MONIKA AVILA MÁRQUEZ

Contact Information

Methods and Data Analysis
University of Geneva

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Fields

Research: Causal inference with observational data and interference, instrumental variables, debiased machine learning for panel data, and crossed-random effects models for experimental data.

Education

Ph.D. in Econometrics (with congratulations of the jury), University of Geneva — 2022
Dissertation: Contributions in the areas of three dimensional panel data and the use of machine learning to estimate econometric models.
Supervisor: Prof. Jaya Krishnakumar.
Committee: Prof. Stefan Sperlich (Chair), Prof. Aleksey Tetenov, Prof. Jeffrey Wooldridge.

Msc. Economics, (Highest Honors) University of Geneva — 2016
Orientation: Econometrics

B.A., Economics, (Highest Honors) University Juan Misael Saracho — 2008

Fellowships & Awards

rOpenSci Mentor — 2026
rOpenSci Champion — 2025
Subside Tremplin, University of Geneva — 2020 - 2021
Société Académique de Genève — 2018
Scholarship Simon I. Patiño — 2014 - 2016

Research Experience

Postdoctoral researcher in Statistics, MAD, University of Geneva — 2022 - present
Model selection for Mixed-Effects Models for experimental data.

Research Assistant, Prof. Jaya Krishnakumar, University of Geneva — 2016-2022

Professional Experience

Lecturer (Pathway 1: Research and teaching), University of Bristol — 2023 - 2025
Tutorials of courses Mathematics, Probability, and Econometrics.
Research in causal inference with interference, panel data econometrics.

Consultant Department of Statistics, International Labour Organization — 2022
Structural vector autoregressive modeling to identify the short-run effect of fertility on the growth of real GDP p.c.
Simultaneous equations modeling to identify the effect of old-age pension coverage on the share of labour in agriculture.

Consultant Department of Statistics, International Labour Organization — 2022
Statistical analysis of Disability Labour Market data.

Intern Department of Statistics, International Labour Organization — 2016
Statistical analysis of Mexican labour data.
Skill mismatch measurement in Mexican labour market.
Development of efficient data analysis tool for labour and migration data of Arab countries.

Sovereign Risk Analyst, Central Bank of Bolivia — 2012 - 2014
Sovereign risk assessment of the foreign exchange reserves investments.
Development of the early warning system.
Use of Bloomberg for news monitoring, assets monitoring, risk monitoring.

Teaching Experience

Teaching Assistant, University of Geneva — 2016 - 2022
Graduate Level: Advanced Econometrics, Microeconomics II.
Undergraduate Level: Development Economics, Econometrics, Introduction to Econometrics, Introduction to Statistics.

Seminar Presentations

University of Exeter (Invited)	2025
University of Bristol	2022
University of Cologne	2022
University of Zurich	2022
Örebro University	2022
Universidad EAFIT	2022
University of Gothenburg	2022
Universitat de les Illes Balears	2022

Conference Presentations

EuroCIM, poster session	2026
EC^2, poster session	2025
Invited speaker for 19th International Conference on Computational and Financial Econometrics (CFE-CMStatistics 2025)	2025
Invited speaker for 18th International Conference on Computational and Financial Econometrics (CFE-CMStatistics 2024)	2024
European Economic Association Conference	2023
28th International Panel Data Conference	2023
Annual Congress of the Swiss Society of Economics and Statistics	2022
8th Annual Conference of the International Association for Applied Econometrics	2022
27th International Panel Data Conference	2022
European Winter Meeting of the Econometric Society	2021
Bolivian Conference on Development Economics	2021
26th International Panel Data Conference	2021
25th International Panel Data Conference	2019
Swiss Economist Meeting	2018
NY Econometrics Camp	2018
Swiss Young Economist Meeting	2018
23th International Panel Data Conference	2017

Refereeing

Statistical Journal of the IAOS	2025
Journal of Human Development and Capability Association	2023
Econometric Reviews	2022
Journal of Human Development and Capability Association	2017

Job Market Paper

"Weak instrumental variables due to nonlinearities in panel data: A Super Learner Control Function estimator"

