Martin Mugnier

Ph.D. Candidate in Economics at CREST, ENSAE Paris, Institut Polytechnique de Paris
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Ph.D. Supervisor: Xavier D'Haultfœuille Xavier.D'Haultfoeuille@ensae.fr

Primary Fields of Research: Econometrics (theory and applications), analysis of panel data
Secondary Fields of Research: Mathematical statistics, high-dimensional statistics

Education

Postgraduate Studies

Sep. 2019 – **CREST, ENSAE Paris, Institut Polytechnique de Paris**, France
Ph.D. Candidate in Economics
• Dissertation title: "Nonlinear Panel Data Models and High-Dimensional Statistics"
• Expected Completion Date: June 2023

2018 – 2019 **Université Paris-Saclay**, France
M.Sc. in Applied Mathematics (*with honors*)
• Major in Mathematical Statistics and Machine Learning Theory

2017 – 2019 **ENSAE Paris**, France
Ingénieur Économiste-Statisticien, Graduate Program
• Major in Data Science and Statistical Learning

2016 – 2017 **École Polytechnique, HEC Paris, ENSAE Paris, ENS Paris-Saclay**, France
Master in Economics (1st year) (*with highest honors*)

2015 – 2019 **École Normale Supérieure Paris-Saclay**, France
M.Sc. in Economics and Management
• Civil servant student (*"normalien"*)

Graduate Studies

2015 – 2016 **Université Paris 1 Panthéon-Sorbonne and ENS Paris-Saclay**, France
B.Sc. in Economics (*with honors*)

2013 – 2015 **Toulouse School of Economics & Lycée Ozenne**, France
Licences 1 & 2 in Economics and Management (*ranked 7th out of 722 & 1st out of 274*)
• Preparatory classes for the national competitive examination for admission to the ENS Paris-Saclay (option D2): two-year undergraduate intensive course in mathematics, economics, and management.

Working Papers

Fixed Effects Binary Choice Models with Three or More Periods (*with Xavier D'Haultfœuille and Laurent Davezies*) R&R at *Quantitative Economics*
We consider fixed effects binary choice models with a fixed number of periods T and without a large support condition on the regressors. If the time-varying unobserved terms are i.i.d. with known distribution F, Chamberlain (2010) shows that the common slope parameter is point identified if and only if F is logistic. However, he only considers in his proof $T = 2$. We show that actually, the result does not generalize to $T \geq 3$: the common slope parameter can be identified when F belongs to a family including the logit distribution. Identification is based on a conditional moment restriction. Under restrictions on the covariates, these moment conditions lead to point identification of relative effects. Finally, if $T = 3$ and mild conditions hold, GMM estimators based on these conditional moment restrictions reach the semiparametric efficiency bound.

Make the Difference! Computationally Trivial Estimators for Grouped Fixed Effects Models
Novel estimators are proposed for linear grouped fixed effects models. Rather than predicting a single grouping of units, they deliver a collection of groupings with the same flavor as the so-called Lasso regularization path. Mild conditions are found that ensure their asymptotic guarantees are the same as the so-called grouped fixed effects and post-spectral estimators (Bonhomme and Manresa, 2015; Chetverikov and Manresa, 2021). In contrast, the new estimators are computationally straightforward and do not require prior knowledge of the number of groups. Monte Carlo simulations suggest good finite sample performance. Applying the approach to real data provides new insights on the potential grouped structure of the unobserved heterogeneity.

Identification and (Fast) Estimation of Large Nonlinear Panel Models with Two-Way Fixed Effects (*with Ao Wang*)
We study a nonlinear two-way fixed effects panel model that allows for unobserved individual heterogeneity in slopes (interacting with covariates) and (unknown) flexibly specified link function. The former is particularly relevant when the researcher is interested in the distributional causal effects of covariates, and the latter mitigates potential misspecification errors due to imposing a known link function. We show that the fixed effects parameters and the (nonparametrically specified) link function can be identified when both individual and time dimensions are large. We propose a novel iterative Gauss-Seidel estimation procedure that overcomes the practical challenge of dimensionality in the number of fixed effects when the dataset is large. We revisit two empirical studies in trade (Helpman et al., 2008) and innovation (Aghion et al., 2013), and find non-negligible unobserved dispersion in trade elasticity (across countries) and the effect of institutional ownership on innovation (across firms). These exercises emphasize the usefulness of our method in capturing flexible (and unobserved) heterogeneity in the causal relationship of interest that may have important implications for the subsequent policy analysis.

