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RESEARCH INTERESTS

Market Design, Mechanism Design, Microeconomics, School Choice, Matching Theory and Applications.

EDUCATION

- 2015 – 2022 **PhD in Economics**, Koç University, Turkey
Dissertation: *Three Essays on Matching Theory and Application of School Choice Problems*
- 2013 – 2015 **MA in Economics**, Bilkent University, Turkey
- 2006 – 2012 **BS in Mathematics**, Bilkent University, Turkey

CURRENT POSITION

SEP 2025 – PRESENT	Visiting Assistant Professor Department of Economics, Universidad Carlos III de Madrid, Spain Teaching undergraduate microeconomic theory and conducting full-time research.
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POSTDOCTORAL POSITIONS

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| AUG 2023 – JAN 2024 | Postdoctoral Scholar
Simons Laufer Mathematical Sciences Institute (SLMath, formerly MSRI), Berkeley, CA
Viterbi Endowed Postdoctoral Fellowship. Market and Mechanism Design Program, under the guidance of Peter Biró. |
| MAR 2024 – SEP 2025 | Postdoctoral Researcher in Economics
Università degli Studi di Messina, Italy
Supervisor: Prof. Antonio Miralles Asensio. Research on allocation mechanisms, school choice, classmate choice, and within-school segregation. |
| JAN – AUG 2023 | Postdoctoral Scholar
Department of Industrial Engineering, Koç University, Turkey
ERC-funded GoodMobility Lab. Transportation science and logistics. |
| FEB – JUL 2024 | Postdoctoral Scholar
Department of Industrial Engineering, Koç University, Turkey
ERC-funded GoodMobility Lab. Transportation science and logistics. |

WORKING PAPERS

APRIL 2026- PRESENT

D. Sili, Antonio Romero Medina, Coalitional Refinement via Move Graphs: A Unified Framework for Fair Stability with an Application to Klaus, Klijn, and Özbilen (2025) Developed a graph-based approach for fair classroom assignment and coalition formation problems. Proved that complex group reallocations can be represented and analyzed through simple cycles, leading to efficient algorithms with guaranteed convergence. Showed that under symmetric friendship preferences, fair and welfare-maximizing classroom assignments are stable against group deviations and can be implemented through a strategy-proof mechanism. Also identified conditions under which fairness and stability are no longer compatible when friendship preferences are asymmetric.

OCT 2025- PRESENT

D. Sili, Ö. Yılmaz, Ö.F. Şahin, Dynamic Multi-Hospital Kidney Exchange: Coordination Costs, Complementarities, and Threshold Policies. [*Job Market Paper*]

We develop a dynamic model of multi-hospital kidney exchange that incorporates inter-hospital coordination costs, stochastic patient–donor arrivals, and compatibility constraints. The problem is formulated as a Markov decision process in which a centralized clearinghouse decides, upon each arrival, whether to match within a hospital, across hospitals, or defer matching to thicken the pool. To address the intractability of the four-dimensional state space, we analyze two stylized benchmarks: a Complementary Pools (CP) model, in which hospitals hold reciprocal types that can only be matched across institutions, and a Substitutable Pools (SP) model, in which hospitals hold the same type and compete for arriving over-demanded pairs. For both, we prove that the optimal value function is componentwise concave and superconcave, supermodular in the CP case, and submodular in the SP case, and we characterize optimal policies as monotone threshold rules. Numerical analysis of the full mixed model confirms that these structural properties carry over locally: the value function is supermodular in quadrants where hospitals hold opposite excesses and submodular where they hold similar excesses. Inter-hospital exchanges concentrate in complementary states and shut down as coordination costs rise, with hospitals operating as a single pool when costs vanish and reverting to local matching when costs are high. The results clarify how complementarities, substitutabilities, and coordination costs jointly shape dynamic exchange efficiency, and point to transport reimbursement and incentive design as central policy levers.

JUL 2025

Ö.F. Şahin, D. Sili, M.U. Ünver, Ö. Yılmaz, Optimal Dynamic Matching under Local Compatibility: An Application to Kidney Exchange.

In the past two decades, the design and implementation of living donor kidney exchange clearinghouses have been a major success story in market design. Instead of batching and optimizing exchanges over a fixed pool of incompatible patient-donor pairs, the busiest programs now operate dynamically, matching pairs as they arrive. This feature has also sparked interest in dynamic matching mechanisms. Yet for general matching problems with high-dimensional state spaces, a full characterization of optimal dynamic mechanisms remains elusive, and only approximate solutions are known. We develop a new methodology to characterize and compute dynamically optimal mechanisms for bilateral matching over arbitrary state spaces, provided that compatibility between agent types follows a linear spatial structure. This technique applies to optimal dynamic kidney exchange and extends to other spatial matching problems. Our approach leverages second-order properties of the value function, extending recent advances in Markov Decision Processes and queueing systems, which traditionally focus only on substitutable components.

