

Astrid Loretta Ayala Castellanos

Contact Information

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Academic Positions

August 2023 – present Stetson-Hatcher School of Business and Economics, **Mercer University**, United States
 - Associate Professor of Economics and Finance.

January 2006 - July 2023 School of Business, **Francisco Marroquin University**, Guatemala and Panama
 - Professor of Economics
 - Director of the Legal Master (LL.M.) in Finance program
 - Director of the Guatemalan Econometric Study Group (GESG).

Studies

PhD in Economics, University of Navarra, Pamplona, Spain

- Thesis title: Three Essays on Real and Nominal Macroeconomic Variables in Latin America
- Supervisors: Luis Alberiko Gil-Alana (University of Navarra) and Juncal Cuñado (University of Navarra).

Master of Economics and Finance (MEF), University of Navarra, Pamplona, Spain

- Thesis title: The Relationship between the Economic Value Added and the Market Value of the Equity
- Advisor: Rocío Sánchez Mangas (Universidad Autónoma de Madrid).

Master of Business Economics (Magna Cum Laude), Francisco Marroquin University, Guatemala

- Thesis title: "Genesis and Crisis of Moral Principles in Contemporaneous Western Society from a Freudian Psychoanalytic Perspective."
- Advisor: Wenceslao Giménez-Bonet (Francisco Marroquin University).
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MBA (Summa Cum Laude), Francisco Marroquin University, Guatemala.

Public Accountant and Auditor (Summa Cum Laude), Francisco Marroquin University, Guatemala.

Teaching

Mercer University, Stetson-Hatcher School of Business

2023 - present:

- Strategic Corporate Finance (Major in Finance, BBA)
- Equity Research (Major in Finance, BBA)
- Investments Seminar (BBA)
- Financial Analytics (Master in Business Analytics)
- Global Managerial Economics (MBA)
- Visual Reporting and Communication (Master in Business Analytics)
- Strategic Corporate Finance (Major in Finance, BBA)

Francisco Marroquin University (Guatemala and Panama), School of Business and Faculty of Economics

- Valuation (MBA)
- Financial Econometrics (Master of Finance)
- Value-Based Management (LL.M.)
- Mergers and Acquisitions (LL.M.)
- Valuation Capstone (LL.M.)
- Corporate Finance (LL.M.)
- Economic Value Added (M.Sc. in Economics and Business)
- Financial Analysis (MBA)
- Budgeting (MBA)
- Working Capital Management (MBA)
- Financial Principles (Undergraduate program in Law)
- Financial Statement Analysis in different Industries (MBA)
- Microeconomics (MBA, LL.M., and Master in Real Estate Project Management)
- Macroeconomics (MBA, LL.M., Master in Real Estate Project Management, and Master in Finance)
- Business Valuation Capstone (Executive Program of Francisco Marroquin University and Tulane University)
- Financial Accounting (MBA, LL.M. Master in Finance)
- Competition and Entrepreneurship (Master in Economics)
- The Art Challenge (CoLab Francisco Marroquin University)
- Centro de Estudios Superiores Online de Madrid Manuel Ayau (Spain) www.ommayau.com
- Financial Statement Analysis (Master in Value Investing)
- Accounting and Financial Analysis (Master in Design and Entrepreneurial Development of Cities)
- Introduction to Accounting (Master in Value Investing)

Research Interests

- Corporate Finance
- Financial Econometrics
- Macroeconometrics
- Dynamic Conditional Score Models
- Cultural Economics

Publications

- (P25) Ayala, A, Blazsek, S., and Subrahmanyam, V. (2026) Score-driven Markov-switching models of scale and shape parameters: an application to the Indian stock market. **Applied Economics**, <https://doi.org/10.1080/00036846.2026.2632711>.
- (P24) Ayala, A, Blazsek, S., and Ruiz-Sanchez, M. (2025) Sample selection bias for Jackson Pollock auctions: A case study. **Applied Finance Letters**, <https://doi.org/10.24135/afl.v14i.915>.
- (P23) Ayala, A, Blazsek, S., and Subrahmanyam, V. (2025) Score-driven expected return and volatility spillovers between the Indian and United States stock markets. **Applied Economics**, <https://doi.org/10.1080/00036846.2025.2476775>.
- (P22) Ayala, A, and Blazsek, S. (2025) Exogenous, endogenous, and observable switching models of industrial production in the United Kingdom. **Applied Economics**, <https://doi.org/10.1080/00036846.2025.2464823>.
- (P21) Blazsek, S., and Licht, A., Ayala, A., Su-Ping Liu (2024). Core inflation rate for China and the ASEAN-10 countries: Smoothed signal for score-driven local level plus scale models. **Studies in Nonlinear Dynamics & Econometrics**, <https://doi.org/10.1515/snnde-2023-0042>.
- (P20) Ayala, A., Blazsek, S., and Licht, A. (2023) Score function scaling for QAR plus Beta-t-EGARCH: An empirical application to the S&P 500. **Applied Economics**, <https://doi.org/10.1080/00036846.2023.2208335>.

