

# Galo Nuño

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## Current positions

- 2022- Banco de España, Monetary Policy and Capital Markets, Head of Division.
- 2024- CEPR, Research Fellow, Monetary Economics and Fluctuations.
- 2023- CEMFI, Research Associate.
- 2020- CESifo, Research Fellow.

## Previous positions

- 2023-2024 BIS, Monetary and Economic Department, Visiting Economist.
- 2020-2022 Banco de España, Monetary Policy and Macroeconomic Analysis, Head of Division.
- 2018-2020 Banco de España, Monetary Policy and Macroeconomic Analysis, Head of Unit.
- 2014-2018 Banco de España, Monetary Policy and Euro Area Analysis, Senior Economist.
- 2012-2014 European Central Bank, International Policy Analysis, Economist.
- 2009-2012 Banco de España, International Economics, Senior Economist.
- 2006-2008 BBVA, Research Department, Senior Economist.
- 2003-2004 Boston Consulting Group, Consultant.
- 2002-2003 École Polytechnique de Montréal, Research Assistant.

## Professional appointments

- 2024-2025 ECB Strategy Review workstream, co-lead.
- 2023- ECB, Challenges for Monetary Policy Transmission in a Changing World (ChaMP) Research Network, Advisor.
- 2019- ECB Monetary Policy Committee, backup member.
- 2022- ECB Expert Group on “Heterogeneity and Monetary Policy”, co-chair.
- 2022- ECB Expert Group on “CBDC”, member.
- 2021-2022 BIS Working Group on “Asset purchases for monetary policy purposes”, member.
- 2021-2022 ECB workstream “Incorporating climate change, including market efficiency, considerations in CSPP benchmarks and the collateral framework”, member.
- 2020-2021 ECB Strategy Review workstreams “Price Stability” and “Monetary-Fiscal Interactions”, member.
- 2017-2019 ECB Taskforce on “the Long-run Operational Framework of Monetary Policy”, member.

## Teaching positions

2020	University of Mannheim, EABCN course Professor.
2020-2023	CEMFI, Summer School Professor.
2020	LUISS, Visiting Professor.
2017-2018	CUNEF, Associate Professor.
2008-2017	Universidad de Comillas, Associate Professor.
2010-2011	University of Cagliari, Dept. of Economics, Visiting Professor.

## Education

2006	MSC in Management Science and Engineering, Stanford University, CA.
2006	PHD in Electrical Engineering, Universidad Politécnica, Madrid.
2002	MSC in Electrical Engineering, Universidad Politécnica, Madrid.

## Grants, honors and awards

2006	Outstanding Graduate Prize, Stanford University.
2005-2006	La Caixa Fellowship, La Caixa.
2003	Prize for Graduate Research Accomplishment, Rafael Escolá Foundation.
2002	Prize to the Best Engineering Student, Telefónica Foundation.
2001-2002	Fellowship, Asociación Mutualista de Ingenieros Civiles.
2001	Outstanding Undergraduate Prize, Universidad Politécnica de Madrid.

## Publications

### WORKING PAPERS

Strike while the Iron is Hot: Optimal Monetary Policy with a Nonlinear Phillips Curve (with Peter Karadi, Anton Nakov, Ernesto Pasten and Dominik Thaler), 2024.

Navigating by Falling Stars: Monetary Policy with Fiscally-driven Natural Rates (with Rodolfo Campos, Jesús Fernández-Villaverde, and Peter Paz), 2024. Revision requested at [Journal of Political Economy: Macroeconomics](#).

CBDC and the Operational Framework of Monetary Policy, (with Jorge Abad and Carlos Thomas), 2024. Revision requested at [Journal of Monetary Economics](#).

The Heterogeneous Impact of Inflation on Households' Balance Sheets, (with Clodomiro Ferreira, José Miguel Leiva, Álvaro Ortiz, Tomasa Rodrigo, and Sirenia Vazquez), 2023.

Firm Heterogeneity, Capital Misallocation and Optimal Monetary Policy (with Beatriz Gonzalez, Dominik Thaler and Silvia Albrizio), 2023, Revision requested at [Journal of Political Economy](#).

## Economics

The Term Structure on Interest Rates in a Heterogeneous Monetary Union (with Jim Costain and Carlos Thomas), 2024. Conditionally accepted at [Journal of Finance](#).

Inequality and the Zero Lower Bound (with Jesús Fernández-Villaverde, Joël Marbet and Omar Rachedi ), 2024. Forthcoming at [Journal of Econometrics](#).

Financial Frictions and the Wealth Distribution, [Econometrica](#), 91 (3), pp. 869-901 (with Jesús Fernández-Villaverde and Samuel Hurtado), 2023.

