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DOCTORAL STUDIES Massachusetts Institute of Technology (MIT)
PhD, Economics, expected completion June 2024
DISSERTATION: "Essays on the Economics of Information"

DISSERTATION COMMITTEE AND REFERENCES

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PRIOR EDUCATION Bocconi University:
Bachelor of Science, *summa cum laude* 2015
Master of Science, *summa cum laude* 2017

CITIZENSHIP Italian **GENDER:** Male

LANGUAGES Italian, English, Spanish

MIT Economics

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FIELDS	Primary Field: Theory	
	Secondary Fields: Organizational Economics, Networks	
TEACHING EXPERIENCE	Graduate Class in Game Theory, MIT Economics Teaching Assistant to Professors Drew Fudenberg and Muhamet Yildiz	2021
	Graduate Class in Organizational Economics, MIT Sloan Teaching Assistant to Professors Bob Gibbons and Charles Angelucci	2020
	Math camp instructor for the MicroMasters Program in Data, Economics, and Development Policy, JPAL, MIT	2020
	Guest Lecture on “Persuasion with Non-Linear Preferences” for the graduate class in Contract Economics taught by Professors Ian Ball and Stephen Morris, MIT Economics	2022
FELLOWSHIPS AND AWARDS	Gordon B. Pye Dissertation Fellowship, MIT	2022-2023
	Marco Fanno Ph.D. Fellowship, Unicredit & Universities Foundation full-tuition and stipend scholarship	2018-2020
	Bocconi Merit Awards, full-tuition scholarship	2016-2017
PROFESSIONAL ACTIVITIES	Refereeing: Econometrica, Journal of Political Economy, American Economic Review: Insights, Theoretical Economics, Journal of Economic Theory, American Economic Journal: Microeconomics, Mathematics of Operation Research, Games and Economic Behavior, Journal of Mathematical Economics, Mathematical Social Sciences.	
	Presentations: 2023: ACM EC’ 23 (King's College London), SAET 2023, SITE Workshop on Market Design (Stanford University), Microsoft Research New England Lab. 2022: North American Summer Meeting of the Econometric Society (University of Miami), Barcelona School of Economics Summer Forum on Networks, D-Tea (Paris School of Economics), Stony Brook International Conference on Game Theory, European Summer Meeting of the Econometric Society (Bocconi University), 2021: D-Tea, 2020: World Congress of the Econometric Society (Bocconi University), European Winter Meeting of the Econometrics Society.	
	Invitations to Conferences: 2023: NBER Spring Political Economy Meeting (Discussant), Cowles	

Conference in Economic Theory, The European Summer Symposium in Economic Theory.

2022: Cowles Conference in Economic Theory, Simons Institute at Berkeley: Workshop on the Economics of Networks (Presented at poster session).

PUBLICATIONS

“On Concave Functions over Lotteries”

(with D. Fudenberg and D. Levine) *Forthcoming at Journal of Mathematical Economics*

“Dynamic Opinion Aggregation Long-run Stability and Disagreement”

(with S. Cerreia-Vioglio and G. Lanzani) *Forthcoming at The Review of Economic Studies*

“Nonlinear Pricing with Under-Utilization: A Theory of Multi-Part Tariffs”

(with J.P. Flynn and K. Sastry) *American Economic Review*, 113, 836-60, 2023

“Communication Protocols under Transparent Motives” (with Y. Dai)

Extended Abstract at ACM EC Conference Proceedings, 2023.

“Epistemic game theory without types structures: An application to psychological games” (with P. Battigalli and F. Sanna)

Games and Economic Behavior, 120, 28-57, 2020.

“Incorporating belief-dependent motivation in games” (with P. Battigalli and

M. Dufwenberg) *Journal of Economic Behavior & Organization*, 167, 185-218, 2019

RESEARCH PAPERS

“Mediation Markets: The Case of Soft Information” (Job Market Paper 1)

This paper proposes a theoretical framework that combines information design and mechanism design to analyze markets for mediation services between an informed and an uninformed party. The mediator receives compensation from the informed party and must rely on information that is voluntarily reported. We describe all the outcomes that can be induced via a mediation contract, and compare the optimal outcomes when the mediator has the bargaining power (i.e., monopolistic mediation) with those when the informed party has it. The main finding is that mediation contracts often reveal more information with a monopolistic mediator because they give up some information rents to retain incentive compatibility. Unlike the conventional logic of quality under-provision for physical goods, here the attempt to capture information rents can lead to increased information disclosure. These findings shed light on the controversial matter of whether a monopolistic market for information intermediaries, such as rating agencies for financial securities, is more or less desirable than a competitive one.

“The Bounds of Mediated Communication” (Job Market Paper 2)

(with Y. Dai) *Extended abstract in ACM EC Conference Proceedings 2023*

We study the bounds of mediated communication in sender-receiver games in which the sender's payoff is state-independent. We show that the feasible distributions over the receiver's beliefs under mediation are those that induce zero correlation, but not necessarily independence, between the sender's payoff and the receiver's belief. Mediation attains the upper bound on the sender's value, i.e., the Bayesian persuasion value, if and only if this value is attainable under unmediated communication, i.e., cheap talk. The lower bound is given by the cheap talk payoff. We provide a geometric characterization of when mediation strictly improves on this using the quasiconcave and quasiconvex envelopes of the sender's value function. In canonical environments, mediation is strictly valuable when the sender has countervailing incentives in the space of the receiver's belief. We apply our results to asymmetric-information settings such as bilateral trade and lobbying and explicitly construct mediation policies that increase the surplus of the informed and uninformed party with respect to unmediated communication.

