

# Shomak Chakrabarti

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## EMPLOYMENT

- *Lecturer in Economics*, UNIVERSITY OF MANCHESTER, UK. 2021-Present
- *Associate Fellow*, CENTRE FOR RESEARCH IN ECONOMIC THEORY AND APPLICATIONS, UNIVERSITY OF WARWICK, UK. 2021-Present

## EDUCATION

- *Ph.D. in Economics*, THE PENNSYLVANIA STATE UNIVERSITY, USA. 2016-2021  
COMPLETED: October, 2021. TITLE: *Essays in economic theory*
- *M.A. in Economics*, DELHI SCHOOL OF ECONOMICS, UNIVERSITY OF DELHI, India. 2013-2015
- *B.Sc in Economics*, PRESIDENCY COLLEGE, UNIVERSITY OF CALCUTTA, India. 2010-2013

## INTERESTS & SKILLS

*Fields of Interest:* Economic Networks (*primary*), Economic Epidemiology (*primary*); Industrial Organisation (*secondary*)  
*Computer Skills:* Python, MATLAB, R, L<sup>A</sup>T<sub>E</sub>X, Stata, Julia (*intermediate*), SQL (*basic*)  
*Language Skills:* Bengali (*native*), English (*proficient*), Hindi (*Basic*), French (*elementary*).

## TEACHING & RESEARCH ACTIVITIES

- *Course Instructor*
  - INTERMEDIATE MICROECONOMIC ANALYSIS. May 2020-Jul 2020
  - INTERMEDIATE MACROECONOMIC ANALYSIS. May 2019-Aug 2019
- *Teaching Assistant for*
  - Nima Haghpanah: ECONOMICS OF LAW AND REGULATION. Jan 2021-May 2021
  - Mark McLeod: INTERMEDIATE MICROECONOMICS. Aug 2020-Dec 2020
  - Daniel Goldstein: INTERMEDIATE ECONOMETRICS. Jan 2020-May 2020
  - Nima Haghpanah: ECONOMICS OF LAW AND REGULATION. Jan 2019-May 2019
  - Benjamin Glass: ECONOMICS OF THE CORPORATION. Jan 2019-May 2019
  - Dave Brown: INTRODUCTORY MICROECONOMICS. Aug 2016-dec 2018
- *Reseach Assistant for*
  - Kalyan Chatterjee, The Pennsylvania University. May 2021-July 2021
  - Rohit Lamba, The Pennsylvania State University. Jan 2018-Dec 2019

Charles Murry & Karl Schrueter, The Pennsylvania State University.  
K.L.Krishna & D.K.Das, KLEMS India Project.  
Rohini Somanathan, Delhi School of Economics.

May 2018-Aug 2018  
May 2015-May 2016  
May 2014-Oct 2014

## RECENT HONOURS & ACHIEVEMENTS

- *PSU Graduate Research Exhibition*, The Pennsylvania State University. Mar 2021
- *Graduate Student Online Teaching Certificate*, The Pennsylvania State University. Fall 2017
- *Graduate Fellowship*, The Pennsylvania State University. Aug 2016-present
- *Qualified NET Examination in Economics*, UGC-NET (Govt of India). Dec 2015
- *Delhi School of Economics Merit Scholarship*, Delhi School of Economics. May 2014-May 2015
- *Krishna Raj Summer Fellowship*, Delhi School of Economics. May 2014-Aug 2014
- *K.A.Naqvi Memorial Scholarship*, Delhi School of Economics. May 2013-May 2014
- *Best Economist & World Bank Policy Debate Winner*, South Asian Economics Meet. Dec 2012

## PROFESSIONAL MEMBERSHIPS

- *Royal Economic Society*
- *European Economic Association*
- *American Economic Association*
- *Society for the Advancement of Economic Theory*

## RESEARCH PAPERS

- *Working papers/ Work in progress [DRAFT AVAILABLE SOON]*

### 1. **Strategic diffusion in communication networks [JAN 2021].**

*This paper studies information diffusion in a social network where a third party can control the precision of information as well as who initially receives information. Applications include spreading of news by digital media outlets, lobbyists persuading senators to contribute to a project and others. A designer engages in a bayesian persuasion game with multiple agents, but is constrained to send information privately to a subset of agents. The agents can communicate this information to each other through links in a social network. The optimal precision of information sent by the designer reflects a fundamental tradeoff: precise information increases diffusion, but reduces the designer's ability to manipulate the agents' beliefs towards his objective. The seeding strategy involves choosing an agent with the highest "influence". As preferences become more diverse, there exists equilibria with sub-optimal spreading where the designer caters only to agents relatively more aligned towards his objective.*

