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Subsidizing Gentrification: A Spatial Analysis of Place-Based Tax Incentives

Michelle D. Layser

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Place-based tax incentives, such as the New Markets Tax Credit (NMTC) and Opportunity Zones incentives, are often used to promote investment in low-income neighborhoods. However, not all low-income neighborhoods have an equal need for investment subsidies. Subsidies for investment in already gentrifying neighborhoods, for example, may reflect inefficient inframarginal investment, and they may lead to inequitable outcomes. Critics fear that when gentrifying neighborhoods are eligible for tax incentives, they will draw investment away from the neighborhoods that need it most. However, few studies have provided empirical analysis to assess whether these concerns have merit. Through a novel geospatial analysis of the location patterns of tax-subsidized projects, this Article provides new evidence that critics' concerns are justified.

This Article analyzes fifteen years of NMTC data to explore the location patterns of tax-subsidized projects in twenty U.S. cities. It employs two spatial analysis methods, quadrat density analysis and negative binomial regression analysis, to describe the location patterns of NMTC projects and their relationship to two variables known to correlate with gentrification: high vacancy rates and increasing rental rates. The quadrat density analysis reveals that, in most cities, NMTC project density is highest in eligible census tracts that had high vacancy rates, increasing rents, or both. The results of the negative binomial regression analysis confirmed that, in many cities, high vacancy rates or rent increases were statistically significant predictors of NMTC investment. Together, these results provide new evidence that gentrifying census tracts may draw tax-subsidized investment away from other eligible areas. They also suggest that a commonly proposed Opportunity Zones reform—to add statutory safeguards modeled after those in the NMTC—would fail to prevent tax-subsidized investment in places that are already gentrifying.

The observed spatial patterns reflect inefficient allocations, limit the NMTC program's ability to promote equitable change, and cast doubt about whether federal regulators can

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effectively shape program outcomes. Opportunity Zones are likely to have similarly inefficient and inequitable outcomes. Therefore, this Article argues that statutory and administrative reforms are necessary to reduce the frequency at which tax incentives are used to subsidize investment in neighborhoods that are already gentrifying. This study has profound implications for the five-billion-dollar-per-year federal NMTC program, the $3.5 billion per year federal Opportunity Zones program, and state-level tax incentives modeled after these federal tax laws.

<div align="center">INTRODUCTION</div>

When the new Opportunity Zones[1] tax incentive was created by the Tax Cuts and Jobs Act of 2017,[2] it was touted by members of both political parties as a tool to lift up struggling communities by promoting investment in low-income neighborhoods.[3] State governors acted quickly to designate 8,764 census tracts as

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1.   I.R.C. § 1400Z-1.
2.   Tax Cuts and Jobs Act, Pub. L. No. 115-97, 131 Stat. 2054 (2017).
3.   Siri Bulusu, *How a Tax Perk Can Turn a Paper Mill into a Fish Farm (Podcast)*, BLOOMBERG TAX (May 10, 2019, 1:45 AM), https://news.bloombergtax.com/daily-tax-report/how-a-tax-perk-can-turn-a-paper-mill-into-a-fish-farm-podcast [https://perma.cc/9JVL-LCMK].

tax-favored Opportunity Zones.[4] Tract eligibility was restricted by statute, and for the most part, governors selected tracts with lower income, higher poverty rates, and higher unemployment than those that were not selected.[5] However, the law has drawn criticism for targeting investment to neighborhoods that were already gentrifying.[6]

Take, for example, Philadelphia. In that city, the census tracts designated as Opportunity Zones showed "greater signs of economic distress" than eligible tracts that were not chosen.[7] At the same time, officials also "selected a higher proportion of gentrifying tracts for the program than any other major city."[8] Critics fear that the designation of gentrifying census tracts like these may undermine program objectives by attracting investment away from the areas that need it most.[9] In other words, "the program's usefulness will be undermined if investment is concentrated in already-gentrifying areas at the expense of other designated tracts."[10]

Yet, no existing study has provided empirical analysis to assess whether these concerns have merit. A significant body of research examines the *amount* and *types*