Work in Progress

2020	Unobserved Clusters of Time-Varying Heterogeneity in Nonlinear Panel Data Models
2020	Asymptotic Properties of Empirical Quantile-Based Estimators (*with Xavier D'Haultfœuille and Jérémy L'Hour*)
2019	Linking Patents to Firms: Insights with French Firms (*with Matthieu Lequien, Loriane Py and Paul Trichelair*)

Grants & Awards

2022 – 2023	French ANR 4th year grant: "Investissements d'Avenir/LabEx Ecodec"
2021 – 2022	EUR Data Science for Economics, Finance and Management International Mobility Grant
2019 – 2022	French Ministry of Higher Education, Research and Innovation, Full Scholarship
2015 – 2019	École Normale Supérieure Paris-Saclay, Full Scholarship
2017	Hackaton Ernst & Young-Genius ENSAE, 2nd Prize – Deep Learning Challenge

Teaching Experience

Undergraduate Courses (Principal Instructor)

Fall '19	Linear Algebra and Python (*24 hrs*), HEC Paris & ENSAE Paris

Undergraduate TA sessions at ENSAE Paris

Fall '20, '21	Mathematical Fundations of Probability Theory (*21 hrs*), prof. Cristina Butucea
Spring '21	Differentiable Optimization (*21 hrs*), prof. Guillaume Lecué

Graduate TA sessions at ENSAE Paris

Spring '20, '21	Econometrics II (*18 hrs*), prof. Mickael Visser
Fall '20, '21, '22	Mathematical Statistics I (*18 hrs*), prof. Arnak Dalalyan
Spring '20, '21	Mathematical Statistics II (*11 hrs*), prof. Matthieu Lerasle

Professional Experience

April – Sep.	**CREST, Microeconometrics Lab**, Palaiseau, France (*4 months*)

2019	Research assistant to Pr. Xavier D'Haultfœuille. • Theoretical econometrics • Conducted research on statistical identification in discrete choice models with high-dimensional fixed effects.
June – Sep. 2018	**Banque de France, DGSEI, SEPS**, Paris, France (*4 months*) Research intern, supervised by Matthieu Lequien and Loriane Py. • Designed a machine learning based agorithm to fuzzy-match patent data from the PATSTAT Global database to SIRENE, the national register of French firms held by Insee.
2017 – 2018	**Société Générale, Inspection Générale**, Paris, France (*8 months*) ENSAE Team Project in Applied Statistics (part-time internship), supervised by Clément Sentis and Walid Amrane. • Designed predictive algorithms to forecast and anticipate credit risk and defaults in a portfolio of medium-sized firms for a subsidiary in Africa.
April – July 2017	**Toulouse School of Economics, IAST**, Toulouse, France (*4 months*) Research assistant to Senior Scholar Daniel-Li Chen (IAST/NBER). • Collected, cleaned and explored very large datasets. Designed and implemented econometric specifications to capture psychocognitive bias in decision-making in U.S. Courts such as cognitive caseload, time-effects, sequential-contrast effects, date of birth effects • Research assistance on the project "The Impact of Financial Payments from Pharmaceutical Industries on Prescribing Behaviors and Patient Outcomes".
May – July 2016	**French Treasury, French Embassy in Colombia, Regional Economic Service**, Bogotá, Colombia (*2 months*) Economist intern, supervised by Laurent Charpin. • Performed a statistical analysis aiming to highlight promising sectors for French exports • Produced a report from personal research and many interviews conducted in Spanish.
2016 – 2017	**C'efficace**, Paris, France (2 years) Individual teacher. • Taught courses in Economics, Marketing and Mathematics to high-school and undergraduate students.

Programming Skills & Languages

Prog. skills	Python***, R**, Stata**, SAS**, LaTeX***, Microsoft Office**, HTML/CSS*
Languages	English (fluent, TOEIC : 915/990), Spanish (intermediate), French (native)

Conferences, Seminars & Academic Visits

Seminars	University of Chicago (Econometrics Student Group, 05/2022; I.O. lunch, 04/2022; Econometrics Workshop, 04/2022), CREST Ph.D. Seminar (06/2022, 10/2021, 12/2020, 07/2020), CREST Microeconometrics Seminar (03/2022, 09/2021), Hadamard Doctoral School Ph.D. Seminar (02/2021), EPFL Workshop on Computational Methods in Social Science (07/2019)
Conferences	North American Summer Meeting of the Econometric Society (06/2022), European Winter Meeting of the Econometric Society (12/2021), Bristol Econometric Study Group (07/2022, 09/2021), EEA Congress (08/2022, 08/2021), China Meeting of the Econometric Society (06/2022, 07/2021), Asian Meeting of the Econometric Society (06/2021), African Meeting of the Econometrics Society (06/2021), IAAE Annual Conference (06/2021, 2020 cancelled), 50èmes Journées de la Statistique (2020 cancelled)
Co-organizer of	CREST Ph.D. Seminar (2019-2021), CREST Statistics·Econometrics·Machine-Learning Seminar (2019-), CREST Econometric Reading Group (2020)
Academic Visits	Department of Economics of the University of Chicago (2022 Winter and Spring Quarters), sponsor: Prof. Stéphane Bonhomme.

Other Duties

2020 – 2021	Ph.D.s' representative on the Board of Directors of Groupe des Écoles Nationales d'Économie et Statistique (Genes)
Referee	*Quantitative Economics*, *Review of Economics and Statistics*

References

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