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).
Thesis: Essays in econometrics of networks.

MPhil Economics and Econometrics 2020-2022
Tinbergen Institute
Major: Econometrics
GPA: 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
Topic: 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: *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.*
CEPR discussion paper 19892

Estimating spillovers from sampled connections
Abstract: *Empirical researchers often estimate spillover effects by fitting linear or non-linear regres- sion models to sampled network data. We show that common sam-*

pling schemes bias these estimates, potentially upwards, and derive biased-corrected estimators that researchers can construct from aggregate network statistics. Our results apply under different assumptions on the relationship between observed and unobserved links, allow researchers to bound true effect sizes, and to determine robustness to mismeasured links. As an application, we esti- mate the propagation of climate shocks between US public firms from self-reported supply links, building a new dataset of county-level incidence of large climate shocks.
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 Thinking at the Oxford Martin School** 2024
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 Reading Group**, Tinbergen Institute (with Stanislav Adveev) 2021-2022
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**, Oxford Mathematical Institute 2019

Teaching

Urban economics: challenges and policies, VU Amsterdam TA/guest lecturer 2023-present
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