Puru Gupta

S2.110 Social Sciences Building, University of Warwick, Coventry CV4 7AL

+44–756-150-0263 Puru.Gupta.1@warwick.ac.uk gupta-puru.github.io/website

Education

University of Warwick — **Oct. 2020 – Mar. 2025 (Expected)**
Ph.D. Economics — *Coventry, England*

University of Warwick — **Oct. 2018 – Oct. 2020**
M.Res. Economics (Distinction) — *Coventry, England*

Delhi School of Economics, Delhi University — **July 2014 – June 2017**
M.Phil. Economics — *New Delhi, India*

TERI School of Advanced Studies — **July 2012 – May 2014**
M.Sc. Economics — *New Delhi, India*

Birla Institute of Technology & Science, Pilani — **July 2007 – June 2011**
B.E. (Hons.) Electrical & Electronics Engineering — *Goa, India*

Research Interests

- **Primary** – Quantitative Finance, Financial Economics
- **Secondary** – Operations Research

Experience

Department of Economics, University of Warwick — **Autumn Term 2021/22, 2024/25**
Graduate Teaching Assistant — *Coventry, England*

- Problem Solving Classes for Final Year Undergraduate Financial Economics Module.

Warwick Business School, University of Warwick — **Spring Term 2020/21, 2021/22**
Graduate Teaching Assistant — *Coventry, England*

- Problem Solving Classes for Final Year Undergraduate Game Theory Module.

Department of Economics, University of Warwick — **Spring Term 2019/20, 2024/25**
Graduate Teaching Assistant — *Coventry, England*

- Problem Solving Classes for First Year Undergraduate Macroeconomics Module.

Research

Derivative Pricing With Strategic Competition For Liquidity — **Job Market Paper**

- **Abstract** We consider a financial market with two large investors whose trades affect prices, so they face liquidity risk. In this setting, we examine utility based prices for derivative securities in an extended version of the canonical Black—Scholes derivative pricing model. In our model, the large investors' risk preferences are represented by an exponential utility function. In a stylized binomial example with price impact, we show that the payoff space and the no–arbitrage pricing functional are convex but not necessarily linear, which impedes arbitrage pricing. In a framework where the large traders play a non-zero sum dynamic Cournot game, and where price movements are governed by singularly perturbed stochastic differential equation, we obtain a pricing rule for derivative securities that can be characterized by a nonlinear transformation of the expected distorted derivative payoff under the Markov—Nash pricing measure. Under specified assumptions, we derive a liquidity adjusted Black—Scholes equation and show that the manipulation-free price coincides with the Black—Scholes price. We also implement a numerical algorithm for computing the price of European style options in a general framework.

Martingale Schrödinger Bridge For Newsvendors **Work-In-Progress**

- **Abstract** We consider the classical single commodity newsvendor inventory management problem in a stochastic setup, where the distribution of the commodity price satisfies martingale and marginal constraints implied by no–arbitrage arguments. We demonstrate a strong duality between the newsvendor's optimization problem and the canonical martingale Schrödinger bridge (Schrödinger, 1932), which is the entropy minimizing martingale coupling amongst all equivalent martingale couplings of marginal distributions of the ex–ante and ex–post spot prices. We obtain primal and dual attainment results under mild restrictions on the physical probability measure. We also characterize vendor's optimal inventory policy in terms of its dual martingale Schrödinger bridge.

Working Papers

Portfolio Choice In Dynamic Thin Markets: Merton Meets Cournot (Co–Author: Saul D. Jacka) **September 2023**

- *Download Links* – [SSRN] [Arxiv]
- *Revised Draft Under Preparation*

Scholarships/Awards

- Skeoch Foundation Scholarship, University of Warwick 2020–2024
- Economics Departmental Scholarship, University of Warwick 2018–2020
- Travel Grant, Princeton University (Offered But Declined) June 2023
- Junior Research Fellowship, University Grants Commission, India (Cleared Qualifying Exam) 2017
- Non–NET Fellowship, University of Delhi 2014–2016

Conferences/Seminars

- **2022** – Macroeconomics & International Economics Workshop (**University of Warwick**), Financial Mathematics Workshop, (**University of Oxford**).
- **2023** – SIAM Conference on Financial Mathematics & Engineering (**Philadelphia**), Stochastic Control & Financial Engineering Workshop, (**Princeton University**).
- **2024** – Conference on Mathematical & Statistical Methods for Actuarial Science & Finance (**University of Le Havre Normandie**), VI PhD Conference in Economics and Finance (**Queen Mary University of London**), XXXII European Workshop in Economic Theory (**University of Manchester**), 12th World Congress of the Bachelier Finance Society (**FGV EMAp, Rio de Janeiro, Brazil**)*, Lancaster–Manchester–Warwick Joint PhD Workshop on Quantitative Finance and Financial Technology (**Warwick Business School**)*, 66th Annual Conference of Operational Research Society (**Bangor University, Wales**), Royal Statistical Society International Conference (**Brighton, England**)

* – Withdrawn Due To Personal Circumstances

Technical Skills

- **Programming Languages**: Python, MATLAB, Stata (Basic).
- **Word Processing Tools**: LaTeX

Professional Service

- **Coordination**: Reinforcement Learning Reading Group (Spring Term – 2020/21).
- **Refereeing**: Stochastics