A Framework for Debt-Maturity Management, [Journal of Political Economy: Macroeconomics](#), 1(1). pp. 119 - 190 (with Saki Bigio and Juan Passadore), 2023.

Monetary Policy and Sovereign Debt Sustainability, [Journal of the European Economic Association](#), 21(1), pp. 293–325 (with Samuel Hurtado and Carlos Thomas), 2023.

Optimal Redistributive Inflation, [Annals of Economics and Statistics](#), 146, pp. 3-64 (with Carlos Thomas), 2022 .

A Large Central Bank Balance Sheet? The Role of Interbank Market Frictions, [Journal of Monetary Economics](#), 114, pp. 350-367 (with Oscar Arce, Dominik Thaler and Carlos Thomas), 2020.

Social Optima with Heterogeneous Agents, [Review of Economic Dynamics](#), 28, pp. 150-180 (with Benjamin Moll), 2018.

Bank Leverage Cycles, [American Economic Journal: Macroeconomics](#), 9(2), pp. 32–72 (with Carlos Thomas), 2017.

Quantitative Effects of the Shale Oil Revolution, [Energy Policy](#), 86, pp. 855-866 (with Cristiana Manescu), 2015.

Learning from Experience in the Stock Market, [Journal of Economic Dynamics and Control](#), 52, pp. 224–239 (with Anton Nakov), 2015.

A Twin Crisis with Multiple Banks of Issue, [European Review of Economic History](#), 19 (2), pp. 171–194 (with Pedro Tedde and Alessio Moro), 2015.

Saudi Arabia and the Oil Market, [Economic Journal](#), 132 (12), pp. 1333-1362 (with Anton Nakov), 2014.

Does TFP drive Housing Prices? A Growth Accounting Exercise for Four Countries, [Economics Letters](#), 115 (2), pp. 221-224 (with Alessio Moro), 2012.

Optimal Research and Development and the Cost of Business Cycles, [Journal of Economic Growth](#), 16 (3), pp. 257-283, 2011.

## Machine Learning and Applied Mathematics

Optimal Social Policies in Mean Field Games, [Applied Mathematics and Optimization](#), 76(1), pp. 29-57, 2017.

A New Location Estimation System for Wireless Networks based on Linear Discriminant Functions and Hidden Markov Models, [EURASIP Journal on Advances in Signal Processing](#), 1 (2), pp. 215-232 (with José Manuel Páez), 2006.

A New Time-Hopping Multiple Access Communication System Simulator: Application to UWB, [EURASIP Journal on Advances in Signal Processing](#), 1 (3) pp. 346-358 (with José Manuel Páez), 2005.

#### POLICY PAPERS (NON REFEREED)

Quo vadis  $r^*$ ? The natural rate of interest after the pandemic (with Gianluca Benigno, Boris Hofmann, and Damiano Sandri), [BIS Quarterly review](#), 2024.

La política monetaria del Banco Central Europeo frente a la crisis pandémica (with Pablo Aguilar, Ana Arencibia, Jim Costain, Samuel Hurtado, Jaime Martínez and Carlos Thomas), [Papeles de Economía Española](#), 2022.

The ECB's price stability framework: past experience, and current and future challenges, [ECB Occasional Papers](#) (with several coauthors), 2021.

Monetary-fiscal policy interactions in the euro area, [ECB Occasional Papers](#) (with several coauthors), 2021.

The ECB Monetary Policy Response to the Covid-19 Crisis , [Bank of Spain Occasional Papers](#) (with Pablo Aguilar, Óscar Arce, Samuel Hurtado, Jaime Martínez and Carlos Thomas), 2020.

The Eurosystem's Monetary Policy Following the End of Net Asset Purchases, [Bank of Spain Analytical Articles](#) (with Óscar Arce and Carlos Thomas), 2019.

Monetary policy implications of central bank-issued digital currency, [Bank of Spain Analytical Articles](#), 2018.

The natural interest rate: concept, determinants and implications for monetary policy, [Bank of Spain Analytical Articles](#) (with Carlos Thomas and Alessandro Galesi), 2017.

Evaluación y perspectiva de los precios del petróleo, [Revista de Economía Aragonesa](#), 2016.

El mercado del petróleo: cambios en la oferta y determinantes de la caída de los precios en 2014, [Boletín Económico Banco de España](#), 2015.

Long-run growth and demographic prospects in advanced economies, [Bank of Spain Occasional Paper](#) 1206 (with Cristina Pulido and Rubén Segura), July 2012.

The Process of Economic Adjustment after Financial Crises: a Historical Perspective, [Bank of Spain Economic Bulletin](#), October 2011.

