Rubén Hernández-Murillo

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Professional Summary

- PhD economist with 20+ years of experience in economic research, policy analysis, and public engagement.
- Former Fed economist with a record of contributing to System Committees and communication initiatives.
- Published 25+ scholarly and 50+ general-interest articles in many and diverse economic areas.
- Reproducible-research advocate who has trained economists and analysts in version control, literate programming, and automated publishing.
- Native Spanish speaker with deep interest in economic development for Hispanic and immigrant communities.
- Skilled in making complex economic issues accessible to public, private, and nonprofit stakeholders.

Areas of Expertise

- **Research fields:** Regional and urban economics, public finance, banking and household finance, labor and migration, forecasting.
- **Methods:** Time series and mixed-frequency forecasting, spatial and panel econometrics, text analytics, network analysis.
- **Research computing:** Version control, literate programming (R Markdown, Quarto), Linux, cloud notebooks, R and Python.
- **Model risk management:** Validation of statistical, machine-learning, and GenAI models; validation automation.
- **Public engagement:** Economic outreach, public communications, presentations to community groups and media.
- **Leadership:** Team management, cross-functional collaboration, mentoring, and training.

Work Experience

- **KeyBank, NA**, Quant. Analytics Sr. Assoc., Cleveland, OH 06/2022 - present
  - Independently validate 10–15 models a year across AML, credit risk, fraud, and marketing, assessing conceptual soundness, data, and performance, and communicating findings to model owners and risk leadership.
  - Collaborate with the GenAI Validation team that reviews and approves proofs of concept built on large language models, evaluating their risks, controls, and fitness for use.
  - Build tools for the MRM Automation team: Python with Rust acceleration and HTML/CSS/JS interfaces that automate validation of model documents and workbooks, reducing manual review.
  - Apply network theory and interactive visualizations (Cytoscape.js) to map and help maintain the bank's model-inventory dependency graph.
  - Help set the validation group's best practices for Google Cloud (Compute Engine, Vertex AI Workbench notebooks) as a member of its GCP working team.
  - Teach reproducible workflows to model validators through various seminars, including on Git for SAS users and on Marimo vs. Jupyter notebooks for Git-friendly, reproducible analysis.
  - Developed a Python/Streamlit app on GCP that uses text embeddings to analyze patterns across model-validation findings.
  - Worked with model owners and developers across LOBs on model standards and governance.
- **Federal Reserve Bank of Cleveland**, Senior Policy Economist, Cleveland, OH 03/2015 - 03/2022
  - Designed and led a training program for economists and research analysts on reproducible-research tools (Git, Make, Pandoc, R Markdown) and wrote companion tutorials.
  - Mentored PhD dissertation interns and research analysts on research design and computational methods.
  - Translated econometric analyses into briefings for Bank leadership and the Board in support of monetary policy deliberations.
  - Published peer-reviewed research in journals including the *Journal of Public Economics* and *Regional Science and Urban Economics*, plus data briefs on pandemic layoffs and COVID-19 mortality.
  - Built models and data workflows in R and Python, analyzing high-frequency and survey data with SQL and Spark.
  - Applied NLP and text analytics to Federal Reserve communications in Python and R.
  - Conducted public outreach on Federal Reserve policy and regional and national economic trends.
  - Published articles on immigrant labor, public health disparities, unemployment, and housing.
- **Federal Reserve Bank of St. Louis**, Senior Economist, St. Louis, MO 10/2000 - 03/2015
  - Managed the Beige Book team and chaired the Federal Reserve System's *Regional Analysis Committee*, organizing its annual conference.

- Quantified the forecasting value of the Beige Book with mixed-frequency (MIDAS) and text-analytic methods (*Journal of Money, Credit and Banking*).
- Co-authored peer-reviewed research with economists across the Federal Reserve System and academia, from model design and coding through publication.
- Published research on banking technology adoption and racial disparities in mortgage lending (*Journal of Banking and Finance*, *Regional Science and Urban Economics*, *Real Estate Economics*).
- Published research on Hispanic demographic and labor trends, racial disparities, fiscal policy, and happiness.
- Presented economic analyses to leadership and the Board for monetary policy decisions.
- Conducted public outreach and briefed nonprofit, government, and business leaders on Eighth District trends.
- Frequent contributor to *The Regional Economist*; collaborated on public-facing communication strategies.
- Reviewed banks' CCAR stress-test models for Federal Reserve System supervision.

- **Washington University in St. Louis, Olin Business School**, Lecturer, St. Louis, MO 06/2013 - 08/2013
  - Taught an Executive MBA course on Managerial Economics.
- **ITAM (Instituto Tecnológico Autónomo de México)**, Visiting Assistant Professor, Mexico City 01/2002 - 06/2002
  - Taught graduate Industrial Organization and undergraduate Microeconomics (in Spanish).

Training and Tutorials Delivered

- *Reproducible Research with Git, Make, Pandoc, and R Markdown*: training series and tutorials for economists and research analysts, Federal Reserve Bank of Cleveland.
- *Git for SAS Users*: tutorial and seminar for model validators, KeyBank.
- *Marimo vs. Jupyter Notebooks*: reproducible, Git-friendly notebooks, KeyBank.
- Internal seminars on *Generative AI*, *Reproducible Research*, and *Fed Communications*, KeyBank.

Technical Skills

- **Programming:** R, Python, SQL, MATLAB, Stata, JavaScript/HTML/CSS; Rust for Python performance extensions
- **Reproducible research:** Git (GitHub, GitLab), CI/CD, Make, Pandoc, R Markdown, Quarto, Jupyter and Marimo notebooks
- **Computing:** Linux (25+ years) and the command line; Google Cloud (Compute Engine, Vertex AI Workbench), AWS; Spark; parallel R and Python
- **AI and ML:** Large language models and GenAI applications (incl. validation of LLM-based proofs of concept), LLM coding assistants, text embeddings, NLP, machine learning
- **Econometrics:** Time series and forecasting, mixed-frequency (MIDAS) models, spatial and panel econometrics, network analysis, model validation
- **Languages:** English, Spanish (native)

Education

- **PhD in Economics**, *University of Rochester*, Rochester, NY 2001
  - Research assistant writing MATLAB and Fortran code.
- **MA in Economics**, *University of Rochester*, Rochester, NY 1998
  - Teaching assistant for undergraduate Econometrics and Sports Economics.
- **BA in Economics** (Summa Cum Laude), *ITAM (Instituto Tecnológico Autónomo de México)*, Mexico City 1995
  - Research assistant. Teaching assistant for undergraduate Microeconomics and Macroeconomics.

Publications

[77] R. Hernández-Murillo, "Age-adjusted covid-19 mortality rates by demographic groups," *Federal Reserve Bank of Cleveland District Data Brief*, no. 2022-03-23, pp. 1–8, Mar. 2022. doi: 10.26509/frbc-ddb-20220323

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