

Harnessing Ideas to Idealism

Arvind Subramanian profiles

Michael Kremer



IDEAS in economics can sometimes prompt policies that promote the greater good. But ideas motivated by idealism and then pursued with intense commitment are rare. Yet these are the qualities that make Michael Kremer, the Gates Professor of Developing Societies at Harvard University, so special, according to his many colleagues and students.

As Abhijit Banerjee of the Massachusetts Institute of Technology, Kremer's colleague and coauthor, explains: "When most economists come up with an idea that might make the world a better place, they assume that they must have got it wrong, on the grounds that if it were correct it would be in place already, and, reluctantly, decide to forget about it. Michael immediately starts to think of ways to make it happen."

And make it happen, he does. His intellectual work and indefatigable public persuasion recently paved the way for the creation of a new mechanism called advance market commitments (AMCs) to further the development of a vaccine against pneumococcal diseases, which claim the lives of up to a million children in poor countries each

year. Robert Barro, one of the gurus of the study of economic growth and Kremer's advisor at Harvard, says that the AMC idea "is likely to make an unprecedented contribution to the improvement of health outcomes in the world's neediest countries."

Kremer has also helped introduce a major methodological innovation in empirical development economics: the randomized evaluation of public policy interventions. This has not only helped rehabilitate the discipline of development economics in academia, it has moved governments and nongovernmental organizations (NGOs) around the world to more rigorously evaluate their activities and their impact. And he has made other important academic contributions, many with the common theme of identifying ways to work collaboratively (typically at the international level) to improve the welfare of poor people. Fellow Harvard professor and Nobel Laureate Amartya Sen stresses that Kremer "has made an outstanding contribution in combining economic theory and sophisticated empirical techniques and applying it to critical policy issues in development economics."



Kremer, now 43, grew up in Kansas and attended Harvard as an undergraduate. Trips to South Asia and Kenya—where he spent a year teaching mathematics and science to students and devoting a lot of time to getting a resource-starved school in remote western Kenya up and running—triggered his interest in development. Kremer followed up on the Kenya experience by starting WorldTeach, a nonprofit organization that now sends 370 teachers annually to schools in the developing world, including such places as the Marshall Islands. He also equipped himself with a graduate degree in economics from Harvard, followed by professorships, first at the Massachusetts Institute of Technology and then at Harvard.

Vaccines for the poor

In February 2007, five countries—Canada, Italy, Norway, Russia, and the United Kingdom—and the Bill & Melinda Gates Foundation announced they would dedicate \$1.5 billion to an AMC (see Box 1) to help pay for the development of a vaccine against pneumococcal diseases, such as pneumonia and meningitis. That historic announcement thrilled Kremer, who had spent years developing the idea.

Advance promises to pay for life-saving vaccines once they are produced are intended to create incentives for biotechnology and pharmaceutical companies to produce appropriate and affordable vaccines for use in poor countries. Vaccines for poor countries are seen as a bad business investment by companies that are reluctant to pour money into R&D in search of a vaccine whose customers, at the end of the day, can pay little for the drug. Estimates from the World Bank and the GAVI Alliance suggest this commitment could prevent an estimated 5.4 million childhood deaths by 2030.

If this approach works—and this is a big “if”—the potential impact is enormous. Malaria and other diseases that claim about 20 million lives each year could be tackled, and the approach could even be extended to completely different areas, such as technologies for revolutionizing agriculture in sub-Saharan Africa.

When Kremer—who contracted malaria when he was living in Kenya—started working on this issue, the idea of encouraging R&D by committing to purchase vaccines had been floated before but not taken seriously. His thinking on this issue first appeared in a 1998 academic paper on patent

buyouts published in the *Quarterly Journal of Economics*. He subsequently articulated the economic rationale for AMCs and laid out the design issues in two papers published in 2000 in *Innovation Policy and the Economy*. He later elaborated these in greater detail in *Strong Medicine*, a book that he coauthored with his wife, Rachel Glennerster. The intellectual challenge lay in the complex questions of practical design: Which diseases should be covered? How should the eligibility of candidate vaccines be determined? What if multiple vaccines were produced? Should recipient countries also be required to make a contribution? How much should companies be promised to develop a vaccine?

But figuring out the analytics turned out to be the easy part. Kremer devoted nearly 10 years to selling the idea and bringing on board the interested parties—academics, pharmaceutical companies, governments, and policymakers—many of whom were initially skeptical. While thrilled about progress so far, Kremer remains cautious. To succeed, the initiative must be structured correctly—no trivial issue—and success is essential if the idea is to be extended to other devastating diseases.

A new way of testing ideas

In the economics field, Kremer is best known for his efforts to help researchers determine “truths”—that is, finding a way to adjudicate dispassionately among competing beliefs. For years, economists had experimented with randomized trials, which are the “gold standard” in other fields, such as medicine. These trials involved selecting two large groups at random, administering a “treatment” to only one of the groups, and then comparing the results. Indeed, this method was used to evaluate

Box 1

What is an advance market commitment?

