Puru Gupta

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Education

University of Warwick — **Oct. 2020 – Dec. 2024 (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

Warwick Business School, University of Warwick — **Jan. 2022 – Mar. 2022**
Graduate Teaching Assistant — *Coventry, England*

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

Department of Economics, University of Warwick — **Oct. 2021 – Dec. 2021**
Graduate Teaching Assistant — *Coventry, England*

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

Delhi School of Economics, Delhi University — **Aug. 2017 – May 2018**
Assistant Professor (Ad–hoc) — *New Delhi, India*

- Problem Solving Classes For Postgraduate Microeconomic Theory and Game Theory Modules.

Research

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

- **Abstract** We examine preference based derivative prices in an extended version of the canonical Black–Scholes model, in which risk preferences of investors are represented by CARA utility functions and market incompleteness is generated on account of non–Walrasian trading by large investors whose trading influences the underlying asset price. In a two–period motivating example with non–Walrasian trading we show that the payoff space and no–arbitrage pricing functional are nonlinear which impedes arbitrage pricing. Under certain regularity assumptions we characterize a manipulation free pricing rule as nonlinear expectation of the derivative security payoff under the Markov–Nash pricing measure in a non–zero sum singular stochastic differential game framework. We show that the risk–neutral indifference price coincides with the Black–Scholes price and derive a liquidity adjusted Black–Scholes equation which facilitates analytical as well as numerical computation of the price of European style options.

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

- **Abstract** We consider the classical single commodity newsvendor problem in a stochastic setup where the commodity price distribution satisfies martingale and marginal constraints derived from no–arbitrage arguments. We show that there is strong duality between optimization problem of the newsvendor and the canonical martingale Schrödinger bridge (Schrödinger, 1932) – 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 as well as dual attainment results under mild restrictions on the physical probability measure and characterize the optimal inventory policy of the buyer 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, † – Forthcoming

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