Theorem: Taxing behaviors that harm others benefits all

Lectures: Human cooperation beyond self interest

Many animals cooperate — to hunt prey or defend territory, for instance — but humans alone cooperate in large numbers beyond the immediate family. Self interest, the mantra of biologists and economists alike, doesn’t fully explain human cooperation.

Two Institute researchers, SFI Professor Sam Bowles and External Professor Herbert Gintis, have developed an alternative explanation of how humans evolved into such a highly cooperative species.

“We found compelling evidence that genuine altruism — morality, generosity, and civic-minded behavior — could have evolved among humans through a process of intergroup competition in which groups with more altruists won.”

Sam will present these findings in a three-part series of Ulam Lectures, titled “A Cooperative Species: How We Got to Be Both Nasty and Nice,” on Sept. 16-18. The talks will summarize the researchers’ forthcoming book, A Cooperative Species: Human Reciprocity and Its Evolution.

Their work has wide-ranging implications, especially for economists and policymakers whose models often neglect morality and altruistic behavior, Sam says. The findings could suggest ways to revise policies and institutions that mostly try to harness self interest for the public good.

“Sometimes these policies destroy altruistic motivations,” he says.

Sam’s research is supported by an endowment to the Institute provided by George Cowan, as well as funding from the NSF and other sources. The talks are part of a continuing lecture series dedicated to the memory of the great Polish mathematician Stanislaw Ulam, who died in 1984. Ulam is known for his contributions to a wide range of disciplines including number theory, set theory, and theoretical biology.

 exterality-laden behaviors include public smoking, which harms others’ health; driving during peak rush hour, which worsens congestion; and building homes on flood plains, where taxpayer-funded rescue is sure to be needed eventually.

“An externality is a violation of somebody else’s property rights,” says SFI External Professor and Yale economist John Geanakoplos, the theorem’s lead author. “Paying a tax on it is just like paying any other market price.”

A new economic theorem may provide an argument for taxation that even tax minimalists could embrace.

The theorem shows how a broad package of taxes levied expressly on consumer choices having significant negative externalities (e.g., choices that impose cost and burdens on others) ends up benefiting everyone in society, and all without the coercive confiscation and paternalism that make taxation a four-letter word for some.

Research news

The occasion for the July 20 interview was Gore’s call for a ten-year program to shift the U.S. to non-carbon fuel sources for electric power. Near the end of the interview, Gore cited the devastating effect of beetles on forest health due to increasing global temperatures and mentioned a connection between beetles, deforestation, and climate change.

Last year, Jim sent Gore his 2006 SFI white paper, “Insects, Trees, and Climate,” which examines the connection between beetles, deforestation, and climate change. Gore cited the devastating effect of the spruce bark beetle on forest health due to increasing global temperatures.

Market ecologies workshop draws wide interest

A five-day workshop at SFI July 28-Aug. 1 drew a dozen experts from the fields of economics, physics, ecology, and biology to explore how the principles driving financial markets can be better understood if they are viewed as evolving ecosystems.

Like species, financial strategies compete with one another, adapt, live and die, and spread or go extinct, according to SFI Professor Doyne Farmer, who organized the workshop. (SFI Update, August issue)

The workshop’s discussions began with a review of traditional views of financial markets, a primer on market ecology concepts, and a discussion of potential first steps toward understanding ecosystems and how they function. Subsequent presentations outlined how to model various ecosystems.
Cardenas selected for Harvard post

Former SFI Internationa

Camilo Cardenas is the Robert F. Kennedy Professor of Latin American Studies at Harvard this semester.

The professorship, created in 1986 through an endowment from the Edward J. Safra Foundation and the Republic of New York Corporation, was established to invite eminent Latin Americans from any country to pursue a custom project for the summer. University of Michigan undergrad Kimira Ruelle mer program came to a close in mid-August. Each REU student paired up with an SFI professor to pursue a custom project for the summer. University of Michigan undergrad Kimira Ruelle

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Predictive information and exploratory behavior of autonomous robots Aj., Nihat (SFI External Professor); Bertinchere, N; De R; Qutier; F; Olrich, E; Electronic Journal B 63 (3), June 2008, pp. 300-309

Why are large cities far more complex than small? Using a model-building approach, Bertinchere and colleagues found that the spatial organization of urban systems is self-similar across time scales, and that they are scale-free, which is similar to those observed in the organization of the Internet and the World Wide Web. The findings provide new insights into the mechanisms that govern the growth and complexity of urban systems.