Energy Markets and the Euro Area Macroeconomy, [ECB Occasional Papers](#) (with several coauthors), 2010.

Un modelo para analizar las causas y consecuencias de las variaciones en el precio del petróleo, [Boletín Económico Banco de España](#) (with Anton Nakov), 2010.

After Bretton Woods II, [BBVA Working Papers](#) (with José Luís Escrivá, Alicia García-Herrero and Joaquín Vial), 2008.

#### CHAPTERS IN BOOKS

Microfinanzas e Inmigración, *Inmigración, Estado y Derecho*. Ed. M. Balado, Madrid.

## Teaching

- 2022 *Advanced Numerical Methods in Macroeconomics*. Training school. Inter-American Development Bank and Banco de la Republica -Colombia.
- 2020 *Continuous-time Methods in Macroeconomics (with applications to heterogeneous agent models)*. EABCN Training School (joint with Jesús Fernández-Villaverde).
- 2022 *Advanced Numerical Methods in Macroeconomics*. Training school. Banco de Chile (joint with Jesús Fernández-Villaverde).
- 2020-2023 *Advanced Numerical Methods in Macroeconomics*. CEMFI Summer School (joint with Jesús Fernández-Villaverde).
- 2020 *Continuous-time Methods in Macroeconomics and Finance*. PhD course, LUISS.
- 2015, 2016 *Continuous-time Methods for Economics and Finance*. PhD Summer School in Computational Economics at the University of Cagliari.
- 2008-2017 *Quantitative Finance*, Master in Finance, Universidad de Comillas.
- 2017-2018 *Statistics*, Degree in Business Administration, CUNEF.

## Conference Presentations, Invited Talks and Seminars

2024 Banque de France (e), Brown (e), Boston Fed (e), U. Alicante (e), ECB ChaMP Conference, Annual Conference of the Central Bank of Chile (e), SNB-BIS joint conference, EUI, CNB Heterogeneous Agents in Macroeconomic Models, Workshop computational macroeconomics at KIT, Zurich Workshop on the Frontier of Quantitative Macroeconomics, State Bank of Pakistan, Banco Central de Uruguay, U. Bern, Bocconi U.; 2023 Goethe University, UCL, DNB, U. of Surrey, ECB, Konstanz Seminar on Monetary Theory and Policy, BSE Summer Forum; CESifo Venice Summer Institute Workshop; IMF; Central Bank of Uruguay; U. Lausanne, U. Zurich, Deutsche Bundesbank, Econometric Society Summer School in Dynamic Structural Econometrics, OeNB Liquidity Conference, CEPR-ECB Conference: "The macroeconomic implications of central bank digital currencies", U. Zurich, Prague: VŠE; 2022 BIS; BI Norwegian Business School; Rice University; Federal Reserve Bank of New York; Bank of Finland; Banca d'Italia Conference on Monetary Policy; PSE Macro days; University of Mannheim and EABCN Conference on "New Challenges for Monetary Policy", Mannheim; Latvijas Banka; ESSEC Workshop "on Monte Carlo and Approximate Dynamic Programming Methods", Paris; HKUST/Jinan Macro workshop; IMF; BSE Summer Forum; Konstanz Seminar on Monetary Theory and Policy, University of Bonn, T2M, Cambridge University, Banco de Chile; 2021 Federal Reserve Bank of Chicago; Bank of England / ECB / King's College Conference on "Advanced Analytics: New Methods and Applications for Macroeconomic Policy"; Hydra: Philadelphia Fed Conference on "Machine Learning at Central Banks"; EEA-ESEM; Canadian Economic Association, Society for Economic Dynamics; "Heterogeneous Agent Models in Macroeconomics - Advances in Continuous Time"; Lund University, University of Liverpool, University of Hamburg, ECB; 2020 EIEF/LUISS Workshop "Mean Field Games in Economics", Bank of Canada, London School of Economics-Bank of England "Income Distribution, Wealth Distribution and Central Bank Policies", Londres; 2019 Oxford, "Salento Macro Meetings" Galatina; Hydra; European Commission, Barcelona GSE Summer Forum, Banco de Portugal, CEPR-U. Mannheim-Goethe U. Conference on Financial Markets and Macroeconomic Performance, Frankfurt. 2018 IAE-UAB, Barcelona; ADEMU Conference on Sovereign Debt, Toulouse; International Research Forum Monetary Policy, Federal Reserve Board; Csef-Igier Symposium on Economics and Institutions, Capri, EIEF; LUISS; University of Lund; ECB/CEPR Workshop: Household heterogeneity in macroeconomics, Frankfurt; CEBRA annual meeting, Frankfurt 2017 CEPR Conference on "The New Macroeconomics of Aggregate Fluctuations and Stabilisation Policy," UCL; U. Penn / Philadelphia Fed Conference on Machine Learning for Macroeconomics, Philadelphia; Paris School of Economics; University of Nottingham; EABCN Meeting on "Recent Developments

