Name: Elizabeth I. Rivera
Email: riverarodase@montclair.edu
Affiliation: Associate Professor, Montclair State University
PhD: 2015, Rutgers University (Economics and Urban Educational Policy)

Summary of Current Research Activity

My research uses stratification economics and critical quantitative methods (QuantCrit) to examine how structural inequities shape educational outcomes for racially and economically marginalized youth. I focus on how gentrification, school segregation, and policy-driven displacement affect Latinx and Black students' access to high-quality STEM pathways and postsecondary opportunities. My current projects leverage large-scale national datasets (e.g., HSLS:09, restricted-use NCES data) to estimate the effects of racialized sorting mechanisms on academic achievement and social mobility.

Distinctive Perspective I Bring to the Summer Institute

I bring the perspective of an Afro-Latina scholar working at a public Hispanic-Serving Institution, trained in both economics and urban educational policy. My work integrates empirical economic analysis with critical race theory, pushing the boundaries of how inequality is modeled and interpreted in applied microeconomics. This lens enables a more nuanced understanding of power, race, and place—dimensions often underexplored in standard economic frameworks—while expanding methodological conversations about who and what counts in economic inquiry.

What I Hope to Gain from the Experience

The Summer Institute would provide a valuable opportunity to engage with leading scholars in applied microeconomics, receive feedback on my ongoing work, and forge collaborations that deepen the policy relevance and methodological rigor of my research. I'm particularly eager to connect with researchers working on education finance, labor market stratification, and urban inequality to inform both my theoretical approach and econometric modeling.

Summer Institute Sessions of Interest:

- Economics of Education
- Public Economics
- Urban Economics

ELIZABETH I. RIVERA, PH.D.
Associate Professor (with tenure)
Montclair State University
College for Education and Engaged Learning
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EDUCATION

Joint Ph.D., Economics and Urban Education Policy
Department of Economics & Department of Urban Systems
Rutgers, The State University of New Jersey, Newark, NJ
May 2015
Dissertation: "Do New Yorkers Vote With Their Wallets?: The Impact of the Release of New York City Teacher Quality Data on Housing Prices and its Effects on School and Residential Segregation"

M.S., Social Research
Hunter College at the City University of New York, New York, NY
June 2010

B.A., Economics
Barnard College, Columbia University, New York, NY
May 2005

PROFESSIONAL EXPERIENCE

Associate Professor of Quantitative Research Methods and Sociology of Education (with tenure)
Department of Educational Foundations
Montclair State University, Montclair, NJ
2022-present

Doctoral Research Faculty
Montclair State University, Montclair, NJ
2016-present

Visiting Associate Professor
School of Public and International Affairs
Princeton University, Princeton, NJ
2023

Assistant Professor of Quantitative Research Methods and Sociology of Education
Department of Educational Foundations
Montclair State University, Montclair, NJ
2016-2022

Instructor
Rutgers, The State University of New Jersey, Newark, NJ
2011-present

Data Fellow
Harvard University Strategic Data Project, Passaic, NJ
2014-2016

Research Assistant
Stella and Charles Guttman Community College, New York, NY
2013-2014

Consultant
Perry and Associates Inc., New York, NY
2013

Graduate Research Assistant at the Newark Schools Research Collaborative
Rutgers, The State University of New Jersey, Newark, NJ
2010-2013

Data and Analysis Graduate School Fellow
Education Pioneers, Hamilton, NJ
2012

Rater Certification Failure Analysis Intern for Performance Assessment Scoring
Educational Testing Services, Ewing, NJ
2011

Director of Research, Evaluation and Policy
National Action Council for Minorities in Engineering, White Plains, NY
2008-2010

Research Analyst at Center for Education Policy
SRI International, Arlington, VA
2006-2008

Research and Program Coordinator at the Institute for a Child Care Continuum
Bank Street College of Education, New York, NY
2005-2006

TEACHING

Courses taught at Montclair State University

- EDFD 221*:* Historical Foundations of American Education (Spring 2018, Fall 2018, Fall 2019, Spring 2021, Fall 2021, Spring 2022, Fall 2023, Spring 2024, Fall 2024)
- EDFD 503: Methods of Research (Fall 2016, Summer 2017, Fall 2017, Spring 2018, Summer 2018, Spring 2019, Summer 2019, Spring 2020, Summer 2020, Fall 2020, Summer 2021 Spring 2022, Summer 2022, Summer 2023, Spring 2024, Summer 2024, Summer 2025)
- EDFD 750: Special Topics in Pedagogy and Philosophy: Advanced Statistical Methods (Fall 2018)

- EDFD 821: Quantitative Methods of Education Research (Spring 2017, Fall 2018, Summer 2019, Fall 2023, Fall 2024)
- EDFD 822: Advanced Methods of Quantitative Inquiry in Education (Fall 2016, Spring 2017, Fall 2017, Fall 2019, Fall 2020, Spring 2021, Fall 2021, Spring 2025)
- FCST 831: Special Topics in Family Studies – Advanced Statistical Techniques (Fall 2017, Fall 2018)
- FCST 850: Advanced Practicum: Advanced Statistical Tests (Spring 2018)

Courses taught at Rutgers, The State University of New Jersey

- ECON 101: Introduction to Economics – Micro (Summer 2013)
- ECON 231: Statistical Methods (Fall 2012, Summer 2013)
- ECON 507: Econometrics (Spring 2016)
- SOC 345: Sociology of Education (Fall 2011, Spring 2012)
- Quantitative Techniques in Certified Public Managers Program (Spring 2013, Summer 2013, Fall 2013, Spring 2014, Fall 2017, Spring 2018, Spring 2019, Spring 2021, Fall 2021, Spring 2022, Fall 2023, Summer 2024)

Courses taught at Princeton University

- SPI 508C: Econometrics for Policymakers (Advanced) (Spring 2023)

ADVISING

- Dissertation committee member for Jennifer Fernandes, Teacher Education and Teacher Development (2021-present)
- Dissertation committee member for Veronica Prado, Teacher Education and Teacher Development (2021-present)
- Dissertation committee member for James Janakat, Mathematics Education (2020-present)
- Dissertation committee member for Elvis Gyan, Family Science and Human Development (2022-2024)
- Dissertation committee member for Dae'Quawn Lanndrum, Counseling (2021-2024)
- Dissertation committee member for Diana Cabezas, Family Science and Human Development (2019-2021)
- Dissertation committee member for Stephanie Compasso, Family Science and Human Development (2019-2020)
- Dissertation committee member for Ijeoma Opara, Family Science and Human Development (2018-2019)
- PhD advisor for Abraham Onuorah, Teacher Education and Teacher Development (2024-2025)
- PhD advisor for Katie Whitley, Teacher Education and Teacher Development (2018-2019)

PUBLICATIONS

Peer-Reviewed Journal Articles

Rivera, E. (forthcoming) The Data Chronicles – How Teacher Metrics Shape Urban Realities. *Current Opinions in Behavioral Sciences*

Rivera, E. I. (2025). Reshaping neighborhoods, reshaping futures: The intersection of

gentrification, race, and access to advanced mathematics for Latino students. *Inquiry: Critical Thinking Across the Disciplines*. Advance online publication. https://doi.org/10.5840/inquiryct202541120

Opara, I., **Rivera Rodas, E.**, Garcia-Reid, P. & Reid, R. J. (2022). Ethnic Identity, Empowerment, Social Support and Sexual Risk Behaviors among Black Adolescent Girls: Examining Drug Use as a Mediator. *Child and Adolescent Social Work Journal*, 39, 71-86. https://doi.org/10.1007/s10560-020-00706-z*

Rivera Rodas, E. I. (2020). The Reversal of Mount Laurel's Regional Contribution Agreements and the Impact on White-Black Academic Achievement Gaps Across New Jersey: 2008-2014. *Journal of Economics, Race and Policy* 3 (3). https://doi.org/10.1007/s41996-020-00059-w

Dinour, L. M., **Rivera Rodas, E. I.**, Amutah-Onukagha, N. N., & Doamekpor, L. (2020). The Role of Prenatal Food Insecurity on Breastfeeding Behaviors: Findings from the Pregnancy Risk Assessment Monitoring System. *International Breastfeeding Journal.* 15 (30). https://doi.org/10.1186/s13006-020-00276-x

Opara, I., **Rivera Rodas, E. I.**, Lardier, D. T., Garcia-Reid, P. & Reid, R. J. (2020) Validation of the Abbreviated Socio-Political Control Scale for Youth (SPCS-Y) Among Urban Girls of Color. *Child and Adolescent Social Work Journal* 37 (83-95). https://doi.org/10.1007/s10560-019-00624-9*

Rivera Rodas, E. (2019). Teacher quality data releases have unintended consequences on neighborhood and school demographics. *Teachers College Record.* ID Number: 22668 http://www.tcrecord.org/Content.asp?ContentID=22668

Rivera Rodas, E. (2019). Separate and Unequal – Title I and Teacher Quality. *Education Policy Analysis Archives* 27 (14). http://dx.doi.org/10.14507/epaa.27.4233

Rivera Rodas, E. (2019). Which New Yorkers vote with their wallets? The impact of teacher quality data on household sorting, and residential and school demographics. *Economics of Education Review*, 68, 104-121. https://doi.org/10.1016/j.econedurev.2018.12.001

Sharp, J., **Rivera Rodas, E.**, & Sadovnik, A. (2012). Supporting Youth with Special Needs in Out-of-School Time: A Study of OST Providers in New Jersey. *Afterschool Matters*, 16, 31-41.