4. OPPORTUNITY ZONES, https://opportunityzones.hud.gov [https://perma.cc/PS7F-XE9P] (last visited May 12, 2020)

5. Ofer Eldar & Chelsea Garber, *Does Government Play Favorites? Evidence from Opportunity Zones* 1, 4 (Duke L. Sch. Pub. L. & Legal Theory Series, No. 2020-28, 2020), https://poseidon01.ssrn.com/delivery.php?ID=31001302102706602509409502800012712305904103 804402106411803109403012301400209602010405303904202711409700012512507708611110907201 906102304900100007110408111301112505405004108607312102710808800111602300312200212008 908600211312601910702112010608711807 4&EXT=pdf&INDEX=TRUE [https://web.archive.org/web/20211005212242/https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3463541].

6. According to one study, gentrifying census tracts had a nineteen percent chance of receiving Opportunity Zone designation. Jacob Adelman, *Philly's 'Opportunity Zone' Tracts Are Some of the City's Poorest, and Among Its Biggest Gentrifiers, Fed Finds*, PHILA. INQUIRER (Nov. 15, 2019), https://www.inquirer.com/real-estate/commercial/opportunity-zones-philadelphia-federal-reserve-gentrification-poverty-development-20191115.html [https://perma.cc/HF2V-S7BF]; Kelsi Maree Borland, *Many Opportunity Zones Are Already Gentrified*, GLOBEST.COM (Feb. 14, 2019, 4:00 AM), https://www.globest.com/2019/02/14/many-opportunity-zones-are-already-gentrified/ [https://perma.cc/MSM2-7DA9]. Other designations that have drawn critique include wealthy census tracts that were mistakenly designated due to mapping errors and tracts on college campuses where the presence of students skewed census survey results. Trump, Inc., *An Opportunity for the Rich*, WNYC STUDIOS (June 19, 2019), https://www.wnycstudios.org/podcasts/trumpinc/episodes/trump-inc-opportunity-for-rich [https://perma.cc/W6FY-TP6Q]; Tom Kacich, *That's Rich: Housing Scheme Cuts Out Poor*, NEWS-GAZETTE (Sept. 15, 2019), https://www.news-gazette.com/news/tom-kacich-that-s-rich-housing-scheme-cuts-out-poor/article_b179355a-f47c-536a-ac1c-ebf2ba059115.html [https://perma.cc/XXJ6-65ZU].

7. Adelman, *supra* note 6.

8. *Id.*

9. *Id.*; *see also* Kathryn Kranhold, *There's No Evidence That Opportunity Zones Benefit Low-Income Residents and Their Neighborhoods*, MOTHER JONES (June 29, 2020), https://www.motherjones.com/politics/2020/06/theres-no-evidence-that-opportunity-zones-benefit-low-income-residents-and-their-neighborhoods/ [https://perma.cc/7KW2-VUWC] (noting that critics argue that places where development was already dynamic do not need incentives for redevelopment and describing gentrifying areas as places that have improperly received Opportunity Zones support).

10. Adelman, *supra* note 6.

of investments that take place in response to tax incentives,[11] but few studies have analyzed *where* investments are made within tax-favored zones.[12] If all eligible tracts are equally likely to attract investment, then the presence of a small number of gentrifying census tracts may not significantly affect program outcomes. On the other hand, if gentrifying tracts attract a disproportionate share of investment, then those designations may undermine program goals.

Data about the locations of Opportunity Zones investment is not yet available due to the law's recent enactment, and the failure of the law to require robust reporting requirements may prevent researchers from accessing such information for the foreseeable future.[13] However, important insights can be gained from studying a more established tax incentive—the New Markets Tax Credit (NMTC).[14] The NMTC was recently expanded in December 2020 by the Consolidated Appropriations Act to provide five billion dollars per year in tax credits for investment in low-income communities.[15]

Among the existing tax incentives used to promote economic development, the NMTC is most structurally analogous to the Opportunity Zones incentive.[16] For this reason, it is likely that a study of NMTC investment patterns would be generalizable to Opportunity Zones. That is, if NMTC investment disproportionately flows to gentrifying areas, the same pattern is likely to result in the context of Opportunity Zones. In addition, such results would suggest that a common reform proposal—to add safeguards to the Opportunity Zones law

