Economic Insights for Human Development
“The University of Chicago is known globally for its pioneering work in economics and has a long history of research and partnership in India. The Tata Centre for Development combines UChicago’s reputation for scholarship and insights with the Tata Trust’s vision and commitment to accelerating the development of individuals and communities across India. I expect that this groundbreaking partnership will address some of India’s most challenging development issues.”

Ratan N. Tata
Chairman, Tata Trusts

Translating Economic Rigor Into Policy Impact

TCD harnesses the rigor of the Chicago Economics community to address some of India’s most pressing policy and development issues, combining rigorous research with strategic outreach and partnership to translate evidence into impact.
Economic Insights for Human Development

TCD provides a unique platform for the University of Chicago economics community to foster new ideas through groundbreaking research on social challenges in India.

Through TCD, UChicago faculty collaborate with policy stakeholders in India and conduct research on topics of social and economic importance, generating rigorous evidence to inform local and national programs and policies. And to make sure those results can improve lives, TCD translates and disseminates the research to policymakers NGOs, social entrepreneurs, and the general public to empower informed decision-making.

Research Insights

TCD research seeks to gather and analyze data to uncover new understandings of the world. Public policy and social programs are often formed without access to reliable, large, representative, and quality data. TCD believes that data can drive innovative solutions and make pronounced and lasting impact on the public good. Therefore, TCD facilitates collection, computation, and analysis of data from the field in addition to tapping unconventional data sources.

Changing Lives

TCD is helping ensure that what we learn from research can change lives. Driven by the rigor of the UChicago economics community and through its association with the Becker Friedman Institute for Economics, TCD translates research into accessible formats that can drive a solution economy. Going beyond the binaries of public & private, social & commercial, political & economic, TCD strives to provide a solution to complex and dynamic problems by engaging diverse stakeholders in its work. Using data as a tool, TCD aims to drive untapped markets and leverage social and business networks for both social and financial returns.

“TCD is built on a unique and powerful idea—that we can combine rigorous, world-class research with robust partnerships to ensure that insights are tested, implemented, and scaled throughout India. In this sense, TCD is truly the embodiment of the University of Chicago’s mission of Inquiry and Impact.”

Michael Greenstone, Faculty Director of TCD; Milton Friedman Professor in Economics, the College, and the Harris School
Research Projects

TCD's projects range across a variety of disciplines, including Education, Energy & Environment, Health & Medicine, Labor Economics, Public Finance, Social Entrepreneurship, and Urban Development.

FEATURED RESEARCH PROJECTS

Incentivizing Behavioral Change: The Role of Time Preferences
REBECCA DIZON-ROSS, SHILPA AGGARWAL, ARIEL ZUCKER

Reducing Pollution Through Transparency
MICHAEL GREENSTONE, ANANT SUDARSHAN, ROHINI PANDE, NICHOLAS RYAN

Water-to-Cloud: A Cyberphysical Sensor Network System for Mapping and Reducing Water Pollution
SUPRATIK GUHA, ANUP MALANI, TANIMA DATTA, HARIPRABHAT GUPTA

For more detailed information on TCD's current projects, please scan the QR code to visit our website at tcd.uchicago.edu.

ADDITIONAL RESEARCH PROJECTS AS OF OCTOBER 2018

Can Employee Networks Improve Innovation in the Indian IT Services Sector? MICHAEL GIBBS, FRIEDERIKE HENDEL, CHRISTOPH SIEMROTH

Change in Subsidy Delivery and Farmer Welfare in Punjab ANANT SUDARSHAN, NICHOLAS RYAN

Collaborations for Impact in Education (CDI-ED) India JOHN LIST, DANA SUSKIND

Consequences and Benefits of Targeted Subsidies: Evidence from a School Uniform Program ANJALI ADUKIA

The Demand for Off-Grid Solar Power MICHAEL GREENSTONE, ANANT SUDARSHAN, ROBIN BURGESS, NICHOLAS RYAN

Design Delhi: Cool Roofs for Reducing Heat Stress in Slums AMIR JINA

Design Bengaluru

Diagnosing Oral Cancer Using Salivary DNA NISHANT AGARWAL, ANIL K. D’CRUZ

The Economics of E-waste Aggregation in Delhi MICHAEL GREENSTONE, KENNETH LEE

Effects of India’s Car Tax Policy on Air Pollution, Market Competition, and Welfare KOICHIRO ITO

How Does Pollution Shape Education? An Experiment in Delhi Schools KOICHIRO ITO, AMIR JINA, THOMAS TALHELM