An advance market commitment (AMC) aims to create a market for future vaccines that is large and credible enough to stimulate private investment in vaccine research and to accelerate development and the creation of manufacturing capacity for vaccines that primarily address diseases of developing countries.

An AMC requires sponsors (or donors) to make legally binding financial commitments to support a market of a pre-agreed value. Companies participating in AMC agreements commit to supply a successful vaccine at a guaranteed price. An independent adjudication committee would be set up to determine whether the vaccine met those criteria. Then, as long as there is effective demand from developing countries (that is, countries express a wish to introduce the vaccine), the company can receive the funds from the AMC at the price negotiated.

Once the AMC is exhausted, companies are required, within the terms of the commitment, to ensure the supply of the vaccine to developing country markets at a lower long-term price (known as the “tail price”) that countries can afford. Developing countries would be expected to contribute to the cost of a vaccine (the “co-pay”) when it is introduced, up to the point where the AMC is exhausted and, subsequently, to purchase the vaccines at the long-term lower price (which could be the same as the co-pay).

the famous PROGRESA scheme in Mexico, which involved providing cash transfers to households for sending children to school. And the sound results of that study paved the way for the adoption of similar schemes in other countries.

But Kremer's real contribution was to show that these trials could be done on a widespread basis. It didn't have to be just governments, with massive budgets, evaluating the impact of a particular program. Collaborations between NGOs and academics could be used to try a wide variety of approaches to problems, compare the cost-effectiveness of different approaches in similar settings, and shed light on the impact of a particular program, as well as on larger underlying questions. He showed that randomization could be cost-effective—a concern, given how expensive it is in medicine—and flexible, flexibility being difficult to achieve when government policies or interventions are being evaluated.

The idea of randomized evaluation first occurred to Kremer almost casually. He was visiting his old village in Kenya in 1995, when a friend mentioned that the NGO he worked for would be assisting seven schools by building more classrooms and providing new textbooks and uniforms. Kremer suggested that the NGO consider phasing in these new “interventions” randomly to study their effects. In a paper that used this randomization technique, he and coauthor Ted Miguel of the University of California at Berkeley later showed that mass treatment of children with deworming drugs had reduced school absenteeism by 25 percent and had been more effective than other ways of boosting attendance (see Box 2).

In addition to the huge impact of randomization as a methodological innovation, the experiments Kremer and his coauthors conducted yielded valuable lessons about development policy, often overturning conventional wisdom. For example, conventional approaches to improving the quality of education and health care often do not work and sometimes even backfire because of distortions in the underlying system. In Kenya, for example, the provision of textbooks increased test scores only for students who scored well on pretests, probably because many students had fallen behind the official curriculum. And reducing pupil-teacher ratios did not lead to significant test score gains, perhaps because the teachers did not change their teaching techniques to focus more on the needs of individual students after the pupil-teacher ratios fell.

Instead, Kremer and his coauthors found that programs that improved providers' incentives were more promising. For example, contract teachers hired locally by school committees in Kenya were much more likely to be present in class than centrally hired civil service teachers, even though they earned only one-fourth as much, and their students performed substantially better on exams. A Colombian program that provided vouchers allowing poor families to send their children to private secondary schools led to large gains in learning and in high school completion rates. The contracting out of health care services in Cambodia led to dramatic improvements in health care delivery because the NGOs that won the contract created performance-based incentives for health workers.

The underlying methodological innovation of such papers launched a veritable cottage industry, almost a new subdiscipline in economics. Randomization is being used to tackle not just

issues in education and health delivery, but a much wider spectrum of issues, including the determinants of the adoption of new technologies, the effects of decentralization, the efficacy of different approaches to controlling corruption, the impact of efforts to empower women, and even the impact of migration. Indeed, a sign of the influence of randomized evaluation is the skepticism it is beginning to evoke (see Box 3).

Reviving microdevelopment economics

Regardless of how the debate on randomization unfolds, there is little doubt that it will remain a vital part of the empirical economist's tool kit. Development agencies and private philanthropies are likely to adopt these techniques to assess their programs and glean lessons for future efforts. And the introduction of these techniques has helped revive the discipline of development economics.

Kremer notes that as a graduate student at Harvard in the late 1980s, he had few colleagues in this field, the best and brightest having flocked to the more conventional pastures of international or labor economics or finance. Today, though, development economics programs at schools such as Harvard and the Massachusetts Institute of Technology are attracting students who would previously not have considered them. Kremer and his Cambridge colleagues Banerjee and Esther Duflo have played a key role in popularizing the field.

Box 2

Randomization: The new buzz word

The purpose of a randomized trial is to ensure that outcomes are actually a consequence of the intervention rather than biased by other factors. One way of doing this is to randomly determine the order in which an intervention is phased in. In the case of a deworming effort undertaken by a Dutch nonprofit agency and a local government in western Kenya, about 30,000 children in 75 primary schools were treated. Financial and administrative constraints meant that the treatment had to be phased in.