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11. U.S. GOV'T ACCOUNTABILITY OFF., GAO-10-334, NEW MARKETS TAX CREDIT: THE CREDIT HELPS FUND A VARIETY OF PROJECTS IN LOW-INCOME COMMUNITIES, BUT COULD BE SIMPLIFIED (2010); Tami Gurley-Calvez, Thomas J. Gilbert, Katherine Harper, Donald J. Marples & Kevin Daly, *Do Tax Incentives Affect Investment?: An Analysis of the New Markets Tax Credit*, 37 PUB. FIN. REV. 371 (2009); Kaitlyn Harger & Amanda Ross, *Do Capital Tax Incentives Attract New Businesses? Evidence Across Industries from the New Markets Tax Credit*, 56 J. REG'L SCI. 733 (2016); Richard C. Hula & Marty P. Jordan, *Private Investment and Public Redevelopment: The Case of New Markets Tax Credits*, 10 POVERTY & PUB. POL'Y 11 (2018).

12. To the author's knowledge, the only study of this topic is an unpublished dissertation that analyzes the relationship between New Markets Tax Credit and Low-Income Housing Tax Credit siting patterns. Michael Henderson, The Locational Patterns and Socioeconomic Effects of the New Markets Tax Credit and Low Income Housing Tax Credit in Distressed Metropolitan Census Tracts (Apr. 30, 2018) (Ph.D. Dissertation, Georgia State University) (https://scholarworks.gsu.edu/pmap_diss/71/ [https://perma.cc/GTG6-FB9R]).

13. Rebecca Lester, Cody Evans & Hanna Tian, *Opportunity Zones: An Analysis of the Policy's Implications*, 90 STATE TAX NOTES 221, 226–28, 230–31 (2018) (noting that increased reporting would help researchers and using New Markets Tax Credit data to help inform an analysis of Opportunity Zones).

14. I.R.C. § 45D.

15. Consolidated Appropriations Act, 2021, H.R. 133, 116th Cong. § 112 (2020); I.R.C. § 45D(f)(1)(H) (West)*; see also* Martha Groves Pugh & Brian Moore, *NMTC Extended Through 2025 with $5 Billion Annual Appropriations*, NAT'L L. REV. (Jan. 7, 2021), https://www.natlawreview.com/article/nmtc-extended-through-2025-5-billion-annual-appropriations [https://perma.cc/ENR9-J5EC].

16. Michelle D. Layser, *A Typology of Place-Based Investment Tax Incentives*, 25 WASH. & LEE J. C.R. & SOC. JUST. 403, 449 (2019); Lester et al., *supra* note 13, at 226.

modeled after those contained in the NMTC—would be insufficient to prevent tax-subsidized investment in places that are gentrifying.

For these reasons, this Article analyzes fifteen years of NMTC data to explore location patterns of tax-subsidized investments in twenty U.S. cities. Specifically, this study asks whether NMTC allocations have disproportionately flowed to eligible census tracts that exhibit signs of gentrification. This study employs spatial analysis methods to describe the spatial patterns of investment and their relationship to two variables known to correlate with gentrification: high vacancy rates and increasing rental rates.[17] Through this analysis, this Article provides new evidence that NMTC subsidies have flowed disproportionately to eligible census tracts that exhibit signs of gentrification.

This Article makes several important contributions to the tax, empirical, and urban law literatures. First, it contributes to the tax policy literature by providing new, empirically grounded insights about taxpayer behavior that are essential to inform the design of effective and impactful place-based tax incentives.[18] Second, it contributes to the empirical literature about taxation by extending spatial analysis methods, which have more frequently been employed by geographers, to the study of taxation. Third, it contributes to the urban law literature by providing new insights about the role of tax incentives within broader urban redevelopment policy debates.

