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EDUCATION

Ph.D. in Economics, Stanford University,
Expected Completion: June 2026

M.S. in Mathematics and Statistics, University of Melbourne, 2019

Diploma. In Mathematical Science, University of Melbourne, 2017

B.Com. in Economics and Finance, University of Melbourne, 2017

DISSERTATION COMMITTEE

Prof. Paul Milgrom
Economics Department, Stanford University
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Prof. Ilya Segal
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Prof. Ravi Jagadeesan
Economics Department, Stanford University
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Prof. Alvin Roth
Economics Department, Stanford University
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RESEARCH AND TEACHING FIELDS

Primary field: Microeconomic theory.

Secondary fields: Market design.

TEACHING EXPERIENCE

- 2022-25 Teaching Assistant, Stanford University
Undergraduate level first year economics: Econ 1,
Undergraduate level intermediate microeconomics: Econ 50,
PhD first year microeconomics sequence: Econ 202, Econ 204, MGTECON 601
- 2016-20 Teaching Assistant, University of Melbourne
PhD first year microeconomics: Microeconomics
Undergraduate level first year economics: Introductory *Macroeconomics*

RELEVANT POSITIONS

2025-Present Student Researcher, Google.
2021-22 Research Assistant for Prof. Ilya Segal, Stanford University.
Research Assistant for Prof. Lawrence H. Goulder, Stanford University.
2020-21 Research Assistant for Prof. Daniel Garrett, Toulouse School of economics.
2018-20 Research Assistant for Prof. Simon Loertscher, University of Melbourne.

SCHOLARSHIPS, HONORS AND AWARDS

2019 Professor Wilson Prize (Awarded to the student submitting the best thesis in Pure or Applied Mathematics).
2018-19 Melbourne Graduate Scholarship.
2017-18 Australian Mathematical Sciences Institute Vacation Research Scholarship
2015-17 Dean's Honours List.
2016 Economic Society of Australia Prize for Microeconomics

PROFESSIONAL ACTIVITIES

Referee: *American Economic Review: Insight, Journal of Economic Theory, International Journal of Game Theory.*

Conference Presentation:

2025 The Canadian Economic Theory Conference
2024 European Association for Research in Industrial Economics Conference
Conference on Mechanism and Institution Design in Budapest
2023 The Asian School in Economic Theory Keio University in Tokyo
The Connections Workshop: Mathematics and Computer Science of Market and Mechanism Design at UC Berkeley
2019 Australasian Economic Theory Workshop, University of Technology Sydney
Melbourne Industrial Organization and Theory Day, University of Melbourne
Organizational Economics Workshop, Australian National University

PUBLICATIONS

Liu, Bing, Simon Loertscher, and Leslie M. Marx. "[Efficient consignment auctions](#)." Review of Economics and Statistics (forthcoming).

RESEARCH PAPERS

[Non-linear Pricing with Maximum Demand](#) (Job Market Paper)

We revisit non-linear pricing with a parsimonious yet empirically grounded departure: each consumer has two types, a per-unit value, and a maximum demand (a finite quantity beyond which marginal utility becomes zero). This single modification simultaneously addresses two major limitations in the literature that has only been studied in isolation: the difficulty of rationalizing the prevalence of all-you-can-eat pricing (zero marginal price) in many subscription models and unlimited uses, and the restrictiveness of the single-crossing assumption that precludes any rank change in marginal utilities across types as quantity varies. We show that, when single-crossing fails, zero marginal price can be optimal, thereby linking the two limitations. In addition, the optimal mechanism can feature full consumer surplus extraction and non-monotonic allocations. Notably, the monopolist's profit-maximizing quantity may

exceed the efficient quantity, overturning the standard intuition. Finally, we characterize when the optimal marginal prices rise or fall as a function of the correlation of the two types. The optimality of rising marginal prices when the two types are positively affiliated challenges the canonical quantity-discount prediction and rationalizes the widespread use of quantity premiums in utility markets, parcel shipping, and cloud storage.

[The Optimal Design of Countervailing Incentives](#)

Countervailing incentives -- arising when an agent has an incentive to understate their type at some realizations and to overstate it at others -- are pervasive in many mechanism and market design settings such as resource pooling, auction with externalities, and multi-product monopoly pricing. This paper develops a unified framework for optimal mechanism design that explicitly accounts for countervailing incentives, presents an algorithm to compute the optimal mechanism and identifies conditions on agents' preferences under which the method applies. The algorithm enables empirical estimation of the designer's welfare weight by matching theoretical allocations to observed outcomes. We establish that leveraging countervailing incentives can increase designer surplus and that a 'quantity' premium is a general feature of optimal mechanisms when agents have linear utilities. Finally, we derive comparative statics for agents' worst-case payoffs: counterintuitively, uniformly worsening one agent's outside option can increase other agents' worst-case payoffs.

RESEARCH IN PROGRESS

Control a Conversation (with Martino Banchio, Andrés Perlroth). [Draft coming soon]

Product Differentiation and Competition (with Gagan Aggarwal, Andrés Perlroth).

Subscription vs Advertising (with Gagan Aggarwal, Martino Banchio).

The Biggar DWL (with Simon Loertscher). [Draft available upon request]

Analysing otherwise standard monopoly and oligopoly models in which consumers' investments improve product quality, we show that the effects of market power on consumer and social surplus easily dwarf those in models without investments. Prohibiting mergers that are profitable once investments are sunk can be Pareto improving because, under Cournot oligopoly, industry and per-firm profit before investment need not be maximized at monopoly. Price ceilings inhibiting profit maximization ex post can increase everyone's welfare by creating commitment firms with market power lack. Accounting for consumers' investment incentives also opens scope for socially deficient free entry and, thereby, for industrial policy.

Externalities, efficiency, and partitioned VCG mechanisms (with Simon Loertscher). [Draft available upon request]

Externalities, while relevant in the real world, are, according to common practice, not accounted for in market design. This paper shows when the common practice is justified even though externalities matter for the efficient allocation of resources and derives the direct mechanisms that allocate efficiently, endow the agents with dominant strategies, respect their individual rationality constraint and minimize their communicative requirements. These mechanisms and standard auction formats like the second-price auction are part of a family of mechanisms that we call partitioned VCG mechanism. In such a mechanism, each agent bids on all elements in a partition of a subset of the feasible allocations. The coarsest partitioned VCG consistent with efficiency

minimizes the agents' communicative requirements. It can be implemented in undominated strategies with a two-stage mechanism in which in the first stage each agent selects the partition it wants to bid on. Consequently, the designer does not need to know the agents' preference structure to allocate efficiently in the presence of externalities.

SOFTWARE SKILLS Python, R, Matlab, Mathematica

LANGUAGES English (fluent), Chinese (native), French (intermediate), German (basic)