WORKING PAPERS

- MARCH 2026 | **D. Sili, A. Nalbant, B. Yıldız**, A Centralized Mechanism for Customer–Service Provider Matching in Last-Mile Delivery. *Submitted to Transportation Science*. [\[SSRN\]](#)
Studies a matching problem in which an independent market operator allocates last-mile parcel deliveries among competing providers to maximize public value. Establishes existence of Nash equilibria and proposes a MIP formulation scaling to 2,500+ customers. Welfare gaps across equilibria exceed 20%; centralized assignment typically lies on the environmental–quality efficient frontier.
- APRIL 2026 | **C. Meo, A. Miralles, P. Salmaso, D. Sili**, Coalition Formation with Size Constraints and Quality Effect.
We study a coalition formation model in a purely hedonic setting in which the number of coalitions and their sizes are fixed *ex ante*. We establish the existence of swap-stable partitions when the utility w_{ij} that agent i derives from being in the same coalition as agent j is the sum of two components: a symmetric “friendship” term v_{ij} , in the spirit of Bilò et al. (2022), and an agent-specific coefficient t_j capturing the “quality effect”—either beneficial or disruptive—that agent j exerts on the coalition as a whole. The result generalizes that of Bilò et al. (2022) to non-symmetric preferences.
- 2024 | **D. Sili**, A Numerical Study of Common Enrollment in School Choice: A School Assignment Problem.
Runs 1,100 simulations comparing balanced and unbalanced variants of the Student-Proposing Deferred Acceptance (SPDA) mechanism in inter-district school choice. Unbalanced SPDA yields higher individual efficiency; balanced SPDA achieves more uniform demographic distributions.
- 2024 | **D. Sili**, A Numerical Study of Interdistrict School Choice: A School Assignment Problem.
Analyzes inter-district school choice as a matching-with-contracts model. Simulates scenarios addressing individual rationality, welfare improvement, balanced exchange, and student diversity.
- 2014–2015 | **D. Sili, K. Yıldız**, Impact of an Additional Donor in Lung/Kidney Exchange.
Master’s Thesis, Bilkent University.

WORK IN PROGRESS

- 2013 | **D. Sili, R. İlkılıç**, Project Proposal on Networks in Economics.
A study on networks in economics.

WORK EXPERIENCE

FEB – JUN 2024	Instructor , Koç University, Turkey Engineering Economics
FEB – JUN 2023	Instructor , Koç University, Turkey Engineering Economics
2015 – 2022	Teaching Assistant , Koç University, Turkey Microeconomic Theory (Graduate), Game Theory, Microeconomic Theory, Econometrics
2013 – 2015	Teaching Assistant , Bilkent University, Turkey Microeconomic Theory, Introduction to Probability and Statistics, Intro- duction to Economics

PROJECTS

APR 2021 – JAN 2022	Research Assistant , ERC-Funded Project of Erdem Yörük, Koç University “The Politics of Welfare in Emerging Market Economies”
2011 – 2012	Senior Undergraduate Projects in Mathematics , Bilkent University D. Sili, A. Kerimov, <i>Graph Theory and Ramsey Coloring for Graphs</i> , 2012 D. Sili, S. Sertöz, <i>Infinite Iterated Exponential and Lambert W Function</i> , 2011

FELLOWSHIPS

2013 – 2015	Full Merit MA Scholarship, Bilkent University
2015 – 2021	Full Merit PhD Scholarship, Koç University
2023–2024	Viterbi Endowed Postdoctoral Fellowship, SLMath (formerly MSRI), Berkeley, CA Market and Mechanism Design Program
Mar 2024 – Oct 2025	Postdoctoral Fellowship in Economics, Università degli Studi di Messina Supervisor: Prof. Antonio Miralles Asensio

WORKSHOPS AND CONFERENCES

JUN 2026	4 th Carlos III Micro Retreat, UC3M, Spain
JUN 2025	14th Conference on Economic Design (COED 2025), University of Essex, UK
MAY 2025	Match in Practice, University of Messina, Italy
JUL 2024	Conference on Mechanism and Institution Design (CMID 2024), Budapest
JUL 2024	17th Meeting of the Social Choice and Welfare Society, Paris
JAN 2024	ASSA Annual Meeting, American Economic Association
NOV 2023	Algorithms, Approximation, and Learning in Market and Mechanism Design, SLMath
OCT 2023	Online and Matching-Based Market Design Workshop, Simons Institute, Berkeley
SEP 2023	Introductory Workshop: Mathematics and CS of Market and Mechanism Design, SLMath
SEP 2023	Connections Workshop: Mathematics and CS of Market and Mechanism Design, SLMath
2022	ICE-TEA, Turkish Economic Association
JAN 2021	ASSA Annual Meeting, American Economic Association
2020	ACM Conference on Economics and Computation (EC 2020)
DEC 2021	Data Analysis and Scientific Programming with Python, GESIS – Leibniz Institute EU-funded Training Workshop, Social ComQuant Project

QUALIFICATIONS

COMPUTING	MATLAB, Python, L ^A T _E X
LANGUAGES	Turkish (native), English (fluent), German (intermediate), Italian (intermediate), Spanish(intermediate)
SOFT SKILLS	Works well in a team, good at problem solving

GRADUATE COURSES TAKEN

Dynamic Programming, Advanced Microeconomic Theory, Networks and Model Optimization, Stochastic Models and Applications, Economics of Information and Contracts, Interpolation and Approximation, Experimental Economics, Financial Economics, Advanced Macroeconomic Theory, Data Science for Operational Research, Forecasting.

REFERENCES

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