This Article proceeds as follows. Part I reviews the history of redevelopment policies, state-led gentrification efforts, and the role of tax incentives in urban redevelopment. It situates place-based tax incentives within larger debates about urban redevelopment. Notably, place-based tax incentives are poised to take on increased importance in the aftermath of the COVID-19 crisis as cities seek to revitalize their economies through new economic development.[19] This section argues that the impact of tax incentives like the NMTC and Opportunity Zones law will partially turn on whether they promote investment in gentrifying neighborhoods or whether investment is more broadly distributed.

Part II sets forth a spatial analysis of NMTC investment patterns to demonstrate that tax-subsidized investment has disproportionately flowed to areas that exhibit strong signs of gentrification. Focusing on two variables with known

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17. For a discussion of variable selection, see Section II.A.

18. The phrase "place-based tax incentive" is often used to describe spatially differentiated tax laws, including those used to drive investment to low-income areas. Michelle Layser, *How Place-Based Tax Incentives Can Reduce Geographic Inequality*, 75 TAX L. REV. (forthcoming 2021) (manuscript at 4), https://poseidon01.ssrn.com/delivery.php?ID=11009907207409002600607206409209107002107803 80280400670910840090811140251030010010870410450160000151110980020151231161231210910260590040290031120861000010870060920890700360301150030730720951160990920810780670671030640860951130911100800861081070950980298&EXT=pdf&INDEX=TRUE [https://web.archive.org/web/20211005212032/https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3516469].

19. Michael Novogradac, *Community Development Tax Incentives Poised to Help Spur COVID-19 Recovery*, NOVOGRADAC J. TAX CREDITS, May 1, 2020, at 4.

positive correlations to gentrification—high vacancy rates and rent increases—the analysis proceeds in two steps. First, I perform a quadrat density analysis to describe the spatial distribution of NMTC projects in twenty cities. This analysis shows that project density is consistently highest in eligible census tracts with higher vacancy rates and higher rent increases than in other eligible tracts.

Second, I employ a negative binomial regression analysis to gain further insight into the relationship between the key variables and project density, controlling for additional variables such as racial composition and income levels. Again, this analysis demonstrates that, in many—but not all—cities, NMTC allocations increase as a function of increasing vacancy rates and increasing rents. Together, these analyses present new and surprising evidence that NMTC allocations have flowed to census tracts that exhibit signs of gentrification.

Part III discusses the policy implications of the empirical analysis. It argues that the observed spatial patterns reflect inefficient allocations, limit the program's ability to promote equitable change, and cast doubt about whether federal regulators can effectively shape program outcomes. Specifically, these patterns suggest that the NMTC has resulted in wasteful tax expenditures in gentrifying locations, while also undermining equity within the tax system and failing to benefit the low-income communities with the most need. In addition, variation in results across cities raises new questions about the role of federal regulators in tax incentive administration, as well as the wisdom of state-level tax incentives modeled after these federal programs.

Finally, these results have particularly troublesome implications for Opportunity Zones. For reasons to be explained, the patterns observed in this study are likely to be even more pronounced in the context of Opportunity Zones, which lack many of the safeguards included in the NMTC. For this reason, this Article argues that both laws should require active regulation that includes an evaluation of proposed project locations. Projects located in areas that are already gentrifying should be ineligible for tax-subsidized investment under both laws unless the project actively serves low-income residents. Failure to implement such reforms will result in wasteful and inequitable outcomes that reinforce structural inequality.

I. PLACE-BASED TAX INCENTIVES AND GENTRIFICATION

A. Gentrification and Urban Redevelopment

Like other redevelopment tools, tax incentives are often used to promote the redevelopment of distressed neighborhoods.[20] There are many reasons why government intervention in distressed neighborhoods may be desirable. The presence of abandoned properties may create "fire hazards as well as health and safety hazards, which can quickly become infested with rodents, sites for illegal

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20.   *See* Layser, *supra* note 18, at 10−12 (describing a shift toward tax-based approaches to support affordable housing and community development).