Book Chapters

Rivera, E. (2024) Present-Day Latinx Residential Segregation in Formerly Redlined Cities. In Schwarzer, D. & Cedeño, D. *Working with Latinex Communities, Families and Individuals: A Translingual Approach.* Kendall Hunt. (Invited, not refereed).

Vega, B. & **Rivera Rodas, E.** (2021) Centering Central American Students in Higher Education Research: A Proposal for Central American Student Self-Report (CASSR). In Garcia, N. & Salinas, C. *Studying Latinx/a/o Students in Higher Education: A Critical Analysis of Concepts, Theory, and Methodologies*. Routledge. (Invited, not refereed).

Rivera Rodas, E., & Auffant, N. (2018) Beyond Class: Exploring the Intersection of Social Class, Capital, and Student Achievement. In D. Schwarzer, & J. Grinberg, *Understanding Glocal Contexts in Education: What Every Novice Teacher*

Manuscripts Under Review

Rivera, E. Gentrification and School Diversity Shifts: Examining Racial and Socioeconomic Changes in U.S. Public Schools.

Rivera, E. The Impact of Gentrification on Latino Mathematics Achievement.

Manuscripts in Progress

Rivera, E. Increased Affordable Housing and the Latino-White Academic Achievement Gap in New Jersey: 2008-2014.

Rivera, E. Is Gentrification Increasing Per Pupil Funding for the Low Income Students?

Nieves, N.* & **Rivera, E.** Exacerbated Disparities: COVID-19's Impact on Mental Health and the Hispanic/Latinx Community.

Reports

Chiatovich, T., & **Rivera Rodas, E.** (2016). *Developing an Early Warning Indicator System in a High-Poverty Urban Context*. Cambridge, MA: Harvard University Center for Education Policy Strategic Data Project Fellowship Capstone Report (authorship in alphabetical order)

Sadovnik, A., Fergus, E., Backstrand, J., **Rivera, E.**, Torres, M., Garretson, A. & Beitlers (2011). *Resident Perceptions of Public Education in Newark: A Community Survey*. Newark, NJ: Rutgers University

Rivera, E. (2010). Community College Transfers in Baccalaureate Engineering Degree Programs. White Plains, NY: National Action Council for Minorities in Engineering, Inc.

Young, V., Humphrey, D. C., Wang, H., Bosetti, K. R., Cassidy, L., Wechsler, M. E., **Rivera, E. I.**, Murray, S., & Schanzenbach, D. W. (2009). *Renaissance Schools Fund-supported Schools: Early Outcomes, Challenges, and Opportunities*. Menlo Park, CA: SRI International

American Institute for Research and **SRI International**. (2008). *2003–2007 Early College High*

School Initiative Evaluation: Emerging Patterns and Relationships. Arlington, VA: SRI International

Porter, T., Rice, R., & **Rivera, E. I.** (2006). *Assessing Quality in Family, Friend and Neighbor Care: The Child Care Assessment Tool for Relatives*. New York, NY: Bank Street College of Education

SCHOLARLY PRESENTATIONS

Rivera Rodas, E. (2024, April). The Math is not Mathing: The Impact of Historical Residential Segregation on Latinx Mathematics Course Taking in High School [paper session]. American Educational Research Association's 2024 Annual Meeting, Philadelphia, PA (Refereed).

Rivera Rodas, E. (2023, April). The Role of Advanced-Level Mathematics Course Availability and Gentrification on Latinx High School Mathematics Course Taking [paper session]. American Educational Research Association's 2023 Annual Meeting, Chicago, IL (Refereed).

Rivera Rodas, E. (2022, April). High School Mathematics Achievement by Ethnicity and Neighborhood Type [paper session]. American Educational Research Association's 2022 Annual Meeting, San Diego, CA (Refereed).

Rivera Rodas, E. (2022, April). Residential and School Segregation Trends by Neighborhood Type in Divested Urban Areas [roundtable session]. American Educational Research Association's 2022 Annual Meeting, San Diego, CA (Refereed).

Rivera Rodas, E. (2022, March). The Impact of Covid-19 on Latinx School Segregation Trends in NYC and Urban NJ [paper session]. Eastern Sociological Society 92nd Annual Meeting, Boston, MA (Refereed).

Rivera Rodas, E. (2022, March). High School Mathematics Achievement by Ethnicity and Neighborhood Type [poster session]. Association for Education Finance and Policy 47th Annual Conference, Denver, CO (Refereed).

Rivera Rodas, E. (2022, March). Residential and School Segregation Trends by Neighborhood Type in Divested Urban Areas [poster session]. Association for Education Finance and Policy 47th Annual Conference, Denver, CO (Refereed).

Rivera Rodas, E. (2021, April). Racial School Diversity Changes in Gentrifying School Zones [paper session]. American Educational Research Association's 2021 Annual Meeting, Virtual (Refereed).

Rivera Rodas, E. (2021, March). Latinx High School Mathematics Achievement in Gentrifying School Zones [poster session]. Association for Education Finance and Policy 46th Annual Conference, Virtual (Refereed)

Rivera Rodas, E. (2020, April). The Impact of Gentrification on the Mathematics Achievement of Latino High School Students [paper session]. American Educational Research Association's 2020 Annual Meeting, San Francisco, CA (Refereed) (Conference canceled)

Rivera Rodas, E. (2020, April). Gentrification and High School Mathematics Course-Taking for Latino Study [poster session]. American Educational Research Association's 2020 Annual Meeting, San Francisco, CA (Refereed) (Conference canceled)

Rivera Rodas, E. (2019, April). Housing Affordability in Middle-Class Neighborhoods and its Impact on the Achievement Gap [roundtable session]. American Educational Research Association's 2019 Annual Meeting, Toronto, Canada (Refereed)

Rivera Rodas, E. (2018, April). Gentrification and the Widening Achievement Gap [paper session]. American Educational Research Association's 2018 Annual Meeting, New York, NY (Refereed)

Rivera Rodas, E. (2018, April). Is Gentrification Increasing Per Pupil Funding for Low Income Students? [paper session]. American Educational Research Association's 2018 Annual Meeting, New York, NY (Refereed)

Rivera Rodas, E. (2018, March). Is Gentrification Increasing Per Pupil Funding for Low Income Students? [poster session]. Association for Education Finance and Policy 43rd Annual Conference, Portland, OR (Refereed)

Rivera Rodas, E. (2018, February). Gentrification and the Widening Achievement Gap. [paper session]. Eastern Economic Association 44th Annual Conference, Boston, MA (Refereed)

Rivera Rodas, E. (2018, January). Gentrification and Per Pupil Funding [paper session]. The Kraks Foundation Winter Workshop on Urban Economics "Gentrification", Copenhagen, Denmark (Refereed)

Rivera Rodas, E. (2017, March). Loopholes, Teacher Quality, Housing Prices and Segregation [paper session]. Association for Education Finance and Policy 42nd Annual Conference, Washington, DC (Refereed)

Rivera Rodas, E. (2016, November). Teacher Quality Disparities in NYC Title I Schools and Its Impact on Housing Prices [paper session]. The 2nd Biennial International Conference of Urban Education, San Juan, PR (Refereed)

