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, multithreading, 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 causal inference methods (staggered diff-in-diffs) 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 Datathlon at ETH Zurich (2021)
- **Languages**: Italian (native), English, French (fluent), German, Spanish (basic)