



MATTEO COURTHOUD

Ph.D. Candidate in Economics

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Skills

Statistics: causal inference, A/B testing, experimental design, bootstrapping, GMM, maximum likelihood, bayesian inference, hierarchical models

Machine Learning: supervised and unsupervised models, bagging, boosting, NLP (BERT), reinforcement learning, double machine learning

Mathematics: numerical optimization, gradient descent, dynamic programming

Economics: industrial organization, demand estimation, recommendation systems, game theory, market design, combinatorial auctions

Computing: parallelization, multi-threading, probabilistic programming

Toolbox

Colab • Github • Unix • Latex

SQL • Docker • AWS

Coding

Python: numpy, scipy, pandas, sklearn, XGBoost, LightGBM, pytorch, EconML, causalml, seaborn, plotly

Julia: Optim, DataFrames, Plots

R: tidyverse, dplyr, fixest, staggered, ggplot2

Misc: Stata, Matlab, Go, C++, Visual Basic, Pascal

Work Experience



Data Science PhD Intern, fall 2022

Google, Switzerland

Developed a new estimator for large-scale experiments to test returns to advertising, combining quasi-experimental methods (diff-in-diffs, synthetic control) with paired experimental design. Wrote a new simulation library to test new and existing estimators at scale, combining real data and simulated experiments.



Economic Consultant, 2021 - 2022

Crawford Consulting GmbH

Provided independent economic research on strategic entry, exit, and pricing decisions for Amazon.com, using both observational and quasi-experimental methods on proprietary business data.



Teaching Assistant, 2018 - 2022

University of Zurich, Switzerland

Lectured, assisted and prepared teaching material for multiple econometrics, machine learning, and industrial organization classes, both at MSc and PhD level.



Economics Intern, spring 2016

DG COMP, EU Commission

Provided economic and statistical analysis of auction data for the Halliburton-Baker Hughes (10B\$) merger case, combining applied causal inference methods with structural modeling.

Education



Ph.D. Economics, 2017 - now

University of Zurich, Switzerland

Specialization: Industrial Organization, Applied Econometrics.
Advisors: Gregory Crawford, Armin Schmutzler.



Visiting Doctoral Student, fall 2021

Yale University, United States

Host: Steven Berry, at the Department of Economics.



M.Sc. Economics, 2014- 2016

Bocconi University, Italy

B.Sc. Economics, 2011- 2014

Bocconi University, Italy

Research

• Ratings as a Barrier to Entry

Studied the impact of rating systems on platform dynamics, using data on Airbnb listings. Estimated demand for listings and a structural model of dynamic hosts' entry and exit to assess welfare effects.

• Reinforcement Learning Pricing Algorithms



Implemented reinforcement learning pricing algorithms and experimentally studied their strategic interactions. Proposed a new method to detect collusion via adversarial learning.

• Dynamic Stochastic Games and Competition Policy



Built a dynamic computational model of firm competition, entry, and exit to study anti-competitive behavior in complementary industries with returns to scale, suggesting policy interventions.

Other

- **Technical Writer**, on Towards Data Science on statistics and causal inference
- **1st place**, Machine Learning Datathon at ETH Zurich (2021)
- **Languages:** Italian (native), English, French (fluent), German, Spanish (basic)