- (P19) Ayala, A., Blazsek, S., and Licht, A. (2023) Volatility forecasting using quasi-score-driven models with an application to the coronavirus pandemic. **Studies in Nonlinear Dynamics & Econometrics**, <https://doi.org/10.1515/snde-2022-0085>.
- (P18) Ayala, A., Blazsek, S., and Licht, A. (2023) Comparison of Score-Driven Equity-Gold Portfolios During the COVID-19 Pandemic Using Model Confidence Sets. **Studies in Nonlinear Dynamics & Econometrics**, <https://doi.org/10.1515/snde-2022-0107>.
- (P17) Ayala, A., Blazsek, S., and Escribano, A. (2023) Anticipating extreme losses using score-driven shape filters. **Studies in Nonlinear Dynamics & Econometrics**, <https://doi.org/10.1515/snde-2021-0102>.
- (P16) Ayala, A., Blazsek, S., and Licht, A. (2022) Signal Smoothing for Score-Driven Models: A Linear Approach. **Communications in Statistics – Simulation and Computation**, <https://doi.org/10.1080/03610918.2022.2032165>.
- (P15) Ayala, A., Blazsek, S., and Licht, A. (2022) Score-driven stochastic seasonality of the Russian rouble: An application case study for the period of 1999 to 2020, **Empirical Economics**, 62: 2179–2203. <http://link.springer.com/article/10.1007/s00181-021-02103-6>.
- (P14) Ayala, A., and Blazsek, S. (2021) Score-driven panel data models of the capital structure of US firms. **Applied Economics Letters**, 28 (19): 1666–1670. <https://doi.org/10.1080/13504851.2020.1845293>.
- (P13) Ayala, A., and Blazsek, S. (2019) Score-driven models of stochastic seasonality in location and scale: An application case study of the Indian rupee to USD exchange rate. **Applied Economics**, 51 (37): 4083–4103. <https://doi.org/10.1080/00036846.2019.1588952>.
- (P12) Ayala, A., and Blazsek, S. (2019) Score-driven currency exchange rate seasonality as applied to the Guatemalan Quetzal/US Dollar. **Journal of the Spanish Economic Association (SERIEs)**. 10 (1): 65–92. <https://doi.org/10.1007/s13209-018-0186-0>.
- (P11) Ayala, A., and Blazsek, S. (2018) Score-driven copula models for portfolios of two risky assets, **The European Journal of Finance** 24 (18): 1861–1884. <https://doi.org/10.1080/1351847X.2018.1464488>.
- (P10) Ayala, A. and Blazsek, S. (2018) Equity market neutral hedge funds and the stock market: an application of score-driven copula models. **Applied Economics**. <https://doi.org/10.1080/00036846.2018.1440062>.
- (P9) Ayala, A., Blazsek, S., Cuñado, J., Gil-Alana, L. (2016). Regime-switching purchasing power parity in Latin America: Monte Carlo unit root tests with dynamic conditional score, **Applied Economics**, 48 (29): 2675–2696. <http://dx.doi.org/10.1080/00036846.2015.1128076>.
- (P8) Ayala, A. and Blazsek, S. (2014). Fiscal sustainability of Eurozone governments: An empirical review of the past decade, **Review of European Studies**, 6 (1): 143–150. <http://dx.doi.org/10.5539/res.v6n1p143>.
- (P7) Ayala, A. and Blazsek, S. (2014). Contagion of sovereign debt in the Eurozone, **Theoretical Economics Letters**, 4 (1): 98–109. <http://dx.doi.org/10.4236/tel.2014.41016>.
- (P6) Ayala, A. and Blazsek, S.A. (2013). Structural breaks in public finances in Central and Eastern European countries, **Economic Systems**, 37 (1): 45–60. <http://dx.doi.org/10.1016/j.ecosys.2012.06.004>.
- (P5) Ayala, A., Cuñado, J. and Gil-Alana, L. (2013). Real Convergence: Empirical Evidence for Latin America, **Applied Economics**, 45 (22): 3220–3229. <https://doi.org/10.1080/00036846.2012.703317>.
- (P4) Ayala, A., Cuñado, J. and Gil-Alana, L. (2012). Real convergence in Latin America: a fractionally integrated approach, **Applied Financial Economics**, 22 (20): 1713–1717. <https://doi.org/10.1080/09603107.2012.674204>.
- (P3) Ayala, A., Cuñado, J. and Gil-Alana, L. (2012). Unemployment Hysteresis: Empirical Evidence for Latin America, **Journal of Applied Economics**, 15 (2): 213–233. [https://doi.org/10.1016/S1514-0326\(12\)60010-5](https://doi.org/10.1016/S1514-0326(12)60010-5).
- (P2) Ayala, A. and Blazsek, S. (2012). How has the financial crisis affected the fiscal convergence of Central and Eastern Europe to the Eurozone? **Applied Economics Letters**, 19 (5): 471–476. <http://dx.doi.org/10.1080/13504851.2011.583212>.
- (P1) Ibarquén, G. and Ayala, A. (2006). A market proposal for auditing the financial statements of public companies, **Journal of Management for Value**, 1 (2).

