Rubén Hernández-Murillo

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Career Summary

PhD economist and quantitative analyst with 25+ years in econometric research, model validation, and reproducible research computing.

- **Research economist:** Senior Economist at two Reserve Banks; 25+ peer-reviewed articles and 50+ policy and general-interest pieces.
- **Reproducible-research advocate:** version control, Linux, plain text research, data science at the command line, and Quarto for publishing papers, presentations, and websites.
- **Bridge between economists and reproducibility:** trained Fed economists and analysts on Git, Make, Pandoc, R Markdown, and Quarto; teach Git and reproducible notebooks to bank validators.
- **Model risk and AI:** validate statistical, machine-learning, and GenAI models at a large bank; build Python/Rust automation tools and cloud (GCP) workflows.
- **Communicator:** translate technical findings for audiences ranging from junior analysts to senior leadership, policymakers, and the media.

Full research CV with complete publication list: rubenhm.org/cv

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)

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.
- **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.
  - Translated econometric analyses into briefings for Bank leadership and the Board in support of monetary policy deliberations.
  - 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.
- Mentored PhD dissertation interns and research analysts on research design and computational methods.
- 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.
- Conducted public outreach on Federal Reserve policy and regional and national economic trends.

- **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*).
  - Reviewed banks' CCAR stress-test models for Federal Reserve System supervision.
  - Briefed industry leaders and media on regional and national economic trends.
- **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.

Education

- **PhD in Economics**, *University of Rochester*, Rochester, NY 2001
- **MA in Economics**, *University of Rochester*, Rochester, NY 1998
- **BA in Economics** (Summa Cum Laude), *ITAM (Instituto Tecnológico Autónomo de México)*, Mexico City 1995