\* *Presentation: PSU GRADUATE RESEARCH EXHIBITION*

### 2. **Behavioural Epidemiology: An economic model to evaluate optimal policy in the midst of a pandemic [MAR 2021] (with Ilia Krasikov, Rohit Lamba).**

*This paper builds a behavioural model of disease dynamics and studies optimal policy. It starts with an epidemiology framework with six possible states— susceptible, infected, hospitalised, critical, recovered and dead – and models individuals as partaking in economic and social activities. Lockdown limits the extent of economic activity and behavioural decisions of distancing limit social activities. Tracing and testing further helps isolate the infected from the susceptible. The interaction of behavioural response and testing introduces rich heterogeneity in the model. The unique linear equilibrium characterises the behavioural response, and optimal policy of the government pins down lockdown and testing. Vaccine are assumed to arrive stochastically with a deterministic lag. Using data on the time series of deaths in the United States, the seed, structural and behavioural parameters of the model are estimated. Behavioural response is shown to substantially alter the predictions of the model– the number of infected, critical and dead. Tracing and targeted testing are shown to be effective. A Pareto frontier is constructed between economic output and total mortality to capture the set of possibilities confronting the government. Policy experiments where sub-optimal counterfactuals are explored shed light on more realistic policies being pursued by various governments.*

\* Presentation: PSU THEORY SEMINAR

### 3. Pricing data in a network with endogenous intermediaries [AUG 2021] .

*A set of consumers possess some personal data that is of interest to a data analyst. The personal data of each consumer is unique, but may be shared with her neighbours in a social network (e.g. a birthdate and address may be unique to a consumer, but her friends may (partially) know these pieces of information). The consumers have exclusive property right over their data, and can set the price at which she wants to sell the data to the analyst. We show that providing consumer to set prices does not alleviate the severe under-pricing of data that is usually observed in data markets. The data externality creates concentration of data with the central nodes in the network, which can then be used as a threat by the the analyst to keep prices low. In equilibrium, the analyst buys data only from the central nodes (a measure of centrality to be added here: conjecture is simple degree centrality). We extend the analysis to a situation where consumers can sell data to each other in the network before the analyst makes a purchase decision.*

### 4. A Game theoretic model of network security [AUG 2019] (with Kalyan Chatterjee).

*We present a model of network security where an adversary aims to send a (potentially destructive) object to a target via one of multiple paths. Along each path, there are intermediaries who can periodically involve in costly checks to intercept and destroy the item. The adversary wins if the object reaches the target, and the target (along with the intermediaries) wins if the object is intercepted before reaching the target. We study equilibrium properties of a decentralised version of the game where the intermediaries choose their checking strategies independently. The equilibria exhibits substantial free-rider effect and in any equilibrium the adversary must mix between all possible paths to the target. Critical nodes, i.e. nodes through which multiple paths from the adversary and target pass through, play an important role in the analysis: when the cost of checking is low enough, there are equilibria where only the critical nodes in the network check with positive probability. We also study a situation where the target plays the role of a “mechanism designer” who can control the action of each intermediary. We show that the designer only those nodes in the network which can separate the adversary and target into separate components. For simple networks, a simple vertex-cut algorithm can be implemented to identify the intermediaries checking with positive probability.*

### 5. Attention Costs to Privacy: An Experimental analysis [JAN 2021] (with Moumita Roy).

*[To be added]*

### 6. Network effects in epidemic mitigation policies: Application to Indian data [DEC 2020] .

*[To be added]*

#### • Others

#### 1. What is new about India’s economic growth 1980-2012: The industry perspective using KLEMS dataset [DEC 2016] (with Deb Kusum Das, and Pilu C. Das).

#### 2. The ‘God Makers’ of Kolkata : Can improved infrastructure mitigate the misery of artisans in Kumartuli? [MAY 2014] (with Rajarshi Bhowal, Vinayak Iyer, and Shakya Sengupta).

## MISCELLANEOUS

*Software packages:* Python package containing classes of various probability distribution and their properties (*finished*);  
Python package containing classes that analyse properties of different social networks (*ongoing*);  
Custom latex templates for writing academic CV and academic working papers (*finished*);  
Julia package to smooth discrete discrete function, corresponding to *smooth* function in MATLAB (*finished*);

*Kaggle competition:* Working on Kaggle -Titanic Competition (*ongoing*)

*Online courses:* Introduction to Machine Learning and Cloud computing (*Coursera*)