“Persuasion and Matching: Optimal Productive Transport”

(with A. Kolotilin and A. Wolitzky) *RR at The Journal of Political Economy*

We consider general Bayesian persuasion problems where the receiver's utility is single-peaked in a one-dimensional action. We show that a signal that pools at most two states in each realization is always optimal, and that such pairwise signals are the only solutions under a non-singularity condition (the twist condition). Our core results provide conditions under which riskier prospects induce higher or lower actions, so that the induced action is single-dipped or single-peaked on each set of nested prospects. We also provide conditions for the optimality of either full disclosure or negative assortative matching, where all prospects are nested. Methodologically, our results rely on novel duality and complementary slackness theorems. Our analysis extends to a general problem of assigning one-dimensional inputs to productive units, which we call optimal productive transport. This problem covers additional applications including club economies (assigning workers to firms, or students to schools), robust option pricing (assigning future asset prices to price distributions), and partisan gerrymandering (assigning voters to districts).

“(Un-)Common Preferences, Ambiguity, and Coordination”

(with S. Cerreia-Vioglio and G. Lanzani)

We study the "common prior" assumption and its implications when agents have preferences beyond SEU. We consider interim preferences consistent with the same ex-ante evaluation and characterize the latter in terms of higher-order expectations. Agents are mutually dynamic consistent with the same ex-ante evaluation if and only if all the higher-order expectations limits coincide. We characterize the equilibrium prices in financial beauty contests. Differently from

the SEU case, the limit price does not coincide in general with the common ex-ante expectation. Moreover, when the agents share the same benchmark probabilistic model, high-coordination motives eliminate their concern for misspecification in equilibrium, exposing them to a divergence between the market price and the fundamental value of the security.

“Optimally Coarse Contracts”

(with J. Flynn and K. Sastry)

We study a principal-agent model in which outcomes are imperfectly contractible and the principal can choose the extent of contractibility at a cost. If contractibility costs satisfy a property that is implied by difficulties in distinguishing outcomes when writing the contract, then optimal contracts are necessarily coarse: they specify finitely many outcomes out of a continuum of possibilities. This result holds even if the extent of contractibility costs is arbitrarily small. Applying our results to a nonlinear pricing model, we study how changes in consumer demand, production costs, and informational asymmetries affect the optimal coarse set of quality options.

“Adversarial forecasters, surprises, and randomization”

(with D. Fudenberg and D. Levine)

An adversarial forecaster representation sums an expected utility function and a measure of surprise that depends on an adversary's forecast. These representations are concave and satisfy a smoothness condition, and any concave preference relation that satisfies the smoothness condition has an adversarial forecaster representation. Because of concavity, the agent typically prefers to randomize. We characterize the support size of optimally chosen lotteries, and how it depends on preference for surprise.

“Nonlinear Fixed Points and Stationarity: Economic Applications”

(with S. Cerreia-Vioglio and G. Lanzani)

We consider the fixed points of nonlinear operators that naturally arise in games and general equilibrium models with endogenous networks, dynamic stochastic games, and in models of opinion dynamics with stubborn agents. We study limit cases that correspond to high coordination motives, infinite patience, and vanishing stubbornness in the applications above. Under monotonicity and continuity assumptions, we provide explicit expressions for the limit fixed points. We show that, under differentiability, the limit fixed point is linear in the initial conditions and characterized by the Jacobian of the operator at any constant vector with an explicit and linear rate of convergence. Without differentiability, but under additional concavity properties, the multiplicity of Jacobians is resolved by a representation of the limit fixed point as a maxmin functional evaluated at the initial conditions. In our applications, we use these results to characterize the limit equilibrium actions, prices, and endogenous networks, show the existence of the asymptotic value in a class of zero-sum

stochastic games with a continuum of actions, and compute a nonlinear version of the eigenvector centrality of agents in networks.

“Targeting in Networks and Markets: An Information Design Approach”

In many economic settings, heterogeneous information is aggregated through channels such as social networks or markets' prices. Moreover, information is often controlled and manipulated as to influence the final outcome. The goal of this paper is to introduce aggregation mechanisms in an otherwise standard information design environment and analyze their effect on the information released and on economic outcomes. First, the analysis provides a benchmark irrelevance result: when the designer can target every receiver and the aggregator is linear, it is without loss of optimality to consider public experiments that do not depend on the aggregation mechanism. Differently, if the designer can target only a subset of receivers, then the most prominent individuals are chosen. Next, comparative statics results that link the informativeness of the optimal policy to the underlying aggregation process are discussed. Finally, motivated by robustness concerns, it is shown that the main findings extend to a class of nonlinear aggregation mechanisms.

“Duality, common priors and no-trade”

(with S. Morris)

In this paper, we extend the belief-based approach for the representation of information (cf. Kamenica and Gentzkow, 2011) to a multiple-agent setting. First, we characterize the feasible distributions over higher-order beliefs that can arise from private signals, when the agents share a common prior, in terms of no-trade properties. This allows us to derive interpretable implications of the common prior assumption and to improve on existing results such as the Critical Path Theorem of Kajii and Morris (1997). Second, motivated by the recent growing interest in information design and information robustness, we extend our no-trade characterization to the feasible distributions of coarsenings of higher-order beliefs, such as expectations or actions. Toward this result, we introduce the notion of coarsened type spaces that extend the classical notion due to Harsanyi by allowing each type to be assigned to multiple beliefs that are consistent with given restrictions, such as obedience for action recommendations. With this, we provide a unifying analysis of the common-prior implications as well as a linear-duality toolkit to analyze general information-design problems. From the technical side, we use methods based on the Kantorovich duality of optimal transport and the marginal problem of Strassen (1965) that may reveal fruitful for related applications in information economics.