly focusing on identifying possible choices rather than on calculating outcomes. To run a business, emotional intelligence is as important as a rational intellect. The rebound of financial markets just after the election of President Trump is better explained by "the animal spirits" identified by Keynes than by logical financial analysis. Nicolas Hayek didn't launch the Swatch watch company with a mathematical formula. Angela Merkel, who is a scientist by background, does not manage Germany with equations.

Even in sciences, mathematics does not always prevail. Besides the steam engine, the other big industrial revolution of the 19th century was electricity. Its foundations, or rather those of electromagnetism, were laid down by Michael Faraday in his seminal book, first published in 1839, "Experimental Research into Electricity": 332 pages and not a single mathematical equation...

So why are we so obsessed with mathematics, a subject which destroys the lives of many otherwise perfectly intelligent young students? Essentially to select them before they are allowed to pursue economic studies. When hundreds of students want to be admitted to a university course, they need to be screened. How? Through exams where there is only one correct answer to a specific question, hence mathematical problems. Economic topics where many different responses are conceivable are too difficult to manage, and cannot be corrected in mass by assistants.

The tragedy is that our approach discourages brilliant young people who do not have a scientific mindset. They often are forced to learn complex mathematical concepts or advanced statistics which will be of no use whatsoever in their future career. Worse, equations will give them a false sense of security: if it can be calculated, it must be true. Behavioral sciences, sociology, or even psychology would be more useful.

How damaging this is for the creativity of our children! As Albert Einstein once said, "Logic will take you from A to B, but imagination will take you everywhere." With logic, we shall always repeat the past, with imagination we can create the future.

[Stéphane Garelli](#) is a world authority on competitiveness and has pioneered research in this field. He is Professor Emeritus at IMD where he founded the [World Competitiveness Center](#).