BING LIU

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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
Economics Department, Stanford University
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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 *Macro*economics

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 (2023): 1-45.*

RESEARCH PAPERS

Non-linear Pricing with Maximum Demand **(Job Market Paper)**

A central conclusion of the economics literature on non-linear pricing is that optimal strategies involve differentiated quantity bundles with a quantity discount. However, this prediction leaves unexplained the quantity premiums widely used in utility markets, parcel shipping, and cloud storage, as well as the use of subscription and buffet pricing models. This paper explains these practices with a parsimonious deviation from the standard mechanism design model which assumes that there are some finite quantities beyond which consumers of different types have marginal utilities of zero. It shows that when consumers' maximum demands and per-unit values are correlated, practices including quantity premiums, and all-you-can-eat pricing can emerge as features of the optimal pricing strategy. When the consumers' maximum demands and per-unit values are negatively correlated, consumer preferences violate the

single-crossing assumption used almost ubiquitously in the mechanism design literatures. We provide a method to solve the problem. The optimal mechanism can involve full surplus extraction, all-you-can-eat pricing and non-monotonic allocation. Extending beyond the maximum demand model, we show these features can remain in the optimal mechanism for consumer preferences that violate single-crossing in a more general form. Then, monopoly can lead to over-provision, illustrating that relaxing the single-crossing assumption can reverse standard economic intuitions. We show that a quantity premium (discount) is optimal when per-unit value and the maximum demand are perfectly positively (negatively) correlated and that conclusion extends to the cases when per-unit value and the maximum demand are stochastically related.

The Optimal Design of Countervailing Incentives

Countervailing incentives – like the incentives faced by a shareholder to name a price that acts both as the selling price of their existing stocks and the purchase price of other shareholders' stocks – are pervasive in mechanism and market design. Leveraging these countervailing incentives can make the truthful elicitation of a market participant' valuations easier. We develop a unified framework for optimal mechanism design that explicitly accounts for countervailing incentives and provide a constructive algorithm to compute the optimal mechanism. The algorithm also enables empirical estimation of the designer's welfare weight by matching model-implied allocations to observed outcomes. The framework yields new insights: the optimal mechanism features a quantity premium; cooperative production generates higher designer surplus than in standard exchange platform models; and optimal credible threats (uniformly worse outside options) can raise some market participants' 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. Pro-hibiting 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)