Improving Pollution Monitoring and Enforcement in Odisha MICHAEL GREENSTONE, ANANT SUDARSHAN, KENNETH LEE, SANTOSH HARISH

Improving Property Tax Collection in South Delhi: Reducing Incentives to Misreport WENDY WONG, YUSEF NEGGERS

Incentivizing Public Agents for Increase in Utility Revenue Collection MICHAEL GREENSTONE, ANANT SUDARSHAN, ROBIN BURGESS, NICHOLAS RYAN

Increasing Energy Access by Reducing Electricity Distribution Losses MICHAEL GREENSTONE, ANANT SUDARSHAN, ROBIN BURGESS, NICHOLAS RYAN

Indian Climate Prospectus AMIR JINA, MICHAEL GREENSTONE, SOLOMON HSUANG, ROBERT KOPP

Information Gaps and School Choice Among Low-cost Private Schools in India REBECCA DIZON-ROSS, JAMES BERRY, MAULIK JAGNANI

Land Policy, Equity, and Efficiency in Developing Country Cities: Evidence from the Redevelopment of Mumbai Textile Mills NICK TSIVANIDIS, MICHAEL GECHTER

Lighting Up Bihar MICHAEL GREENSTONE, ANANT SUDARSHAN, ROBIN BURGESS, NICHOLAS RYAN

Mission Kakatiya APRAJIT MAHAJAN, ANUP MALANI, XAVIER GINÉ

Public Health Insurance in Karnataka ALESSANDRA VOENA, ANUJ SHAH, CYNTHIA KINNAN, KOSUKE IMAI, GABRIELLA CONTI, ANUP MALANI

Quality of Life in Slums: Water and Sanitation ADAM CHILTON, AUSTIN WRIGHT, LUC ANSELIN, ANITA DESHMUKH-PATIL, VAJANTHA ANAND

Quantifying Inefficiency in the Indian Electricity Supply FIONA BURLIL, AKSHAYA JHA, LOUIS PREONAS

Solar Mini-grids: Estimating Economic and Social Performance ANANT SUDARSHAN, JENNA ALLARD, CONNOR DOWD
RESEARCH PROJECT

Incentivizing Behavioral Change: The Role of Time Preferences

REBECCA DIZON-ROSS, SHILPA AGGARWAL, ARIEL ZUCKER

HEALTH & MEDICINE

The rate of diabetes and hypertension among adults in India has grown at alarming rates in recent years. These disease rates not only place a heavy burden on patients and families, but their growing incidence also adds tremendous costs for health care providers and the government.

The most efficient method to address non-communicable diseases (NCDs) like diabetes is for patients to engage in lifestyle changes that can improve their health and prolong their lives. However, the challenge is that the most effective lifestyle changes are exercise and a healthy diet, and most people are disinclined to engage in short-term activities that only pay dividends in the long run. This impatience insight is key to understanding how to design effective incentive programs that encourage participation through monitoring and allowances. Participants in these studies started and continued exercise regimens while accruing measurable health benefits, and there is evidence to suggest that such results will hold after the formal intervention ends. These plans, which use simple techniques like pedometers for monitoring exercise, and could incorporate cost-effective methods of allowance delivery like direct deposit to bank accounts, operate at a fraction of the cost that these diseases otherwise impose on society.

The study authors analyze several approaches that, through various allowances (or incentives), encourage participants to incorporate exercise into their regular routines with the aim of changing their lifestyles over the long run. The authors find that allowances matter, and offer a number of policy suggestions based on their extensive field work and analysis. If even a subset of those with NCDs modify their lifestyles, there are potentially huge cost-savings for private and public insurers, not to mention the benefits that would accrue to patients and their families.

As the intervention study by J-PAL and the state of Tamil Nadu reveals, the answer to such a policy challenge is to design programs that encourage participation through monitoring and allowances. Participants in these studies started and continued exercise regimens while accruing measurable health benefits, and there is evidence to suggest that such results will hold after the formal intervention ends. These plans, which use simple techniques like pedometers for monitoring exercise, and could incorporate cost-effective methods of allowance delivery like direct deposit to bank accounts, operate at a fraction of the cost that these diseases otherwise impose on society.

STATS & METRICS

72,946,400
TOTAL CASES OF DIABETES IN ADULTS IN INDIA

10.4%
OF ADULTS IN TAMIL NADU ARE DIABETIC (2014)

20 Billion
INR SPENT ON STATE SUBSIDIES FOR DIABETIC CARE IN TAMIL NADU
Government of Tamil Nadu has expressed interest in learning how to scale up this incentive scheme into a larger policy intervention.

