

Carlos Alberto Toruño Paniagua

Data Scientist | Development Economist, M.Sc.

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Spanish, English, Portuguese, German

Summary

Data scientist and development economist with 12+ years building end-to-end analytical systems including LLM-powered agents, NLP pipelines, and production dashboards for multilateral institutions and international NGOs. Experience architecting full-stack AI applications (LangChain/LangGraph, RAG, vector search) alongside rigorous econometric analysis of large-scale cross-country survey and administrative data. Fluent in Python, R, Stata, SQL, and cloud environments (AWS, GCP, Databricks); has collaborated in producing data products for public policy in the EU, Latam, and South-East Asia.

Professional Experience

Inter-American Development Bank, Data Analyst

January 2026 – Present

Designed and built a regional database of crime, institutional, and prison indicators for Latin America and the Caribbean, including a Python pipeline that standardizes heterogeneous national and cross-national sources into a harmonized, versioned dataset; supported the design of an accompanying Power BI dashboard. Led a harmonization project building panel data from national labor force surveys across five countries (Argentina EPH, Brazil–PNADC, Mexico–ENOE, Ecuador–ENEMDU, Chile–ENE). Tested CKAN APIs for the Group's internal data catalog and explored LLM-based and agentic AI solutions to support the team's data work.

The World Justice Project, Senior Data Analyst

April 2022 – December 2025

Designed and implemented data workflows for multi-country research projects, including the 2024 EUROVOICES initiative across 110 subnational regions in 27 EU member states. Led harmonization and quality control of cross-country survey datasets from 50+ countries, ensuring statistical consistency and comparability. Developed automated econometric analysis pipelines, created interactive dashboards, and implemented LLM-based NLP solutions for large-scale text classification and analysis. Contributed analytical work and visualizations to three thematic research reports and managed web scraping systems for systematic data collection.

Programa Estado de la Nación (PEN), Consultant for political and institutional topics

Nov. 2021 – Mar. 2022

Conducted statistical analysis of large-scale survey data, including the 2021 Nicaraguan Post-Electoral Survey. Contributed analytical work and econometric analysis to the State of Democracy in Nicaragua 2022 Report. Performed data analysis on socioeconomic conditions using STATA and R for report production.

Fundación Nicaragüense para el Desarrollo Económico y Social (FUNIDES), Senior Researcher

Jun. 2016 – Jul. 2019

Led institutional research department, managing multiple analytical projects on economic and social policy topics. Designed and executed quantitative studies using econometric methods, managed databases, and programmed surveys using specialized software. Conducted statistical analysis on education, health, poverty, and inequality using time series and cross-sectional data. Supervised analytical workflows and coordinated with stakeholders on research findings.

National Institute for the Promotion of Economic Competition (Procompetencia), Economic Analyst

Apr. 2014 – Jun. 2016

Conducted firm-level data analysis and market analysis for antitrust cases involving mergers, acquisitions, and unfair competition. Performed econometric analysis to support legal proceedings, including market delineation studies and competitive effects analysis. Prepared analytical reports for senior management and regulatory authorities.

Education

University of Göttingen (Germany), M.Sc. in Development Economics

Oct. 2019 – Oct. 2021

Central American University (Nicaragua), B.Sc. in Applied Economics

Feb. 2010 – Apr. 2014

Skills & abilities

- Technologies: Python, R, Elixir, Stata, Git, Docker.
- Databases: PostgreSQL, SQLite, DuckDB, MongoDB.
- Data extraction, wrangling, and visualization: tidyverse, pandas, polars, matplotlib, seaborn, plotly.
- Quasi-experimental designs: RDD, DID, IV, SCM.
- Regression analysis and econometrics.
- Reproducible research and package development.
- Cloud computing, storage, and databases: AWS, Google Cloud, Databricks.
- Dashboard design and programming: PowerBI, Shiny, Streamlit.
- Machine learning and Natural language processing: scikit-learn, nltk.
- AI agentic systems development: LangChain, LangGraph, Deep Agents.
- Survey design and programming: ODK, CSPro.
- Geospatial analysis: sf, terra, geopandas
- Web scrapping: requests, selenium, BeautifulSoup, httpx, playwright.
- Web development: HTML, CSS, flask, Django, Phoenix