in Monetary Policy Research,” Banque de France; BBVA; Catalan Economic Society. 2016 Stanford Institute for Theoretical Economics; Society for Economic Dynamics, Toulouse; Barcelona GSE Summer Forum. NY Fed - ECB Global Research Forum on International Macroeconomics and Finance; NY. NIPS 2016, Barcelona; 2015 ECB; University of Vigo; ESSIM-CEPR, Tarragona; Barcelona GSE Summer Forum; Oxford-NY Fed Monetary Economics Conference; REDg Barcelona. 2014 International Research Forum Monetary Policy, Federal Reserve Board; T2M, University of Lausanne; ESSIM-CEPR, Tarragona, Society for Computational Economics, Oslo; CAMP, Oslo; ESRB; Dept. of Maths, La Sapienza; “New Perspectives in Optimal Control and Games” Rome; BBVA. 2013 European Economic Association, Gothenburg; “Expectations and Macroeconomics” Bank of Spain; “Empirical Macroeconomics” Universiteit Gent; Federal Reserve Bank of New York; Bank of Canada. 2012 “Monetary Policy and Commodity Prices” ECB; “Oil and the macroeconomy” Banque de France; “Debt and credit, growth and crises” World Bank and Bank of Spain; URJC; Bank of Spain; BBVA; 3rd International Conference Carlo Giannini, Roma; CREI; Universidad Carlos III; IESE. 2015 ECB; University of Vigo; ESSIM-CEPR, Tarragona; Barcelona GSE Summer Forum; Oxford-NY Fed Monetary Economics Conference. 2011 “Information, Beliefs and Economic Policy” ECB; University of Surrey; Society for Computational Economics, San Francisco; University of Cagliari; ECB; “Coping with volatile oil and commodities prices” ECB. 2010 ESSIM-CEPR, Tarragona; Dynare Conference, Tuusula; Bank of Portugal; “International Business Cycles” EABCN, Budapest; ECB. 2009 “Oil prices” Bank of England; CEMLA, Salvador de Bahia; BBVA; ECB. 2008 European Economic Association, Milan; Society for Computational Economics, Paris; University of Valencia.

## Referee

Econometrica, Journal of Political Economy, American Economic Review, Review of Economic Studies, American Economic Journal: Macroeconomics, Journal of Political Economy: Macroeconomics, Journal of Monetary Economics, American Economic Review: Insights, Journal of the European Economic Association, Journal of Economic Growth, Journal of International Economics, Economic Journal, International Economic Review, Quantitative Economics, European Economic Review, Applied Economics, Empirical Economics, Hacienda Pública, Revista de Economía Aplicada, SERIEs, Banco de España Working Papers, European Central Bank Working Papers, Energy Journal, Energy Economics, Financial History Review, IMF Economic Review, Macroeconomic Dynamics.

## Ph.D. Supervision

- 2024 Clara Arroyo, CEMFI (advisor). Placement: IMF.
- 2023 Danila Smirnov, UPF (committee member). Placement: IMF.
- 2023 Joël Marbet, CEMFI (advisor). Placement: Banco de España.
- 2021 Matthias Rottner, EUI (committee member). Placement: Deutsche Bundesbank, Research Center.
- 2021 Hanno Kase, EUI (committee member). Placement: University of Minnesota (post-doc), ECB.

## Other Professional Service

Co-organizer of the ECB- Banco de España Workshop on The impact of Artificial Intelligence on the Macroeconomy and Monetary Policy, 2024.

Scientific Committee Member, Women in Central Banking Workshop, 2024.

Scientific Committee Member, 2nd CEMLA/Dallas Fed Financial Stability Workshop, 2023.

Scientific Committee Member, CEPR - ESSIM 2023.

Scientific Committee Member, Conference on Computing in Economics and Finance 2022.

Program Committee member, Econometric Society 2020 World Congress.

Scientific Committee Member, Central Bank Macro Modelling Workshop 2020.

Co-organizer of the Banco de España Annual Research Conference, 2017, 2023.

Co-organizer of the Banco de España Seminar in Economic History, 2018, 2019, 2020, 2022, 2023.

Session Organizer CEBRA Conference 2019, 2020, 2021, 2022, 2023.

## Languages

Mother tongue: Spanish. Fluent in English. Advanced knowledge of French and Italian. Basic knowledge of German.