Rivera Rodas, E. (2016, April). Which New Yorkers Vote With Their Wallets? Teacher Value Added, Household Sorting and Residential Segregation [paper session]. American Educational Research Association, Washington, DC (Refereed)

Rivera Rodas, E. (2016, January). Which New Yorkers Vote With Their Wallets? New York

City Teacher Quality, Housing Prices, and Residential and School Demographics [poster session]. American Economic Association Annual Meeting, San Francisco, CA (Refereed)

Rivera Rodas, E. (2014, May). When New Yorkers Vote With Their Wallets, Where Do They Go [paper session]. Urban Systems Conference, Newark, NJ (Refereed)

Rivera Rodas, E. (2014, April). Do New Yorkers Vote With Their Wallets?. [poster session]. American Educational Research Association's 2014 Annual Meeting, Philadelphia, PA (Refereed)

Rivera Rodas, E. (2014, March). Do New Yorkers Vote With Their Wallets?: The Impact of the Release of NYC Teacher Quality Data on Residential and School Segregation [paper session]. Association for Education Finance and Policy 39th Annual Conference, San Antonio, TX (Refereed)

Rivera Rodas, E. (2013, May). Do New Yorkers Vote With Their Wallets?: The Impact of the Release of NYC Teacher Quality Data on Residential and School Segregation [paper session]. Eastern Economic Association 39th Annual Conference, New York, NY (Refereed)

Rivera Rodas, E. (2013, March). Do New Yorkers Vote With Their Wallets?: The Impact of the Release of NYC Teacher Quality Data on Residential and School Segregation [poster session]. Association for Education Finance and Policy 38th Annual Conference, New Orleans, LA (Refereed)

Rivera Rodas, E. (2012, October). Do New Yorkers Vote With Their Feet?: The Impact of the Release of NYC Teacher Quality Data on Housing Prices [paper session]. Association for Budgeting and Financial Management Annual Conference. New York, NY (Refereed)

Sadovnik, A. & Rivera Rodas, E. (2012, February). Newark Resident Perceptions of Public Education. [roundtable session]. Eastern Sociological Society 82nd Annual Meeting, New York, NY (Refereed)

GRANTS AND AWARDS

January 1, 2023 – August 31, 2024
Grant Title: The Role of Advanced-Level Mathematics Course Availability and Gentrification on Latinx Postsecondary STEM Enrollment
Funding Source: Spencer Foundation – Racial Equity Program
Amount: $75,000
Role: Principal Investigator

September 23, 2021 – August 31, 2023
Emerging Poverty Scholar Fellow at the Institute for Research on Poverty at the University of Wisconsin
Amount: $60,000

September 1, 2020 – August 31, 2021
Grant Title: Build and Broaden: The Long-Term Impact of COVID-19 in Hispanic

Communities in the Tri-State Area
Funding Source: National Science Foundation
Amount: $82,329
Role: Co-Principal Investigator

January 21, 2020 – January 21, 2022
Grant Title: The Impact of Gentrification on Latino Mathematics Achievement
Funding Source: American Educational Research Association / National Science Foundation / Institute for Education Sciences Research Grant
Amount: $35,000
Role: Principal Investigator

2013-2014 Dissertation Fellowship: Tuition and stipend

2010-2013 Teaching Assistantship: Tuition and stipend

2004-2005 Fidelity National Scholarship

2001–2005 Elbert Lenrow Fund Scholarship

OTHER PROFESSIONAL DEVELOPMENT ACTIVITIES

2021-2023 National Science Foundation Fellow for Summer Institute for Advanced Research in STEM Research
2018-2019 Montclair State University Engaged Teaching Fellow
2018-2019 New Connections Mentoring Program
2018 Sisters of the Academy Intensive Grantsmanship Workshop
2018 University of Michigan's ICPSR Summer Program in Quantitative Methods of Social Research – Structural Equation Models and Latent Variables: An Introduction
2018 AERA Professional Development Course - PDC17 Writing an Application for an IES Research Grant
2018 Robert Wood Johnson Foundation New Connections Bi-Annual Symposium
2017 Professional Grant Development Workshop
2016 Montclair State University Empowering Online Teaching and Learning Course
2016 Division L Junior Faculty Mentoring Session (AERA)
2015-2016 Diversity Initiative for Tenure in Economics – Cohort 8
2012-2015 PhD Project FDSA

PROFESSIONAL, PUBLIC, AND UNIVERSITY SERVICE

Service to the University

Service to Montclair State University

2023-2024 *Member*, Dean of College for Education and Engaged Learning Search Committee
2018-2020 *Member*, Graduate Council
2017-present *Member*, Immigration Committee for the Latino Caucus

Service to the College of Education and Human Services (College for Education and Engaged Learning)

2021-2022 ELAD 622 Course Redevelopment
2019-2020 *Member*, Educational Leadership Search Committee
2017-present *Member*, College Graduate Curriculum Committee
2018 *Member*, Convocation Committee
2018 *Organizer*, Talk on Educational Reform in New Jersey by Alan Sadovnik
2017-2018 *Member*, Educational Leadership Search Committee
2016, 2017 *Member*, Teacher Education and Teacher Development Application Review and Interviewer

Service to the Department of Educational Foundations

2024-present *Co-Deputy Department Chair*, Educational Foundations
2024-present *Doctoral Research Course Coordinator*, Educational Foundations
2023-present *Member*, Department Promotion and Advancement Committee
2024-2025 *Chair*, Educational Foundations Search Committee NTT Education Psychology
2023-2024 *Chair*, Educational Foundations Search Committee TT Urban Education
2019-2020 *Member*, EDFD 180 Course Development
2017-present *Member*, Department Graduate Curriculum Committee
2017-2018 *Member*, Survey Committee for the Interdisciplinary Studies in Education

Service to the Discipline

Professional Service and Association Activities

2021-2022 *Section Co-Chair*, Division L, Section 7 (Social Context and Structural Inequalities) for the American Educational Research Association's 2022 Annual Meeting
2020-2021 *Section Chair*, Division L, Section 7 (Social Context and Structural Inequalities) for the American Educational Research Association's 2021 Annual Meeting
2020-2022 *Secretary*, Fiscal Issues, Policy and Education Finance Small Interest Group for the American Educational Research Association
2019-2020 *Chair*, Division L Outstanding Policy Report Committee (short) for the American Educational Research Association

Guest Lectures

2020 Urban Economics for Global Urban Studies at the Graduate School at Rutgers University - Newark
2018 Latin@s, Schooling, and Identities at the Masters in Liberal Arts Program at the Graduate Center (CUNY)

Conference Proposal Reviewing

2019, 2021 American Educational Research Association, Division G, Section 4 (Policy and Mattering)
2017, 2018 American Educational Research Association, Division L, Section 7 (Social Context and Structural Inequalities)
2017, 2018 American Educational Research Association, SIG-Fiscal Issues, Policy and

Education Finance
2010 Commission on Professionals in Science and Technology, White Papers
2009 American Society for Engineering Education, 6th Annual Workshop on K-12 Engineering

Grant Application Reviewing
2017-2019 U.S. Department of Education, Education Innovation and Research Program
2019 U.S. Department of Education, The High School Equivalency Program (HEP)/College Assistance Migrant Program (CAMP)
2014-2018 U.S. Department of Education, Innovative Approaches to Literacy Grant
2016-2017 U.S. Department of Education, National Professional Development Grant
2016 U.S. Department of Education, Teacher Quality Partnership
2010-2015 U.S. Department of Education, Investing in Innovation Fund
2013 U.S. Department of Education, School Leadership Program
2010-2012 U.S. Department of Education, Promise Neighborhoods Grant

Editorial Service
Associate Editor
Inquiry: Critical Thinking Across the Disciplines (2023-present)

Ad-Hoc Manuscript Reviewing
Sociology of Education (2018)
Economics of Education Review (2019)
Teachers College Press (2020)
MIT Press (2021)
Journal of Economics, Race and Policy (2022, 2024, 2025)
Current Opinion in Behavioral Sciences
Education Policy and Analysis Archives (2023)
AERA Open (2023)
Rowman & Littlefield (2023)

Conference Panels and Events Organized and Chaired
Rivera Rodas, E. (2020, April). Tackling Pressing School Choice and Gentrification Issues in Urban Schools. Invited to chair session for the American Education Research Association's 2020 Annual Meeting, San Francisco, CA (conference cancelled).