Books and Books Chapters

- (C1) Ayala, A., Blazsek, S., and González, R. B. (2015). Default risk of sovereign debt in Central America. In: Nigel Finch (Ed.), *Emerging Markets and Sovereign Risk* (pp. 18–44). ISBN 978-1-137-45065-4, Palgrave Macmillan.

- (B1) Ayala, Astrid (2011). Génesis y crisis de los principios morales de la sociedad occidental contemporánea desde la perspectiva del psicoanálisis freudiano. ISBN 978-3-8465-6329-8, Editorial Académica Española.

Submitted Papers

- Blazsek, S., Escribano, A., and Ayala, A. (2025) Improved gradient scaling for score-driven filters with an application to stock market volatility. Submitted to the Journal of Econometrics.

Working Papers

- Improved gradient scaling for score-driven filters with an application to stock market volatility (with S. Blazsek and A. Escribano). Working Paper 2025-07, **University Carlos III of Madrid**, Department of Economics. <https://hdl.handle.net/10016/45978>
- Score-driven equity plus gold portfolios before and during the COVID-19 pandemic models (with S. Blazsek and A. Licht). **Guatemalan Econometric Study Group** Discussion Paper 1/2022, Francisco Marroquin University, School of Business, 2022. <https://en.ufm.edu/wp-content/uploads/2017/04/AYALA-BLAZSEK-LICHT-2022-GESG-WP.pdf>
- A short note on the scaling parameter in score-driven filters (with S. Blazsek and A. Licht). **Guatemalan Econometric Study Group** Discussion Paper 3/2022, Francisco Marroquin University, School of Business, 2022. <https://en.ufm.edu/wp-content/uploads/2017/04/AYALA-BLAZSEK-LICHT-2022-GESG-WP-3-2022.pdf>
- Optimal Choice of the Scaling Parameters in Score-Driven Filters (with S. Blazsek and A. Licht). **Guatemalan Econometric Study Group** Discussion Paper 4/2022, Francisco Marroquin University, School of Business, <https://en.ufm.edu/wp-content/uploads/2017/04/BLAZSEK-AYALA-LICHT-2022-GESG-WP-04-2022.pdf>
- Volatility forecasting for the coronavirus pandemic using quasi-score-driven models (with S. Blazsek and A. Licht). **Guatemalan Econometric Study Group** Discussion Paper 2/2021, Francisco Marroquin University, School of Business, 2021. <https://en.ufm.edu/wp-content/uploads/2021/01/AYALA-BLAZSEK-LICHT-2021-GESG-WP-2-2021.pdf>
- Optimal signal extraction for score-driven models (with S. Blazsek and A. Licht). **Guatemalan Econometric Study Group** Discussion Paper 1/2021, Francisco Marroquin University, School of Business, 2021. <https://en.ufm.edu/wp-content/uploads/2021/01/AYALA-BLAZSEK-LICHT-2021-GESG-WP-2021-01.pdf>
- Dynamic analysis of the capital structure of S&P 500 firms under unconventional monetary policy using score-driven panel data models (with S. Blazsek). **Guatemalan Econometric Study Group** Discussion Paper 3/2020, Francisco Marroquin University, School of Business, 2020. <https://en.ufm.edu/wp-content/uploads/2020/06/AYALA-BLAZSEK-2020-GESG-WP-1.pdf>
- Maximum likelihood estimation of score-driven models with dynamic shape parameters: an application to Monte Carlo value-at-risk (with S. Blazsek and A. Escribano). Working Paper 19-12, **University Carlos III of Madrid**, Department of Economics, 2019. <https://e-archivo.uc3m.es/handle/10016/28638>
- Score-driven time series models with dynamic shape: an application to the Standard & Poor's 500 index (with S. Blazsek and A. Escribano). Working Paper 19-05, **University Carlos III of Madrid**, Department of Economics, 2019. <http://hdl.handle.net/10016/28133>
- Score-driven models of local level, seasonality and volatility: an application to the currency exchange rate of Indian rupee to USD (with S. Blazsek), **Guatemalan Econometric Study Group** Discussion Paper 1/2018, Francisco Marroquin University, School of Business, 2018. <https://en.ufm.edu/wp-content/uploads/2017/04/AYALA-BLAZSEK-2018-GESG-WP.pdf>
- New score-driven models for trimming and Winsorizing: an application for Guatemalan Quetzal to US Dollar (with S. Blazsek), **Guatemalan Econometric Study Group** Discussion Paper 2/2017, Francisco Marroquin University, School of Business, 2017. <https://en.ufm.edu/wp-content/uploads/2017/04/AYALA-BLAZSEK-2017-UFM-WP.pdf>