Kremer and Ted Miguel suggested that the phasing be done randomly. This was achieved by dividing the schools into three groups alphabetically and assigning every third school to a group. The deworming treatment was administered to the first group in 1998 and 1999, to the second group in 1999, and to the third in 2001. In 1998, the outcome on school attendance for group 1 could be compared with group 2 and group 3 schools (which served as the control groups), and in 1999, outcomes for group 1 and group 2 schools could be compared with those for group 3 schools.

The results showed that deworming improved children's health and, hence, reduced school absenteeism by about 25 percent. Interestingly, absenteeism came down not only in those schools that received the treatment but also in schools nearby because of reduced transmission of the infection from the healthier (treated) children to others in the area. Indeed, one of the important innovations of the study was precisely to be able to identify these “externalities”—that is, the health and education benefits extending even to those not receiving the treatment.

Kremer says that one distinctive strand of his research has been to find ways to design markets in areas that have not traditionally been the focus of economists. For example, he notes that trade sanctions are prone to evasion and often seen as harming the citizens of the sanctioned countries as much as the dictator or regime they might be aimed at. Instead, he and Seema Jayachandran of Stanford University have proposed the use of prospective loan sanctions.

If, for example, following a coup in an oil-rich country, the UN Security Council declared that any future loans to the regime would be considered the personal responsibility of the coup leaders and not of successor regimes, banks would be reluctant to lend to sanctioned regimes, knowing that successor regimes could refuse to pay. Citizens would be spared the burden of repaying debt, such as that of apartheid South Africa or Tudjman's Croatia, that had been incurred to finance repression or benefit a dictator.

Immigration offers another example. Many rich countries are experiencing a backlash against low-skill immigration, seeing it as contributing to inequality. Kremer and Stanley Watt argue that at least one form of low-skill migration, women crossing borders to work as maids and nannies, may reduce wage inequality among natives in receiving countries. This happens because better and more affordable child care allows highly educated mothers to return to the labor force, thereby increasing the supply of skilled relative to unskilled workers in the market.

Kremer has also written on subjects as diverse as the long-run historical relationship between population growth and technological progress, elephants and the poaching problem, the legacy of "odious debt" left by profligate dictators (see *F&D*, June 2002), the preservation of antiquities, and the impact of participation in the hajj. One of his early papers explored the implications of production processes consisting of a series of tasks, mistakes in any of which could ruin a product. He argued that such "O-Ring production functions" (named after the faulty part that caused the Challenger space shuttle disaster) could explain a series of

stylized facts in development and labor economics, including why globalization is often seen as increasing both the demand for skilled workers and inequality in the developing world. This notion is contrary to predictions of a standard Heckscher-Ohlin trade model, which predicts that trade, by favoring the use of unskilled labor, would reduce inequality in developing countries.

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But Kremer's contribution to reviving development economics goes beyond providing new methodological techniques and respectability to the discipline. He has contributed enormously as a teacher and mentor. One student says that in five years of working with him, Kremer has always returned drafts within 48 hours. He mentions the time Kremer read his job market paper over a weekend and returned it to his doorstep at 11 p.m. with five pages of typed comments. Ted Miguel also singles out Kremer's generosity and fairness. Miguel says that he was "surprised" when Kremer suggested that the alphabetic ordering of the names on the deworming paper be flipped to give Miguel lead authorship even though both of them had done "tons of work on the paper."

Carving out a legacy

Over the years, Kremer has received innumerable awards, including a MacArthur "Genius" Fellowship, Fellow of the American Academy of Arts and Sciences, Scientific American 50 Best Researchers Award, and Presidential Early Career Award for Scientists and Engineers. But the one award he has not received is arguably the most prestigious one for young economists—the John Bates Clark medal, which is awarded by the American Economic Association to the best economist under 40. In his last year of eligibility for the prize, 2004, it went to Steven Levitt, the University of Chicago professor known for his popular book on the dismal science, *Freakonomics*.

These two economists are standard bearers for two distinct methodological approaches to empirical economics. Kremer is a strong proponent of conducting economic policy experiments on randomly assigned groups and evaluating them, whereas Levitt's approach relies on finding "natural" experiments—a method that after some tremendous successes, has begun to attract criticism, captured in the characterization of this approach as "cute-onomics." The durability of their respective legacies could well hinge on which of the two approaches survives the scrutiny of peers and the vicissitudes of academic fashion. ■

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Box 3

Limits of randomization

The great merit of randomization is that it produces more evidence that is reliable and, Kremer argues, able to influence policymakers because of its transparency. But critics argue that although randomization is good for asking questions in a micro setting, it cannot address the larger ones, such as what explains the differences in health outcomes between countries, or which exchange rate policy is better. This is not just because randomized experiments can be implemented only at the micro level but because policies or interventions can sometimes create "externalities" that cannot be captured through experimental methods. One example is the effect of health on income. At the individual level, better health may lead to higher productivity because healthier people work longer and better and hence can earn more. But one cannot aggregate from this micro finding because better health could, in turn, lead to larger population size, which could have detrimental effects on overall growth.