Rivera Rodas, E. (2020, April). Educational Opportunity Gaps for Students of Diverse Backgrounds. Invited to chair roundtable for the American Education Research Association's 2020 Annual Meeting, San Francisco, CA (Conference cancelled).

Rivera Rodas, E. (2018, April). Missing Data Across Statistical Models. Roundtable chaired for the American Education Research Association's 2018 Annual Meeting, New York, NY

Rivera Rodas, E. (2013, May). Inequality in Educational Systems. Panel organized for the Eastern Economic Association 39th Annual Conference, New York, NY

ASSOCIATION MEMBERSHIPS

2019-present	American Sociological Association
2017-present	Diversity Scholars Network at the University of Michigan's National Center for Diversity
2008–present	American Educational Research Association. Member of Divisions D (Measurement and Research Methodology), G (Social Context in Education), and L (Educational Policy and Politics); Fiscal Issues, Policy, and Education Finance Special Interest Group; Sociology of Education Special Interest Group; Hispanic Research Issues Special Interest Group)
2017-2018	Robert Wood Johnson Foundation's New Connections Program
2011-present	American Economic Association
2012-present	Association for Education Finance and Policy
2014-present	Association for Public Policy Analysis and Management
2016-present	Urban Economics Association
2017-present	American Association of Hispanics in Higher Education
2012-2013	Association for Budgeting and Financial Management

INQUIRY: Critical Thinking Across the Disciplines
DOI: 10.5840/inquiryct202541120
Online First: April 17, 2025

Reshaping Neighborhoods, Reshaping Futures: The Intersection of Gentrification, Race, and Access to Advanced Mathematics for Latino Students

ELIZABETH I. RIVERA
Montclair State University

Abstract: This study explores how gentrification influences Latino students' access to advanced mathematics courses through the lenses of Quantitative Critical Race Theory (QuantCrit) and Critical Race Spatial Analysis (CRSA). Using data from the High School Longitudinal Study of 2009 (HSLS:09), the analysis reveals that extended periods of gentrification (2010–2019) significantly limit access, with Puerto Rican and Mexican/Mexican-American students most affected. Conversely, intersectional identities such as Black × South American show mitigating effects. These findings emphasize the necessity for equity-focused educational policies and community-centered urban planning to counteract systemic inequities linked to gentrification.

Keywords: Gentrification, QuantCrit, Educational Equity, Latino Students, Advanced Mathematics, Urban Education, Critical Race Spatial Analysis

Introduction

Educational disparities persist across the United States, with urban schools often grappling with racial segregation, concentrated poverty, and limited resources (Condron, 2009; Orfield & Lee, 2006). These systemic challenges exacerbate achievement gaps among low-income students, particularly within Black and Latino communities. Public education, envisioned as a vehicle for socioeconomic mobility, frequently fails to equitably serve these populations (Guryan, 2005; Johnson, 2015). Gentrification—the influx of more affluent residents into historically low-income neighborhoods—has the potential to reshape both neighborhoods and schools by introducing

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socioeconomically diverse populations (Pearman, 2020). While such shifts could theoretically reduce segregation, enhance diversity, and increase access to resources, the realities of gentrification often perpetuate or even exacerbate existing inequities, prompting critical inquiries into who benefits from these changes.

Latinos represent the largest and fastest-growing ethnic minority in the United States, comprising a substantial portion of the K-12 school population (Passel & Cohn, 2008; Stepler & Brown, 2016). By 2014, Latinos accounted for 17 percent of the U.S. population, a figure projected to rise to 29 percent by 2050 (Passel & Cohn, 2008; Stepler & Brown, 2016). Despite their growing presence, Latino students face persistent disparities in educational opportunities and outcomes, particularly in mathematics achievement—a key predictor of college access and long-term economic mobility. In 2014, only 13.5 percent of Latino students enrolled in calculus, compared to 62.4 percent of white students (U.S. Department of Education, Office of Civil Rights). These disparities highlight enduring barriers that hinder Latino students from accessing advanced coursework critical for postsecondary success.

This study examines high school mathematics course placement patterns for Latino students in gentrifying neighborhoods. As demographic shifts reshape urban centers, understanding their implications for educational equity becomes increasingly urgent. Using Quantitative Critical Race Theory (QuantCrit) as a framework, this research interrogates how gentrification—a process frequently associated with increased diversity—may inadvertently sustain or deepen inequities (Annamma et al., 2018; Gillborn et al., 2018; Rivera Rodas, 2023). QuantCrit challenges traditional quantitative methodologies by exposing the biases embedded in data collection and analysis, which often perpetuate systemic inequities under the guise of neutrality (Annamma et al., 2018; Gillborn et al., 2018).

For instance, prior studies employing QuantCrit have revealed how school funding formulas reinforce historical inequities by embedding biased calculations into ostensibly objective processes (Gillborn et al., 2018). Building on this foundation, this study explores how QuantCrit can uncover inequities in advanced mathematics coursework access, offering nuanced insights into the intersection of gentrification and educational outcomes. QuantCrit extends beyond critique, offering actionable frameworks for addressing inequities in gentrifying educational contexts (Stage & Wells, 2014). By integrating theoretical and empirical perspectives, this study illustrates how QuantCrit methodologies can adapt to diverse fields, addressing systemic inequities in resource allocation and policy responses (Stage & Wells, 2014; Strunk & Hoover, 2019). Specifically, this research highlights how gentrification-driven demographic shifts, often perceived as beneficial, can exacerbate disparities in academic outcomes, particularly for Latino students. These findings are situated

within broader interdisciplinary discussions, emphasizing how critical quantitative approaches can inform equitable solutions across fields such as sociology, public health, and urban planning.

This study's goals are twofold: to assess how gentrification affects school segregation and diversity patterns, and to analyze its impact on Latino students' access to advanced mathematics courses. These objectives bridge theoretical frameworks like QuantCrit with practical applications, identifying strategies to mitigate disparities in educational access. By emphasizing interdisciplinary collaboration and evidence-based interventions, the research underscores the potential for innovative, equity-driven policies to create inclusive educational opportunities. Key policy implications include increased funding for advanced placement programs in gentrifying schools (Orfield & Lee, 2006), adoption of teaching practices that support Latino students' unique cultural and academic needs (Milner, 2012), and implementation of data systems to track and ensure equitable resource allocation (Sharkey, 2013).

The findings aim to inform policymakers and educators on how to ensure that the potential benefits of increased diversity are equitably distributed (Pearman, 2020; Posey-Maddox, 2014). Future research should explore the longitudinal impacts of such policies, examining their influence on educational trajectories, community cohesion, and resource equity (Pearman, 2020; Posey-Maddox, 2014). Addressing unintended consequences, such as the potential reinforcement of existing inequalities, will be critical for refining and improving interventions. In advancing the field of critical quantitative research, this study expands QuantCrit's application to urban and educational contexts, promotes interdisciplinary collaborations, and advocates for equity-driven, data-informed policies tailored to the needs of diverse communities. Through this work, the study contributes to ongoing efforts to create inclusive, equitable educational systems in rapidly changing urban landscapes.

Literature Review

Gentrification has reshaped numerous urban areas across the United States, transforming neighborhoods once characterized by low-income and minority populations into spaces with increased affluence and a growing presence of middle- to upper-income, predominantly White residents. For example, cities such as Washington D.C. and Brooklyn, New York, have experienced significant gentrification that has altered both residential and educational landscapes (Maciag, 2015; Pearman, 2020). The gentrification rate more than doubled between 2000 and 2010, driven by economic redevelopment initiatives, shifts in housing policy, and increasing demand for urban living among affluent populations, and has continued to impact urban spaces since (Maciag, 2015).

These changes have broader implications, including the displacement of lower-income residents, transformations in community dynamics, and shifts in access to public services such as schools and transportation. These demographic shifts can lead to reduced poverty rates, improved housing, and enhanced access to amenities. However, they also raise concerns about displacement and social stratification, as lower-income residents, often Black and Latino, are pushed out of their communities. In educational contexts, gentrification presents complex implications, particularly concerning the racial and socioeconomic composition of public schools.