Inflation of the edge of chaos in a simple model of gene interaction networks. Shick, D; Hane, R; Thurner, Stefan (SFI External Professor); Physical Review E 77 (6 RT) 1 June 2008, pp. 965-972

The SFI grant to help Taos-area youth: Institute welcomes four new postdocs

To help promote Project GUTS, SFI and SFI Professor John Miller are offering novelty license plates for a richer theoretical biology. On the surface, many bacteria break their metabolic processes to cope with one set of environmental conditions and another to cope with another. “In the case of physicist Karl Jansky, founder of the radio astronomy field in 1931, the noise, Gell-Mann says, Jansky heard as a ‘beautiful signal’ was caused not by atmospheric disturbances but by ancient signals streaming to us from the very birth of the universe,” says Doyne. He is one of the very best science, even if that does mean abandoning some of economists’ most cherished economic theories. The new fellows: Tanya Elliott, a graduate student from the University of Oxford’s Mathematical and Computational Finance Centre for Theoretical Physics, is pursuing research interests in condensed matter, statistical physics, mathematics, networks, and quantum physics. In particular, she is exploring analytic methods for determining interest of random geometrical objects of interest in physics, such as “random combs,” and how they might be extended to diverse scales and problems, such as for understanding quantum gravity.
Della Ulibarri among 2008 Spanish Market artisans

Part-time artist and full-time SFI staffer Della Ulibarri was accepted into this summer’s Spanish Market, gaining entry into the exclusive community of artisans on her first attempt.

The Spanish Market is organized by the Spanish Colonial Arts Society, which supports Hispanic artists through education programs, grants, and production of two annual juried public markets in July and December.

Della’s selection allowed her to join several dozen artists selling their wares on the Santa Fe Plaza July 26-27. She’ll be guaranteed a booth during the winter event as well.

Her specialty is straw appliqué, a genre invented in northern New Mexico villages in the 1700s when Hispanic villagers, as a more affordable substitute for traditional gold inlays on crucifixes and other objects of worship, invented a process for adhering straw to wood.

The straw (from hay, corn, or wheat) is split and flattened, the soft inner pith is scraped away, and the straw is cut and glued to wood and sprayed with varnish. The golden straw provides the look of gold inlay.

Della was born and raised in Truchas, N.M., 35 miles northeast of Santa Fe. She moved to Santa Fe in 1985. She completed her 20th year at SFI this summer.

She also displays and sells her art at the Santuario de Chimayo Gift Shop in Chimayo, N.M., and at local arts and crafts fairs.

> Taxing harm continued from page 1

You can choose to pay it or you can walk away [from the behavior].”

Because the taxes are on choices, they are non-compulsory; and because they are based on quantifiable harm to others rather than on some presumed self-harm, they are non-paternalistic.

The theorem appears in a paper titled “Pareto Improving Taxes,” co-written with University of Warwick economics professor Herakles Polemarchakis and published in the July issue of the Journal of Mathematical Economics.

“The idea of taxing an externality is a hundred years old. Our novel contribution here,” John explains, “is the idea of a package. We’ve proven mathematically that when you package these sorts of taxes together, everyone comes out better off.”

While any single externality tax may take something of value from some individuals — say, by making it costlier to drive during rush hour, or to smoke — a broad constellation of such taxes guarantees that each and every person’s quality of life, as measured by his or her own beliefs, tastes, and preferences, will improve on the whole.

> SFI researchers’ work to be featured in PBS NOVA program Oct. 28

The work of SFI President and Distinguished Professor Geoffrey West and Institute External Professors Jim Brown (University of New Mexico) and Brian Enquist (University of Arizona) will be featured in “Hunting the Hidden Dimension,” a special presentation of PBS’s NOVA series to be broadcast Oct. 28.

The program will explore the influence of fractal geometry in scientific breakthroughs ranging from wireless communications to cancer research to the search for solutions to global climate change.

It explains how this area of science was considered beyond the limits of mathematical understanding well into the 20th century, but how research that began to reveal the governing principles of fractals opened new vistas.

“Hunting the Hidden Dimension” weaves the latest understanding of fractals into a mathematical detective story that deepens understanding of nature and inspires a new wave of scientific inquiry and innovation, according to the program’s summary.

> Market ecologies continued from page 1

a taxonomy of financial strategies using the ecosystem approach.

Taking part in discussions over two days of the meeting was noted investor, philanthropist, and political activist George Soros.

One topic was a data set gathered by Doyle’s collaborators in Taiwan on how individual investors bought and sold assets over the last 15 years. During the meeting Doyle strategized with participants about how to use this information.

The workshop was supported by the NSF as part of an SFI award, “Financial Markets as an Empirical Laboratory to Study an Evolving Ecology of Human Decision Making.” It also is part of a larger initiative on financial risk funded in part by SFI Board of Trustees Chair Bill Miller of Legg Mason Capital Management.

> People

Della Ulibarri among 2008 Spanish Market artisans

Della Ulibarri at her Spanish Market booth