Abstract: A triangular structural panel data model with additive separable individual-specific effects is used to model the causal effect of a covariate on an outcome variable when there are unobservable confounders with some of them time-invariant. In this setup, a linear reduced-form equation might be problematic when the conditional mean of the endogenous covariate and the instrumental variables is nonlinear. The reason is that ignoring the nonlinearity could lead to weak instruments (instruments are weakly correlated with the endogeneous covariate). As a solution, we propose a triangular simultaneous equation model for panel data with additive separable individual-specific fixed effects composed of a linear structural equation with a nonlinear reduced form equation. The parameter of interest is the structural parameter of the endogenous variable. The identification of this parameter is obtained under the assumption of available exclusion restrictions and using a control function approach. Estimating the parameter of interest is done using an estimator that we call Super Learner Control Function estimator (SLCFE). The estimation procedure is composed of two main steps and

sample splitting. First, we estimate the control function using a super learner . In the following step, we use the estimated control function to control for endogeneity in the structural equation. Sample splitting is done across the individual dimension. The estimator is consistent and asymptotically normal achieving a parametric rate of convergence. We perform a Monte Carlo simulation to test the performance of the estimators proposed. We conclude that the Super Learner Control Function Estimators significantly outperform Within 2SLS estimators. An R package is available, if you are interested please contact the author.

Publications

"Dynamic Heterogeneous Linear Models for Three-level Panel Data with Short Time Dimension and Stratification" with Jaya Krishnakumar

Matyas L., Badi Baltagi (eds) Seven Decades of Econometrics and Beyond, A tribute to the life and work of Marc Nerlove. 1st Edition. Springer

Brief abstract: Most national survey data are obtained through a sampling scheme that is stratified at multiple levels such as regions, socioeconomic groups, gender, etc., to ensure adequate representativeness of the underlying population. In such a design, the strata as well as the membership of individuals into a stratum are known. This chapter considers a three-level dynamic panel data model, the levels being group (stratum), individual (household, firm etc.) and time. It specifies a model with additive stratum fixed effects and a mixed coefficients structure composed of stratum-specific fixed effects and random stratum-individual-time specific effects. We examine the identification and estimation of this dynamic heterogeneous three-level linear panel data model under stratification when the time dimension is as short as 3. We propose a Mean Stratum-FGLS estimator and a Mean Stratum-OLS estimator to estimate the mean coefficients. To make the GLS estimation of the Stratum-specific parameters feasible, we introduce a ridge estimator of the variance-covariance matrix of the model. We show consistency and asymptotic normality of the Mean Stratum estimators for short panels, under the assumptions that apply to stratified sampling such as the number of strata (groups) is fixed, all strata are observed, and the number of individuals per stratum is large (growing to infinity). We also show the consistency of the variance parameter estimators. We discuss similarities and differences between our specification and a dynamic two-level panel data model with random coefficients. Finally, we discuss long time span.

"Random Coefficients Models (Updated)" with Jaya Krishnakumar and László Balázsi

Matyas L. (eds) The Econometrics of Multi-dimensional Panels. Advanced Studies in Theoretical and Applied Econometrics, 2nd Edition. Springer

Brief abstract: This chapter deals with specification, estimation, and inference within the framework of a random coefficients model for multi-dimensional panel data. Most of the chapter is concerned with a three dimensional setting with an extension to higher dimensions at the end. We discuss several estimation methods, starting with the GLS made feasible by a new estimation procedure for the variance-covariance components as well as an extension of the MINQUE approach. We also derive the full Maximum Likelihood, and a Restricted Maximum Likelihood involving the maximization of a restricted part of the log-likelihood that is free of the intercept and slope coefficients such that we obtain unbiased estimators of the variance-covariance elements. Furthermore, we design specification tests that allow to determine if the response coefficients are constant or varying. Additionally, we present different extensions of the linear model including unbalanced panels, correlated random components, misspecification of the variance-covariance structure, and correlation of the stochastic elements with the regressors. Finally, the chapter ends with brief discussions of non-linear and higher dimensional extensions as well as a simulation experiment comparing the performance of the above methods in a finite sample setting.

Other papers

"Selection of random effects in crossed-random effects models " with Olivier Renaud.

"Causal Identification under Interference: The Role of Treatment Assignment Independence" with Julius Owusu

"Selection of random effects in crossed-random effects models " with Olivier Renaud.

Courses

Macroeconometrics, Africa Training Workshop (AFTW 2025) of the Econometric Society	2025
Workshop on Research Design for Causal Inference, Northwestern Law School	2022
Advances in Financial Time Series Modeling, Study Center Gerzensee	2021

Recent Advances in Bayesian Macroeconometrics, Study Center Gerzensee	2019
Numerical Methods, Study Center Gerzensee	2019
Bayesian Econometrics, World Trade Institute	2018
The identification of structural shocks in dynamic models, HEC Lausanne	2018

Computer Skills

Matlab, Python, R, Stata, LATEX, common Windows text processing, spreadsheet, and presentation software, Bloomberg.

Languages

English (fluent), French (fluent), Spanish (native).

References

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