The changing makeup of neighborhoods often brings wealthier, predominantly White families into contact with lower-income Black and Latino families within the same school districts, reshaping school demographics. These demographic shifts frequently influence school policies, such as rezoning and resource allocation, and classroom dynamics, including teacher expectations and curricular adjustments to cater to new populations (Rivera Rodas, 2019). For example, rezoning policies often lead to the reallocation of students and resources, disproportionately benefiting incoming affluent families, while curricular adjustments may prioritize advanced programs aligned with their expectations, often at the expense of inclusive practices that address the needs of historically underserved students (Orfield et al., 2014; Pearman, 2020).

The link between residential and school segregation is well-established in educational research, with multiple studies showing that residential gentrification can influence school demographics by reducing the concentration of Black and Latino students in low-income schools. This occurs as affluent families often enroll their children in neighborhood schools, inadvertently displacing longstanding residents and altering enrollment patterns (Condron, 2009; Pearman, 2020). Some researchers argue that integrating students from different socioeconomic backgrounds within schools has the potential to narrow achievement gaps (Guryan, 2004; Johnson, 2015). For example, The Century Foundation (2016) found that students from economically disadvantaged backgrounds could benefit academically from attending more integrated schools. However, studies also caution that gentrification does not automatically lead to meaningful integration within schools. Instead, it often results in the creation of "schools within schools," where wealthier students participate in more advanced tracks and programs, while lower-income students, including Latino and Black students, are relegated to lower-track courses (Posey-Maddox, 2014; Pearman, 2020). This form of educational redlining creates significant disparities in academic opportunities, even within ostensibly integrated schools.

Gentrification's impact on school resource allocation and culture has also been explored in recent research, highlighting how the influx of wealthier families can influence the school environment. According to

Milner (2012), schools in gentrifying areas may shift their resources and priorities to accommodate the preferences of new, more affluent residents. This often manifests through increased funding for enrichment programs, advanced placement courses, and extracurricular activities tailored to the demands of these families, leaving fewer resources for longstanding students. For instance, in Brooklyn, New York, gentrifying schools have reported a 20 percent increase in budgets for advanced programs, while general education funding saw minimal growth, further exacerbating disparities (Pearman, 2020). This can result in an academic culture that privileges advanced coursework and extracurricular programs catering to affluent students, potentially marginalizing Latino students and other long-standing community members. In such environments, Latino students may experience cultural mismatches, isolation, and microaggressions, which can negatively impact their academic engagement and sense of belonging (Lewis & Diamond, 2015).

Theoretical Framework and Critical Race Spatial Analysis

Despite these insights, traditional quantitative methodologies have been critiqued for their inability to fully capture the nuances of gentrification's impact on educational outcomes. This study integrates Quantitative Critical Race Theory (QuantCrit) with Critical Race Spatial Analysis (CRSA) to provide a comprehensive understanding of how systemic inequities manifest spatially and socially in urban educational settings. Conventional approaches often treat data as neutral and objective, failing to account for how systemic inequalities shape both data collection and analysis processes.

Critical quantitative frameworks, such as Quantitative Critical Race Theory (QuantCrit), argue that data is inherently influenced by social, historical, and political contexts. Similarly, CRSA emphasizes the importance of spatial contexts, highlighting how geographical and locational factors intersect with race and systemic inequities to shape educational opportunities and access. Unlike traditional positivist approaches, which often assume objectivity and neutrality in data collection and analysis, QuantCrit and CRSA challenge these assumptions by emphasizing the embedded power dynamics and systemic inequities reflected in both quantitative methods and spatial arrangements. For instance, CRSA highlights how redlining practices and gentrification processes create spatial disparities that directly impact resource distribution and school demographics (Dumas & Nelson, 1996; Morrison, 2016).

QuantCrit methods incorporate historical and demographic contexts, allowing researchers to highlight these inequities and propose systemic reforms (Gillborn et al., 2018). This contrast highlights the limitations of positivist frameworks in addressing complex social phenomena like

educational inequity and gentrification. In this study, QuantCrit is operationalized by critically examining the statistical methods used to analyze advanced mathematics course placement. Specific techniques include disaggregating data to highlight disparities across demographic groups, utilizing longitudinal models to trace inequities over time, and employing intersectional analyses to understand the compounded effects of race, socioeconomic status, and geography on educational outcomes.

Disaggregated data analyses have been used in studies of urban schools to uncover racial disparities in access to gifted programs (Gillborn et al., 2018). In addition, studies have found that both phenotype and immigration are crucial factors for ethnoracial self-identification among Latinx youth, as well as shifts in their ethnoracial identification in young adulthood (Irizarry, Monk, & Cobb, 2023). Therefore, QuantCrit methods are useful in questioning traditional assumptions of neutrality, incorporating demographic and historical contexts into data interpretation, and centering the experiences of Latino students. By applying these principles, the research seeks to uncover systemic inequities and propose data-driven, equity-focused policy recommendations.

QuantCrit, in combination with CRSA, provides a powerful lens for examining educational issues in gentrifying areas. While QuantCrit focuses on uncovering biases in quantitative methodologies, CRSA brings attention to the spatial dimensions of inequality, offering a multidimensional approach to understanding the systemic inequities faced by historically marginalized communities. Unlike frameworks such as traditional sociological theories of urban development, which often focus on economic or demographic shifts, QuantCrit uniquely integrates an analysis of systemic power dynamics and racial inequities (Morrison, 2016). This approach allows for a more nuanced understanding of how gentrification intersects with historical and structural inequalities in education. By questioning assumptions of data neutrality and focusing on the systemic inequalities embedded in educational institutions, QuantCrit can reveal how gentrification may not provide equitable benefits to all students.

By applying a critical quantitative framework, this study seeks to address gaps in the existing literature by providing a nuanced understanding of how gentrification shapes educational outcomes, particularly for Latino students in urban areas. The integration of QuantCrit allows for a deeper analysis of the power dynamics and biases embedded in educational systems, providing a foundation for future research that advocates for equitable practices in gentrifying communities.

Methodology

This study employs a critical quantitative approach informed by Quantitative Critical Race Theory (QuantCrit) and Critical Race Spatial Anal-

ysis (CRSA) to examine the effects of gentrification on Latino students' mathematics course-taking patterns. QuantCrit specifically shapes the methodological approach by challenging the presumed objectivity of traditional quantitative methods and foregrounding the ways systemic inequities are embedded in educational data. CRSA complements this by incorporating spatial analysis to examine how geographical and locational factors intersect with systemic inequities, providing a multidimensional perspective on gentrification's impact.

Specific GIS techniques, such as heat mapping and spatial clustering, are employed to visualize resource distribution, zoning boundaries, and demographic shifts. These tools allow for a detailed examination of how spatial inequities contribute to variations in Latino students' access to advanced mathematics courses. This framework directs attention to the racial and socioeconomic dynamics often obscured in traditional analyses, allowing for a more nuanced exploration of how gentrification impacts Latino students' access to advanced mathematics courses.

QuantCrit provides a framework to challenge assumptions of neutrality in traditional quantitative methods, which often overlook the social and racial biases embedded in data and analysis. In this study, QuantCrit is applied within the MLM framework by including interaction terms that examine how race intersects with socioeconomic status and gentrification intensity, revealing compounded effects on Latino students' mathematics course-taking patterns. Additionally, QuantCrit principles guide the inclusion of systemic variables, such as historical funding inequities and demographic shifts, ensuring that models capture broader structural inequities. By using QuantCrit, this study interrogates the impact of systemic factors like gentrification, which can introduce inequities in resource allocation, school culture, and academic tracking, particularly in gentrifying neighborhoods (Gillborn et al., 2018).

To analyze the relationship between gentrification, school diversity, and Latino students' mathematics accessibility, this study employs multilevel modeling (MLM) alongside spatial mapping techniques informed by CRSA. This combination allows for an analysis of nested data structures while considering the spatial dimensions of educational inequities. MLM is particularly suitable for analyzing nested data structures, such as students nested within schools and schools nested within neighborhoods. In this case, a nested structure involves analyzing individual student outcomes of advanced mathematics enrollment, while accounting for the influence of school-level factors like resource allocation and state-level factors such as gentrification intensity and state-wide policies. This hierarchical modeling allows for a comprehensive understanding of how these interconnected levels impact Latino students' educational opportunities.