Data Projects & Dashboards

- **Esmé**: Agentic chatbot built with LangGraph that answers natural-language questions by generating and executing SQL against household survey databases across four countries (ENAH-Peru, GEIH-Colombia, ECHP-Paraguay, ENEMDU-Ecuador), using a ReAct agent, vector search over column metadata (Pinecone), and a Streamlit-based UI.
- **EU Rule of Law Tracker**: Dashboard for systematically tracking, classifying, and analyzing rule-of-law-related social and political events across the 27 EU member states, using news archives and LLM-based classification.
- **Designing Data and Analytical Workflows**: An open, ongoing guide to building reproducible, maintainable, and scalable data and analytical workflows, organized around three core principles (reproducibility, maintainability, optimality) with practical examples in R and Python, built with VitePress.
- **EU-S Copilot**: Web app supporting the data-cleaning, harmonization, and validation of data collected for the World Justice Project's EUROVOICES project.
- **WJPr**: R package developed for The World Justice Project's Data Analytics Unit to standardize Rule of Law Index analysis and reporting, providing curated survey datasets, publication-ready visualization functions, and pkgdown documentation; adopted team-wide.
- **ROLI Map Generator**: Interactive app for generating choropleth maps used in WJP's Rule of Law Index repo, built with GeoPandas and Matplotlib.
- **EU Lawyer Dataset**: Dashboard presenting data scraped from bar association records across all 27 EU member states, profiling publicly listed lawyers residing in the EU (Python for scraping, R/Shiny for the app).
- **Colombia 2022 - A Twitter Companion**: Dashboard analyzing over 3 million tweets related to presidential pre-candidates ahead of Colombia's 2022 national elections (R/Shiny).

Research

- Montoya, A., Rodríguez, N., Pardo, S. & Toruño, C. (2025). *Trustbreakers: How Political Discrimination Shapes Trust in Public Institutions in the European Union*. In N. Sowels, J. Wouters, M. Dulak & M.C. Latorre (Eds.), *The European Union in an Illiberal World* (Chapter 14). Global Policy Journal. Document available on [this link](#).

- Toruño, C. & Pardo S. (2025) *The Cost of Exclusion: Political Discrimination and Trust Deficits in the European Union*. Discussion Paper. Document available on [this link](#).
- Toruño C. (2021). *Political favoritism and social protection policies: Evidence from a cash transfer program in Colombia*. Master thesis submitted to Prof. Dr. Krisztina Kis-Katos at the chair of International Economic Policy of the University of Göttingen. Document available on [this link](#).
- Toruño C. & Granada, D. (2020). *Local democracy in Nicaragua: Study case in the municipalities of El Almendro and Kukrahill* (Original document in Spanish). FUNIDES: Managua, Nicaragua. Document available on [this link](#).
- Toruño C. & López Espinoza, Á. (2019). *Diagnosis of the demand for technical occupations in times of crisis* (Original document in Spanish). RENET: Managua, Nicaragua. Document available on [this link](#).
- Toruño C. & Huelva, L. & Pacheco, C. (2018). *State of Democracy in Nicaragua 2019* (Original document in Spanish). FUNIDES: Managua, Nicaragua. Document available on [this link](#).
- Huelva, L. & Pacheco, C. & Toruño C. (2018). *Effects of maternity on the labor supply of women* (Original document in Spanish). FUNIDES: Managua, Nicaragua. Document available on [this link](#).
- Huelva, L. & Toruño, C. (2017). *Impact of public expenditure in the reduction of poverty and inequality*. (Original document in Spanish). FUNIDES: Managua, Nicaragua. Document available on [this link](#).
- Huelva, L. & Pacheco, C. & Toruño C. (2017). *Quality of Education in Nicaragua: Does the children enjoy of the same opportunities?* (Original document in Spanish). FUNIDES: Managua, Nicaragua. Document available on [this link](#).