

Kieran Marray

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Education	Phd Economics 2022-present Vrije Universiteit Amsterdam and Tinbergen Institute Supervised by Dr Michael König (ETH Zurich, Vrije Universiteit Amsterdam), and Prof. Ozan Candogan (University of Chicago). <i>Thesis:</i> Essays in econometrics of networks.
	MPhil Economics and Econometrics 2020-2022 Tinbergen Institute <i>Major:</i> Econometrics <i>GPA:</i> 8.42 (summa cum laude)
	BA Philosophy, Politics, and Economics, University of Oxford 2016-2019
Employment	Predoctoral research assistant 2018-2020 Oxford Mathematical Institute, University of Oxford Supervised by Prof. J. Doyne Farmer and Dr François Lafond <i>Topic:</i> Network analysis in economics
Academic affiliations	Fellow, Institute for Advanced Studies, University of Amsterdam 2022-present 'Population-Scale Social Network Analysis' research group.
	Smith School for Enterprise and the Environment, University of Oxford 2023 Visiting Phd student
	Department of Methodology, Statistics Netherlands 2022-2025
Working papers	Network rewiring and spatial targeting: optimal disease mitigation in multilayer networks with Ozan Candogan, and Michael König, and Frank Takes. Abstract: <i>We study disease spread on a social network where individuals adjust contacts to avoid infection. Susceptible individuals rewire links from infectious individuals to other susceptibles, reducing infections and causing the disease to only become endemic at higher infection rates. We formulate the planner's problem of implementing targeted lockdowns to control endemic disease as a semidefinite program that is computationally tractable even with many groups. Rewiring complements policy by allowing more intergroup contact as the rewiring rate increases. We apply our model to compute optimal spatially-targeted lockdowns for the Netherlands during Covid-19 using a population-level contact network for 17.26 million individuals. Our findings indicate that, with rewiring, a targeted lockdown policy permits 12% more contacts compared to one without rewiring, underscoring the significance of accounting for network endogeneity in effective policy design.</i> CEPR discussion paper 19892 Estimating spillovers from sampled connections Abstract: <i>We study disease spread on a social network where individuals adjust contacts to avoid infection. Susceptible individuals rewire links from infectious individuals</i>

to other susceptibles, reducing infections and causing the disease to only become endemic at higher infection rates. We formulate the planner's problem of implementing targeted lockdowns to control endemic disease as a semidefinite program that is computationally tractable even with many groups. Rewiring complements policy by allowing more intergroup contact as the rewiring rate increases. We apply our model to compute optimal spatially-targeted lockdowns for the Netherlands during Covid-19 using a population-level contact network for 17.26 million individuals. Our findings indicate that, with rewiring, a targeted lockdown policy permits 12% more contacts compared to one without rewiring, underscoring the significance of accounting for network endogeneity in effective policy design.

ArXiv pre-print 2410.17154

Estimating unobserved networks with heterogeneous characteristics, and an application to the Swing Riots

Abstract: Researchers often observe outcomes determined by economic networks, and characteristics that determine if agents form links, but not the economic network itself. Here we present an estimator for unobserved networks from panel data and characteristics that determine network formation. The estimator recovers the network by decomposes the covariance matrix of outcomes, penalising links more heavily the less likely they are given characteristics. We provide theoretical bounds on estimation error, and a fast coordinate descent algorithm that makes estimation tractable for large networks. As an application, we estimate patterns of coordinated uprisings during the Swing Riots of 1830–1831 among parishes distributed across space. We find a evidence of small core of coordinated unrest centered on known radical parishes. Exposure to coordinated unrest reduces elite preference for franchise expansion.

Research in progress

Global competitor networks

with François Lafond, Gordon Phillips, and Michael König

Place-based policy in endogenous production networks

with Xianglong Kong, Katie MacDonald, Peter Ohlinger, and Ruochen Dai

Awards, grants, and scholarships

Travel grant, Workshop on Firm-Level Supply Networks, University of Oxford 2025

Alfred P. Sloan Foundation Minor Grant in Mesoeconomics 2024

(with Xianglong Kong, Katie MacDonald, Peter Ohlinger, and Ruochen Dai)

Travel grant, 12th Warwick Phd Conference, University of Warwick

Studentship in 'Optimisation-Conscious Econometrics', 2023

Harris School of Public Policy, University of Chicago

Travel grant, Workshop on Firm-Level Supply Networks, University of Cambridge

Full scholarship and tuition waiver (merit-based), Tinbergen Institute 2020-2022

Laidlaw research and leadership scholarship (value of £10,000) 2018

Invited talks

Network rewiring and spatial targeting: optimal disease mitigation in multilayer networks

European Economic Association summer meeting 2024

CeNDEF seminar, **University of Amsterdam**

Dutch network economics day, **Tinbergen Institute**

Eureka seminar, **Vrije Universiteit Amsterdam** 2023

Workshop on population-scale social network analysis, 2022

Institute for Advanced Studies, University of Amsterdam

Dutch network economics day, **Tinbergen Institute**

Estimating spillovers from sampled connections

Network Science in Economics conference (poster), **Stanford University** 2025

European summer meeting of the **Econometric Society** 2024

12th Warwick Phd conference, **University of Warwick**
 Economics lunch seminar, **Vrije Universiteit Amsterdam**
 Eureka seminar, **Vrije Universiteit Amsterdam**
 PhD seminar, **Tinbergen Institute**

Estimating unobserved networks with heterogeneous characteristics, and an application to the Swing Riots

PhD seminar, **Tinbergen Institute** 2025
 CeNDEF seminar, **University of Amsterdam** (scheduled)

Global competitor networks

Workshop on Firm-Level Supply Networks, **University of Oxford** 2025
 Complexity Economics Seminar, **Institute for New Economic** 2024
Thinking at the Oxford Martin School
 Workshop on Firm-Level Supply Networks, **University of Cambridge** 2023

Professional service

Invited Referee Journal of Economic Behaviour and Organisation, Applied Network Science
 Organiser **Prediction and Inference with Machine Learning** 2021-2022
Reading Group, Tinbergen Institute (with Stanislav Adveev)
Network Economics Research Group, Department of Economics, University of Oxford 2019-2020
Network Econometrics Reading Group, University of Oxford Volunteer **Oxford Summer School on Economic Networks**, 2019
 Oxford Mathematical Institute

Teaching

Urban economics: challenges and policies, **VU Amsterdam** 2023-present
TA/guest lecturer
 Master-level applied econometrics course, focussing on policy evaluation for regional/urban economics.
 Course website with interactive lecture notes in Julia available at https://kmarray98.github.io/urban_economic_policy/
 Lecture on ‘Introduction to nonparametric and semiparametric estimation’.

Applied econometrics, VU Amsterdam, TA 2023-present
 Master-level applied econometrics course for spatial economics students.

Econometrics I, Tinbergen Institute, TA 2021
 First-year Phd-level econometrics course.
 ‘Introduction to R for Econometrics’ lecture notes available at https://bookdown.org/kieranmarray/intro_to_r_for_econometrics/

Software Packages

PowerLawSamplers.jl
 GraphicalLassos.jl (in progress)

Programming Experience

Proficient in **Julia** (preferred), **R**, and **Python**. Some experience with **Slurm**, **SQL**, **Netlogo**, **Stata**, and with AWS compute environments (Athena, Batch, EC2).

Unprofessional Activities

Rock-climbing, squash