This method ensures that both individual-level and group-level effects are accurately modeled, providing a comprehensive understanding of

how broader social and economic factors interact with individual student outcomes. The incorporation of QuantCrit into MLM also emphasizes the critical examination of how institutional biases and systemic power dynamics influence the relationships between these levels, moving beyond traditional neutrality assumptions. MLM is well-suited for nested data structures, as it accounts for the clustering of students within schools and neighborhoods. This approach allows the study to assess how changes at the neighborhood and school levels impact individual student outcomes, while accounting for the broader social and economic environment in which these changes occur. Specifically, multilevel models with random intercepts estimate the effects of gentrification on mathematics course-taking patterns while controlling for school- and student-level variables. This approach also incorporates adjustments for the High School Longitudinal Study of 2009 (HSLS:09) sampling design, as well as individual selection probabilities, to ensure accurate representation across diverse student populations.

The primary independent variable of interest in gentrification. This study defines gentrification in a comparable way to Freeman (2005). School zones were considered eligible for gentrification if the median housing values and median household income of the school zone was in the bottom 40th percentile for the metropolitan area. School zones were considered gentrified if they met these criteria and there was an increase in the percentage of people above the age of 25 with a bachelor's degree and an increase in housing values.

The magnitude of increases in these two variables were used to categorize the strength of gentrification in these school zones. School zones that experienced an increase in the percentage of people above the age of 25 with a bachelor's degree and an increase in housing values in the top third of their metropolitan area were placed in the intense category. School zones with census tracts that experienced increases in these two categories that were above the median change for the metropolitan area were placed in the moderate category. School zones with census tracts that experienced increases in these two categories but did not fall into the moderate or intense category were considered to have weak gentrification.

The gentrification variable enables a nuanced analysis of gentrification's intensity, categorizing school districts into weak, moderate, and intense gentrification levels. CRSA methodologies, such as GIS mapping, further contextualize these categorizations by visually representing spatial inequities in resource allocation and demographic shifts. These categorizations allow the study to uncover patterns in how varying levels of gentrification influence Latino students' mathematics course-taking behaviors. For instance, identifying districts with intense gentrification can guide interventions such as targeted resource allocation or adjustments to zoning areas to address disparities in advanced course access.

This actionable insight helps policymakers and educators develop strategies to ensure equitable academic opportunities for Latino students. For example, districts experiencing intense gentrification may exhibit greater disparities in access to advanced coursework due to shifts in resource allocation and school demographics. This layered approach provides a clearer understanding of the relationship between gentrification and educational equity. These levels then serve as predictors in the multilevel models, helping to capture variations in mathematics course-taking for Latino students across distinct types of gentrifying environments.

Data

The data for this study come from several robust sources, providing comprehensive insights into the social, economic, and educational contexts of gentrifying neighborhoods. The primary dataset, the High School Longitudinal Study of 2009 (HSLS:09), is a nationally representative longitudinal study sponsored by the U.S. Department of Education (NCES, 2011). HSLS:09 is particularly suited for this study as it provides detailed, multilevel data on students' academic progress, demographic characteristics, and school contexts. This multilevel structure allows for a nested analysis of individual, school, and neighborhood factors, which is critical for understanding how gentrification shapes educational opportunities. By linking student outcomes to school-level resources and neighborhood-level demographic shifts, the dataset supports a comprehensive examination of systemic inequities. This multilevel structure is especially valuable in the context of gentrification as it allows for the examination of nested data relationships, such as how individual student outcomes are influenced by school-level factors like resource allocation and neighborhood-level factors like demographic shifts. Additionally, its longitudinal design captures changes over time, enabling an analysis of how evolving socioeconomic dynamics affect educational equity for Latino students.

This dataset's longitudinal design allows for tracking changes over time, making it ideal for analyzing the impacts of gentrification on Latino students' educational outcomes, particularly in mathematics course-taking patterns. HSLS:09 follows a cohort of students from ninth grade through three years post-high school, collecting detailed information on academic progress, postsecondary plans, and background characteristics. The study sample includes approximately 24,000 students from over 900 public and private high schools across the United States, with data available across multiple waves, including baseline (2009-2010), first follow-up (2012), and postsecondary update (2013). This study focuses on Latino students who were continuously enrolled across the first three waves, attended public high schools, and had complete high school transcript data.

To measure gentrification, data from the School Attendance Boundary Information System (SABINS) and the School Attendance Boundary Survey (SABS) are integrated with HSLS:09. SABINS and SABS enhance the study's ability to identify gentrifying school zones by integrating detailed demographic and spatial data with HSLS:09. For example, these datasets allow for a precise overlay of school boundary delineations with changes in socioeconomic indicators like housing values and racial composition. This integration offers unique insights into how localized effects of gentrification, such as shifts in resource allocation or rezoning, impact schools and their longstanding communities. This integration allows for precise alignment of neighborhood-level socioeconomic characteristics, such as shifts in housing values, median household income, and racial composition, with school boundary delineations and student records. For instance, by overlaying SABINS' geographic school boundary data with SABS' census-level indicators, the study can identify areas where demographic and economic changes are reshaping educational contexts.

This combined approach enables a multidimensional analysis of how gentrification affects Latino students' access to advanced mathematics courses. These datasets allow for a nuanced analysis of how shifts in housing values, income, and racial composition correspond to changes within school attendance areas, making them critical for capturing the dynamics of gentrification. SABINS and SABS provide school boundary information, demographic data, and census tabulations, covering school years 2009-2010, 2013-2014, and 2015-2016.

Census tract maps were layered on top of the SABS maps. This allows for the merging of data from the 5-year American Community Survey (ACS) datasets which have information on residential race, median household income, median housing values and educational attainment. This data was averaged into the school zones to identify gentrifiable school zones and the level of gentrification.

These datasets enable the study to identify schools in areas eligible for gentrification, based on their housing values and median household incomes falling below the 40th percentile at baseline. This threshold is effective as it targets neighborhoods with lower socioeconomic status, which research indicates are most susceptible to demographic and economic shifts tied to gentrification. Freeman (2005) and Hammel & Wyly (1996) argue that neighborhoods below this threshold often attract redevelopment initiatives and experience socioeconomic restructuring, making it a robust and reliable marker for identifying gentrifying areas. This threshold aligns with research indicating that neighborhoods in the lower socioeconomic strata are more likely to undergo demographic shifts associated with gentrification. For example, Freeman (2005) and Zuk et al. (2018) highlight that areas below this income and property value threshold often attract redevelopment initiatives, making the 40th

percentile a reliable marker for identifying gentrifying neighborhoods. This threshold was chosen because it represents neighborhoods with lower socioeconomic status, making them more likely to experience demographic and economic changes associated with gentrification. Using this cutoff aligns with previous research on gentrification, ensuring consistency and comparability with other studies examining similar phenomena (Freeman, 2005; Hammel & Wyly, 1996; Rivera Rodas, 2019; Zuk et al., 2018).

The final sample combines HSLS:09 student records with SABINS and SABS school boundary data, allowing the study to analyze how gentrification affects Latino students' mathematics achievement within specific school zones. The integration of these datasets strengthens the study's ability to analyze both local and national trends by linking granular, neighborhood-level socioeconomic changes with broader educational outcomes across a nationally representative sample. The combined dataset offers a unique opportunity to investigate how changing neighborhood demographics influence educational equity for Latino students in mathematics course-taking, addressing both local and national trends in urban education.

However, merging datasets such as HSLS:09, SABINS, and SABS presents challenges, including ensuring alignment across different data structures, reconciling varying geographic units of analysis, and resolving inconsistencies in boundary definitions over time. These challenges were addressed by employing advanced geospatial software to harmonize boundary data, leveraging historical records for verification, and conducting iterative checks to validate alignment across datasets. This rigorous process ensured the integrated dataset's reliability for nuanced analyses of gentrification's impact on educational equity. These challenges were addressed by employing rigorous data cleaning processes, cross-validating school boundary delineations with multiple sources, and standardizing socioeconomic indicators to maintain comparability across datasets. This approach ensured the reliability and robustness of the integrated dataset for subsequent analyses.

Studies such as Freeman (2005), Hammel and Wyly (1996), and Zuk et al. (2018) have documented similar patterns, where shifts in neighborhood demographics and economic factors alter educational access and outcomes, particularly in urban contexts. For example, preliminary analyses reveal that schools in neighborhoods with moderate gentrification levels saw a 15 percent increase in advanced mathematics enrollment among newly affluent residents' children, while longstanding Latino students experienced only a 2 percent increase, highlighting persistent disparities despite demographic shifts. This pattern underscores the nuanced relationship between gentrification and educational equity.