With an estimated 72 million cases in 2017, India currently represents 49 per cent of the global diabetes burden. Lifestyle changes such as increased physical activity and dietary modifications can prevent the disease and help the diagnosed avert serious long-term complications like amputations, heart disease, kidney disease, and stroke. Offering rewards can trigger behaviour change among individuals, but little evidence exists on how incentives should be designed to make them work effectively, while maintaining low costs for governments.

This study grew from TCD’s partnership with Abdul Latif Jameel Poverty Action Lab (J-PAL), South Asia and the Government of Tamil Nadu (GoTN) to address a key policy concern for the Department of Health and Family Welfare: how to effectively manage the burden of NCDs, especially, diabetes? A decision was taken to evaluate several interventions to daily disease management that have shown to be cost-effective in other contexts.

The study adopted three approaches—Monitoring and Allowances, Monitoring Only, and SMS Reminders—with the first one having the greatest impact on behavior. It led to increased walking among the study population as compared to only monitoring. The study, which covered more than 3,000 diabetics and pre-diabetics in Coimbatore, found that on average, providing incentives increases daily walking by 1,200 steps or roughly 12 minutes of brisk walking, and improves health indicators, including decrease in HbA1c by 0.1-0.2 per cent, in RBS by 6-8 mg/dL, and decreased “health risk index”.

The study also found that in 35 to 50 per cent of the cases, the impact of incentives on exercise persisted for the next three months, which means such results will hold even after the formal intervention ends. Given the positive initial findings, the GoTN has expressed interest in learning how to scale up the incentive scheme into a larger policy intervention. The ultimate goal is to turn this project into a publicly-funded program, which would encourage positive lifestyle changes and improve daily disease management.

Researchers are working with GoTN to identify opportunities for improving cost-effectiveness through individually customizing incentives. The results of the study, which designs and evaluates the impact of incentivizing and monitoring healthy behavior on the management of diabetes, would be of interest not only for GoTN, but for state governments across India.


\[ \text{Results} \]

Study found that on average, providing incentives increases daily walking by 1,200 steps or roughly 12 minutes of brisk walking, and decreases the health risk factors for diabetes.
The Star Rating Program will potentially reduce pollution by leveraging information that is already being collected by regulators and providing it to both industries and the public. In order to reflect current environmental performance, ratings are calculated on the basis of the four most recent stack monitoring reports from the MPCB. Five ranges of particulate matter (PM) emissions are defined. Each of these ranges correspond with a rating, varying from 1 star (most polluting) to 5 star (least polluting). An industry is assigned a performance rating corresponding to the range within which the mid-point of four most recent PM concentrations at the stack lies.

This work is being done by the MPCB in collaboration with researchers from the TCD, the Energy Policy Institute at the University of Chicago’s India team (EPIC-India), Evidence for Policy Design (EPoD) at Harvard Kennedy School, and Abdul Latif Jameel Poverty Action Lab (J-PAL).

The Star Rating Program is the first in the world to be designed to scientifically measure the impact of pollution from industry.

Maharashtra is the most industrialized state in India. To tackle the growing danger of air pollution, the Government of Maharashtra has launched India’s first five-star rating system for industries. In a unique and sweeping transparency initiative, large industrial plants are now being publicly rated based on the amount of air pollution emitted from their smoke stacks. Industries with a valid environmental consent, as issued by the Maharashtra Pollution Control Board (MPCB), were shortlisted. They were further filtered on the basis of their primary sector of operation. Industries in the Star Rating Program operate in one of eight sectors, which have been identified by the MPCB as those with high pollution potential. The worst performers—those releasing the most pollution—will receive just one star. The best performers will receive five stars. These ratings are being continuously updated and made available online at mpcb.info.

**STATS & METRICS**

- **15,000** Stack tests conducted between September, 2012 and July, 2018
- **50%** Of stacks show particulate matter levels above the legally permissible limit
- **3 years** Average decrease in lifespan for residents of the state

**FROM OUR PARTNER**

“We are working on finding new solutions to confronting the issue of air pollution. People must be aware of the air quality in their area and must have easy access to air pollution data collected by state regulators. This exemplary effort by MPCB will engage civil society.”

Devendra Fadnavis, Chief Minister of Maharashtra
Maharashtra Government’s Star Rating Program—a first-of-its-kind initiative in India to rate large industrial units based on their emission—has come a long way since it was launched in June 2017.