Conferences, Workshops, and Research Seminars

- Exogenous, Observable, and Endogenous Switching Models of Industrial Production in the United Kingdom (with S. Blazsek). **Conference on Finance, Economics, Management, and IT Business FEMIB**, Portugal, April 2025.
- Exogenous, Observable, and Endogenous Switching Models of Industrial Production in the United Kingdom (with S. Blazsek). **Atlanta Research Conference, Mercer University**, April 2025.
- What can Jackson Pollock tell us about the Art Market? (with S. Blazsek and M. Ruiz-Sánchez). **Vietnam Symposium in Banking and Finance 2024, Banking Academy**, Hanoi, Vietnam, October 2024.
- Scaling parameters for QAR plus beta-t-EGARCH (with S. Blazsek and A. Licht). **25th Dynamic Econometrics Conference, Bayes Business School**, London, UK, April 2023.
- Anticipating extreme losses using score-driven shape filters (with S. Blazsek and A. Escribano), **Summer Workshop in Economics of the Hungarian Academy of Sciences**, August 2022 (online).
- Volatility forecasting for the coronavirus pandemic using quasi-score-driven models (with S. Blazsek and A. Licht), **World Finance Banking Symposium**, Budapest, December 2021 (online).
- Volatility forecasting for the coronavirus pandemic using quasi-score-driven models (with S. Blazsek and A. Licht), **2021 Vietnam Symposium in Banking and Finance**, Hanoi, October 2021 (online).
- Volatility forecasting for the coronavirus pandemic using quasi-score-driven models (with S. Blazsek and A. Licht), **24th Dynamic Econometrics Conference**, Timberlake, September 2021 (online).
- Optimal signal extraction for score-driven models (with S. Blazsek and A. Licht), **23rd Dynamic Econometrics Conference**, Timberlake, March 2021 (online).
- Score-driven models with stochastic seasonality for currency exchange rates (with S. Blazsek), **Research Seminar, University of Istmo**, Guatemala City, July 2019.
- Score-driven copula models for financial portfolios (with S. Blazsek), **Research Seminar, University of Istmo**, Guatemala City, November 2018.
- New score-driven models for trimming and Winsorizing: An application for Guatemalan Quetzal to US Dollar, **Annual Economic Research Conference (SIEG)**, Bank of Guatemala, Guatemala City, October 2018.
- Endogenous switching vector autoregression: stock market and economic growth dynamics in China, **Financial Forecasting, Oxford-Man Institute - Society for Financial Econometrics (OMI-SoFiE) Financial Econometrics Summer School**, University of Oxford, Oxford, July 2013.
- A dynamic latent-factor panel data model for public debt in the Eurozone, Hungarian Economic **Society Annual Conference, Budapest**, December 2011.
- A dynamic latent-factor panel data model for public debt in the Eurozone, **Macro-Finance Workshop, University of Navarra**, Pamplona, November 2011.