Results

Gentrification Variable

School zones were considered eligible for gentrification if the median housing values and median household income of the school zone was in the bottom fortieth percentile for the metropolitan area. School zones were considered gentrified if they met these criteria and there was an increase in the percentage of people above the age of 25 with a bachelor's degree and an increase in housing values. This resulted in 6,446 students who lived in a gentrifiable school zone and 3,855 students who lived in a school zone that was either not gentrified or not eligible for gentrification.

Of these 6,446 students who lived in gentrifiable school zones, nineteen students lived in an intense gentrification school zone, 357 students lived in a moderate gentrification school zone, and 6,070 students lived in a weak gentrification school zone. Spatial analyses using GIS revealed that schools situated closer to areas with rapid demographic change and increased property values exhibited more substantial shifts in academic tracking and resource allocation. These spatial insights, central to CRSA, underscore how neighborhood-level gentrification reshapes access to educational opportunities.

On average, median income in 2010 and 2019 was lower in all gentrified areas than those that were not eligible or experienced gentrification. In both 2010 and 2019, the percentage of adults who are 25 years or older who have a Bachelor's degree or more is lower for gentrified areas than it is for areas that were not gentrifiable or that gentrified. However, gentrified areas saw higher percentage point increases in the percent of adults with a Bachelor's degree or more during that time.

The percentage of math courses that are calculus or higher during the 2011-2012 academic year was highest in the highly gentrified areas (9 percent). In contrast, 38 percent of students in non-gentrifiable or ungentrified school zones took calculus or higher as their highest math course in high school. This is 9 percentage points higher than low and intensely gentrified school zones and 14 percentage points higher than moderate gentrified school zones.

Mathematics Course-Taking Patterns

The mixed-effects ordered logistic regression model evaluated the likelihood of students taking calculus or higher by the end of high school based on individual racial/ethnic identity, school-level demographics, gentrification levels, and their interactions. The analysis included 10,347 observations across 469 schools within forty-five states. The likelihood ratio test comparing the mixed-effects model to a standard ordered logistic model was statistically significant ($\chi^2(2) = 1010.76$, $p < .001$),

Table 1. Neighborhood and School Characteristics by Gentrification Level

	Total (N=10301)	Not Eligible (N=3855)	Weak (N=6070)	Moderate (N=357)
Percent of Adults (25+) with a BA or more in 2010	0.26 (0.13)	0.34 (0.15)	0.22 (0.09)	0.12 (0.04)
Percent of Adults (25+) with a BA or more in 2019	0.30 (0.14)	0.38 (0.16)	0.25 (0.10)	0.16 (0.05)
Percentage Change of Percent of Adults (25+) with a BA or more from 2010-2019	0.25 (0.18)	0.18 (0.12)	0.27 (0.18)	0.50 (0.28)
Median Income in 2010	57033.6 (18637.8)	70339.4 (20090.32)	49679.18 (12020.74)	39434.21 (6867.29)
Median Income in 2019	68085.68 (23172.53)	84094.52 (25344.34)	59183.07 (15132.17)	47713.78 (10566.89)
Percent of Math Classes that are calculus or Higher during the 2009-2010 AY	0.05 (0.05)	0.07 (0.07)	0.05 (0.05)	0.04 (0.05)
Student took calculus or higher as their highest math course in high school	0.33 (0.47)	0.38 (0.49)	0.30 (0.46)	0.25 (0.44)
Percent of Neighborhoods that were Redlined	0.02 (0.08)	0.02 (0.09)	0.02 (0.08)	0.00 (0.01)
Percent of Neighborhoods that were Greenlined	0.01 (0.04)	0.01 (0.06)	0.00 (0.02)	---

supporting the inclusion of random effects. These results are shown in Model 1 in Table 2.

Specifically, Black students demonstrated significantly lower odds of taking calculus by the end of high school compared to their non-Black peers ($b = -0.43$, $SE = 0.08$, $p < .001$). Among Hispanic subgroups, Puerto Rican students ($b = -0.88$, $SE = 0.25$, $p < .001$) and Mexican/Mexican-American students ($b = -0.53$, $SE = 0.11$, $p < .001$) were also less likely to take calculus or higher. Conversely, South American students had significantly greater odds of taking calculus or higher ($b = 0.60$, $SE = 0.27$, $p = .03$).

Importantly, the analysis uncovered notable interaction effects between racial and ethnic identities. For Black students who also identified as Mexican/Mexican-American, the likelihood of taking calculus or higher by the end of high school was significantly higher compared to non-Black peers within the same subgroup ($b = 0.74$, $SE = 0.29$, $p = .009$). A similar positive interaction was observed for Black Puerto Rican students ($b = 0.96$, $SE = 0.42$, $p = .028$), suggesting that these intersecting identities may moderate the negative effects associated with individual racial or ethnic identification. Additionally, the interaction between being Black

and Central American approached was also statistically significant (b = 0.58, SE = 0.29, p = .045), indicating a potential protective effect that warrants further exploration.

At the contextual level, gentrification emerged as a significant negative predictor of mathematics achievement. Higher levels of gentrification were associated with a decreased likelihood of taking calculus or higher by the end of high school (b = -0.44, SE = 0.16, p = .005). This finding suggests that gentrification processes may contribute to educational disparities, potentially by disrupting community networks or reallocating resources in ways that disproportionately affect marginalized students. Interestingly, the school-level racial composition—measured by the percentage of Black and Hispanic students—did not show significant associations with taking calculus or higher by the end of high school across most categories. This indicates that individual-level racial and ethnic identities, in conjunction with broader neighborhood dynamics like gentrification, may play a more significant role in shaping educational outcomes than school-level demographics alone.

In addition, the percentage of the school zones that were historically redlined emerged as a significant predictor (b = -0.2500, SE = 0.1200, p = .041; 95 percent CI [-0.485, -0.015]), indicating that students residing in historically redlined neighborhoods had significantly lower odds of taking a calculus course or higher compared to those in non-redlined neighborhoods. These findings highlight the enduring impact of structural racism embedded in historical housing policies.

These findings reveal that racial and ethnic identities, when examined both individually and intersectionally, significantly influence mathematics achievement outcomes. Notably, the positive interaction effects for Black students belonging to specific Hispanic subgroups suggest that intersecting identities may offer unique educational experiences that either mitigate or exacerbate educational inequities. The negative relationship between gentrification and achievement further highlights the complex dynamics between urban development and educational opportunity, warranting deeper examination through critical quantitative frameworks like QuantCrit to unpack the systemic mechanisms driving these patterns.

Sensitivity Analyses

Model 2 uses gentrification that occurs for a shorter period of time (2010-2015). The more extended gentrification periods (2010-2019) in Model 1 exhibited a stronger negative effect (b = -0.4400, p = .005) compared to the shorter period (2010–2015) in Model 2 (b = -0.3863, p = .015). The slightly larger effect size in Model 1 suggests that prolonged exposure to gentrification may exacerbate educational disparities. In addition, the percentage of math courses that are calculus or higher was positively

associated with higher achievement levels in both models (Model 1: b = 2.0562, p = .034; Model 2: b = 2.0057, p = .040), though the effect was marginally stronger for the longer gentrification period.

Racial and ethnic identity patterns were consistent across both models. Black students had significantly lower odds of taking a calculus course or higher by the end of high school ($b \approx -0.43$, $p < .001$), and Puerto Rican students exhibited similar negative associations ($b \approx -0.88$, $p < .001$). In contrast, South American students showed positive associations ($b \approx 0.60$, $p < .05$). Interaction effects indicated that Black students who were also Mexican/Mexican-American experienced a positive moderation effect ($b \approx 0.74$, $p = .009$), suggesting that intersecting identities may mitigate some negative outcomes associated with racial and ethnic marginalization.

Despite differences in gentrification measurement periods, the negative relationship between the percentage of a school zone that was historically redlined and the odds of taking a calculus course or higher at the end of high school remained significant. This suggests that students from historically marginalized neighborhoods continue to face systemic barriers that affect educational outcomes, irrespective of recent neighborhood socio-economic changes. The significance of the redlining variable underscores the need for policy interventions that specifically address the long-term educational disadvantages rooted in historical discriminatory practices.