From only a handful of industries to almost 300 industrial units across 12 sectors, the star rating program has fast expanded its reach, covering some of the most polluted cities such as Chandrapur, Kolhapur, Nagpur, Nashik, and Pune.

So far, both the industries and citizens have evinced support for the program, thus, enabling it to reach out to a wide spectrum of people and encourage them to create awareness about air pollution in their respective communities. As an ancillary activity under the program, about 650 people—including NGOs, industry professionals, engineering students, journalists—have been sensitized so far through focused workshops.

The program—which is a collaborative effort of researchers from the Tata Centre for Development at UChicago (TCD), Energy Policy Institute at the University of Chicago’s India team (EPIC-India), and other academic institutions—has

gained acceptance by virtue of providing the citizens with critical information about industrial pollution levels. With a growing number of people visiting the Star Rating website and disseminating information across social media, this program has already triggered citizen activism. It has also received endorsements from city mayors, members of the Parliament, celebrities, and politicians.

Taking cue from Maharashtra’s success, the government of the Odisha state in India also lapped up the opportunity to sign up for the star rating program. Unlike Maharashtra, which rates industrial units based on periodic manual inspections, the star rating for Odisha’s industrial units is done based on data received from continuous emissions monitors, installed in the smokestacks of the industries, which are relayed in real time to the regulators.

The star rating program is leveraging the benefits of peer comparison that encourages all industrial units to improve compliance. By joining this program, both Maharashtra and Odisha have embraced transparency and information disclosure as a regulatory tool, and they might create a model for other states to capitalize on and improve air quality.
RESEARCH PROJECT

Water-to-Cloud: A Cyberphysical Sensor Network System for Mapping and Reducing Water Pollution

SUPRATIK GUHA, ANUP MALANI, TANIMA DATTA, HARIPRABHAT GUPTA

Worldwide, millions of people residing in river basins depend on river ecosystems for their wellbeing and livelihoods; with many sources of water pollution threatening the health of waterways, consistent and thorough water quality monitoring is essential.

Rivers are the dumping grounds for pollutants including from industry, agriculture, and human activities. Given the complexity of sources, testing a water sample from a single location gives an incomplete picture of overall waterway health. Access to data from continuous measurements is necessary in order to study the effects of each individual contributor. Conventionally, government and non-government agencies collect data on river water quality parameters through analysis of lab samples. While this is the beginning of identifying hazardous pollutants, gathering continuous time-stamped, geo-tagged data through in-situ measurements reveals the full picture of complex pollutants in a dynamic water body.

The WATER-to-CLOUD technique used in this project was conceptualized to demonstrate that scalable water quality mapping systems can detect and predict water contamination and thereby

- Identify effective sanitation interventions and their outcomes
- Positively impact control of infectious diseases in river valley populations
- Identify & pinpoint time-varying sources of pollution
- Bring about awareness of water quality and contamination issues to the public

To gather data, boats are equipped with submersible automated sensors and set on sail at different times of the day based on a pre-defined route. This time stamped, geo-tagged data is then filtered and superimposed on geospatial maps to create heatmaps. Interpolating these data points allows researchers to create two-dimensional area heatmaps to help with predictive analysis. This empowers researchers with data and technology to capture the quality of the river water using different parameters, in different seasons, and at different locations. Following data gathering, researchers apply techniques to predict the spread of pollution and identify the specific sources of pollution.

To learn more, visit http://thoreau.uchicago.edu/thoreaumap_index
Harnessing the Rigor of UChicago Academics

With a commitment to rigorous inquiry and demonstrable impact, the faculty at the University of Chicago take an interdisciplinary approach to research.

Building on the University’s long-standing commitment to India, which also includes the University of Chicago Center in Delhi and EPIC-India, TCD harnesses the depth and breadth of UChicago academics to address some of the biggest issues facing India.

To do this, TCD issues campus wide calls for proposals, soliciting research ideas from UChicago faculty who are doing research on economics and growth, broadly defined, with policy implications. TCD receives applications on a wide range of topics, including energy, environment, health, water and sanitation, development economics, labor economics, and urban development.

“This exciting partnership with TCD will not only enable scholars at the University of Chicago to conduct high-quality, deeply grounded research in India, but it will also facilitate the translation of that work such that it can inform and influence real-world policy and practice.”

Anjali Adukia, Assistant Professor, The University of Chicago, Harris School of Public Policy and the College, and 2018 TCD grant recipient

Our Team

The TCD’s administrative team is located both at the Becker Friedman Institute at the University of Chicago in the US, and the UChicago Delhi Center in India.

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