Publications with Students

2025 Miguel Ruiz Sanchez (BA, Mercer University) (P24)

Guatemalan Econometric Study Group (GESG) Research Seminars

Guatemalan Econometric Study Group (GESG) research seminar presentations at **Francisco Marroquin University** since 2014. See the link: <https://en.ufm.edu/gesg/research-seminars/>, or in the next section.

- Score-driven time series models with dynamic shape: an application to the Standard & Poor's 500 index, March 2019.
- Score-driven models of local level, seasonality, and volatility: an application to the currency exchange rate of Indian rupee to USD, June 2018.
- New score-driven models for trimming and Winsorizing: an application for Guatemalan Quetzal to US Dollar, September 2017.
- Equity market neutral hedge funds and the stock market: an application of score-driven copula models, Agosto 2017.
- Forecast performance of dynamic conditional score copula models, June 2016.

- Regime-switching purchasing power parity in Latin America: Monte Carlo unit root tests with dynamic conditional score, January 2016.
- Default risk of sovereign debt in Central America, November 2014.
- Structural breaks in public finances in Central and Eastern European countries, June 2014.

Referee for Journals

- Domain Social Sciences and Humanities of the Netherlands Organization for Scientific Research (NWO, the Dutch research council)
- National Tax Journal
- Applied Financial Economics
- Technological and Economic Development of Economy
- Applied Economics
- Applied Economic Letters
- Latin American Economic Review
- International Journal of Social Economics
- PLOS One

Editorial Board Membership

- Journal of New Finance

Research Visits

- 2012 Postgraduate Research Visit, University of Navarra, Pamplona
- 2010 Visiting researcher (fiscal convergence of CEE countries), Central Bank of Hungary, Budapest

Research Projects

- 2022-2024: Spillover Effects of COVID-19 Pandemic in G20 Countries". Financing organization: **Wenzhou Kean University**. Main researcher: Su-Ping Liu.
- 2010: Convergence of CEE countries to the Eurozone in the presence of structural changes. Members of the project: Jerome Vandenbussche (Deputy Division Chief, IMF), Szabolcs Blazsek (University of Navarra) and Astrid Ayala (Francisco Marroquin University). Financing organization: **Central Bank of Hungary**.

Research Training Courses

- "Forecast Pro". Francisco Marroquin University, July 2019, lecturer: **Szabolcs Blazsek**.
- "Gauss Training Course". Francisco Marroquin University, December 2016, lecturer: Szabolcs Blazsek.
- "Macroeconomic Density Forecasting and Nowcasting". New Horizons, Computer Learning Center, New York, Timberlake, 31st October to 2nd November 2016, lecturer: **Andrea Carriero**.
- "Time Series Analysis and Modelling". Clare College, University of Cambridge, Cambridge, Timberlake, 20th to 22nd July 2015, lecturer: **Andrew Harvey**.
- "Stata Training Course". Francisco Marroquin University, from 9th June to 16th July 2015, lecturer: **Diego Aycinena**.
- "Dynamic Models for Volatility & Heavy Tails". Cass Business School, London, Timberlake, 16th December 2014, lecturer: **Andrew Harvey**.
- "2013 Econometrics Summer School at the University of Cambridge". University of Cambridge, Cambridge, Timberlake, from 21st to 28th July 2013, lecturers: **Andrew Harvey, Sean Holly, and Melvyn Weeks**.
- "International program in finance and managerial economics". **School of Management, Boston University**, 2006.

Memberships

- Association of Cultural Economics International (2026-present) (<https://culturaleconomics.org/>)
- Guatemalan Econometric Study Group (2014-present) (<https://en.ufm.edu/gesg/>)
- The Society for Financial Econometrics (2013-2015) (<http://sofie.stern.nyu.edu/>)

Languages

- Spanish: Native
- English: Full professional proficiency