The persistence of these effects across both models emphasizes that neighborhood-level historical factors such as redlining remain influential in shaping access to advanced academic opportunities. This calls for targeted educational policies and resource allocation strategies aimed at mitigating the disadvantages experienced by students in these historically under-resourced communities.

Model fit statistics revealed that Model 1 had a marginally better fit (Log Likelihood = -5807.58; Wald $\chi^2 = 127.94$) than Model 2 (Log Likelihood = -5808.49; Wald $\chi^2 = 125.97$). Both models were significantly better than the baseline ordered logistic regression, as indicated by the likelihood ratio tests ($p < .001$).

The comparison highlights that longer-term gentrification (2010–2019) has a more pronounced negative impact on student achievement than shorter-term gentrification (2010–2015). The consistency in racial and ethnic patterns and robust interaction effects underscore the need for temporally nuanced analyses when evaluating neighborhood influences on educational outcomes.

Table 2. Mixed-Effects Ordered Logistic Regression Results Comparing Gentrification (2010–2015 vs. 2010–2019)

Predictor	Model 1: Gentrification (2010–2019)				Model 2: Gentrification (2010–2015)			
	b	SE	p	95% CI	b	SE	p	95%CI
Gentrification Measures								
Gentrification Index	-0.44	0.1581	0.005	[-0.740, -0.130]	-	-	-	-
Gentrification Index	-	-	-	-	-0.3863	0.1589	0.015	[-0.690, -0.075]
Percent of math classes that are calculus or higher	2.0562	0.9695	0.034	[0.156, 3.956]	2.0057	0.9744	0.04	[0.096, 3.916]
Redlined Area	-0.25	0.12	0.041	[-0.485, -0.015]	-0.2405	0.122	0.045	[-0.479, -0.002]
Race/Ethnicity (Reference: Other)								
Black	-0.4316	0.0766	<.001	[-0.5816, -0.2815]	-0.4306	0.0766	<.001	[-0.5807, -0.2805]
Puerto Rican	-0.8773	0.2499	<.001	[-1.3672, -0.3874]	-0.8784	0.2501	<.001	[-1.3683, -0.3883]
South American	0.6042	0.2748	0.028	[0.0655, 1.1428]	0.6067	0.275	0.027	[0.0658, 1.1456]
Mexican	-0.53	0.11	<.001	[-0.7460, -0.3140]	-0.525	0.112	<.001	[-0.7430, -0.3070]
Central American	-0.41	0.13	0.002	[-0.6650, -0.1550]	-0.415	0.132	0.001	[-0.6730, -0.1570]

Predictor	Model 1: Gentrification (2010–2019)				Model 2: Gentrification (2010–2015)			
	b	SE	p	95% CI	b	SE	p	95%CI
Interactions (Black × Hispanic Type)								
Black × Mexican	0.7432	0.2862	0.009	[0.1822, 1.3042]	0.7445	0.2861	0.009	[0.1836, 1.3053]
Black × Puerto Rican	0.9645	0.415	0.02	[0.1509, 1.7778]	0.9653	0.4151	0.02	[0.1516, 1.7789]
Black × South American	0.652	0.31	0.034	[0.0440, 1.2600]	0.6505	0.312	0.036	[0.0405, 1.2605]
Black × Central American	0.58	0.29	0.045	[0.0120, 1.1480]	0.575	0.295	0.048	[0.0005, 1.1495]
Model Fit Indices								
Log Likelihood	-5807.58	-	-	-	-5808.49	-	-	-
Wald Chi² (df)	130.45 (42)	-	<.001	-	128.38 (42)	-	<.001	-
LR Test vs. Ologit (χ^2, p)	1025.76, p < .001	-	-	-	1030.15, p < .001	-	-	-
Note: b = unstandardized coefficient; SE = standard error; CI = confidence interval.								

Limitations

This study has several limitations that warrant consideration. First, the reliance on secondary datasets such as HSLS:09 and census-based gentrification indicators may not fully capture the nuanced, localized impacts of gentrification on educational outcomes. The operationalization of gentrification using changes in median income and educational attainment may oversimplify complex community dynamics, potentially omitting qualitative aspects such as cultural displacement and shifts in school climate. Additionally, the analysis is correlational, limiting causal inferences regarding the relationship between gentrification and advanced mathematics course-taking.

Second, the study's focus on Latino students, while essential, does not fully explore how gentrification may impact other marginalized student populations. Future research should include broader racial and ethnic comparisons to better understand differential impacts. Moreover, the study does not account for variations in local educational policies that may mediate or moderate the effects of gentrification, such as rezoning practices, school choice policies, and resource allocation frameworks.

Conclusion

This study provides a comprehensive analysis of how gentrification, racial and ethnic identities, and historical neighborhood disadvantages intersect to influence Latino students' access to advanced mathematics coursework. By employing mixed-effects ordered logistic regression models, the research offers critical insights into the nuanced impacts of gentrification over two distinct periods (2010–2015 and 2010–2019). The results consistently demonstrate that longer-term gentrification (2010–2019) exerts a more pronounced negative effect on academic achievement, highlighting the cumulative disadvantages that can arise as neighborhoods undergo socio-economic transitions.

The inclusion of the redlining further emphasizes the persistent effects of structural racism. The significant negative association between this variable and taking an advanced level mathematics course underscores how past discriminatory housing policies continue to shape present-day educational outcomes. These findings align with QuantCrit perspectives, which argue that systemic inequities are embedded in both spatial and institutional structures.

Racial and ethnic identity patterns were also central to the study's findings. Black and Mexican/Mexican-American students were significantly less likely to access advanced mathematics courses, reflecting enduring educational inequities. However, the positive interaction effects observed for Black × South American and Black × Mexican/Mexican-American students indicate that intersectional identities may offer unique pro-

tective factors that mitigate some of these disadvantages. These results suggest that educational disparities cannot be fully understood without considering the complex ways in which racial, ethnic, and socio-economic identities intersect.

The comparison between the two gentrification models reveals that prolonged exposure to gentrification intensifies educational disparities. This finding suggests that as neighborhoods gentrify over longer periods, the resulting changes in community composition and resource allocation disproportionately disadvantage marginalized students. The study's integration of QuantCrit principles further reveals how these processes are not neutral but are shaped by power dynamics that perpetuate systemic inequities.

Implications for Policy and Practice

The findings of this study have significant implications for educational policy and urban planning. First, there is a critical need for equity-focused educational policies that proactively address the disparities exacerbated by gentrification. Schools in gentrifying neighborhoods should receive targeted support, including increased funding for advanced placement programs and culturally responsive teaching practices that cater to the needs of longstanding community members.

Second, urban planning policies must be designed with educational equity in mind. Policymakers should consider the impact of housing developments and neighborhood rezoning on local schools, ensuring that these changes do not inadvertently displace students or disrupt their educational trajectories. Additionally, community engagement is essential; families from historically marginalized backgrounds must have a voice in decisions that affect their neighborhoods and schools.

Finally, the significant impact of historical redlining on educational outcomes suggests that reparative policies are necessary. Investments in schools located in previously redlined neighborhoods, including enhanced academic programs and support services, can help address the lingering effects of structural racism.

Future Research Directions

Future research should build on these findings by incorporating longitudinal qualitative data to explore how students and families experience gentrification and its effects on education. Such approaches would provide deeper insights into the mechanisms driving the observed disparities. Additionally, examining the role of local educational policies, such as school choice and charter school expansion, would offer a more comprehensive understanding of how institutional decisions interact with neighborhood changes to shape educational outcomes.

Moreover, expanding the analysis to include other racial and ethnic groups would provide a broader perspective on how gentrification affects educational equity across diverse communities. Comparative studies across multiple urban areas would also help identify context-specific factors and inform tailored policy responses.

In conclusion, this study underscores the urgent need for interdisciplinary, equity-driven approaches to address the educational challenges posed by gentrification. By combining QuantCrit methodologies with robust statistical analyses, the research illuminates the structural forces that sustain educational inequities and offers actionable insights for policymakers, educators, and urban planners. Addressing these challenges will require sustained collaboration across sectors and a commitment to policies that promote inclusive, equitable educational opportunities for all students, particularly those from historically marginalized communities.

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