dumping, harbors for criminal activities, or places for vagrants to live."[21] A dearth of employers in the area may create "spatial mismatch," whereby distance from jobs creates a barrier to employment, contributing to persistent unemployment and poverty.[22] Displacement of residents due to poor housing quality may threaten social networks, leading to less resilient communities that are more dependent on government safety nets.[23] Meanwhile, rehabilitation of the built environment has been linked to a variety of social benefits, including crime reduction and improved health outcomes.[24]

For reasons like these, federal and state governments spend billions of dollars each year in subsidies aimed to encourage investment in distressed areas. These subsidies are increasingly delivered through tax incentives.[25] From 2005 to 2019, the annual cost of federal tax expenditures for economic development increased by $3.2 billion.[26] For example, the size of the federal New Markets Tax Credit, which has been used to subsidize redevelopment since 2000, has steadily increased over time and now provides for five billion dollars of tax credit annually.[27] The Opportunity Zones law is estimated to cost the federal government $3.5 billion in capital gains

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21.   Victoria Chaney Morckel, *Empty Neighborhoods: Using Constructs to Predict the Probability of Housing Abandonment*, 23 HOUS. POL'Y DEBATE 469, 469 (2013).

22.   Christina Stacy, Brady Meixell & Serena Lei, *Too Far from Jobs: Spatial Mismatch and Hourly Workers*, URB. INST. (Feb. 21, 2019), https://www.urban.org/features/too-far-jobs-spatial-mismatch-and-hourly-workers [https://perma.cc/3NX5-8LVR].

23.   *See generally* MATTHEW DESMOND, EVICTED: POVERTY AND PROFIT IN THE AMERICAN CITY (2016) (describing the relationships between poor housing quality, evictions, and the detrimental impact that loss of housing has on low-income communities); Miriam Zuk, Ariel H. Bierbaum, Karen Chapple, Karolina Gorska & Anastasia Loukaitou-Sideris, *Gentrification, Displacement, and the Role of Public Investment*, 33 J. PLAN. LITERATURE 31, 35 (2018) (explaining that displacement often occurs due to poor housing quality).

24.   Charles C. Branas, Eugenia South, Michelle C. Kondo, Bernadette C. Hohl, Philippe Bourgois, Douglas J. Wiebe & John M. MacDonald, *Citywide Cluster Randomized Trial to Restore Blighted Vacant Land and Its Effects on Violence, Crime, and Fear*, 115 PROC. NAT'L ACAD. SCIS. U.S. 2946, 2950 (2018); Erica Raleigh & George Galster, *Neighborhood Disinvestment, Abandonment, and Crime Dynamics*, 37 J. URB. AFFS. 367, 389 (2015); Hilary Thomson, Mark Petticrew & David Morrison, *Health Effects of Housing Improvement: Systematic Review of Intervention Studies*, 323 BRIT. MED. J. 187, 188 (2001) (linking rehabilitation to improved health outcomes).

25.   STAFF OF THE JOINT COMM. ON TAX'N, 109TH CONG., ESTIMATES OF FEDERAL TAX EXPENDITURES FOR FISCAL YEARS 2005–2009, at 35 tbl.1 (Comm. Print 2005) (estimating the following $1.6 billion of tax expenditures in 2005: $0.4 billion for New Markets Tax Credit; $0.7 billion for Empowerment Zone Tax Credit; $0.5 billion for Renewal Community Tax Incentive); STAFF OF THE JOINT COMM. ON TAX'N, 116TH CONG., ESTIMATES OF FEDERAL TAX EXPENDITURES FOR FISCAL YEARS 2019–2023, at 26 tbl.1 (Comm. Print 2019) (estimating the following $4.8 billion of tax expenditures in 2019: $1.3 billion for New Markets Tax Credit; $3.5 billion for Qualified Opportunity Zones), https://www.jct.gov/publications.html?func=startdown&id=5238 [https://perma.cc/4WUQ-VMNJ].

26.   *Id.*

27.   Consolidated Appropriations Act, 2021, H.R. 133, 116th Cong. § 112 (2020); I.R.C. § 45D(f)(1)(H).

relief each year through 2022.[28] These federal tax incentive programs also have state and local counterparts, whereby state and local governments fund similar incentives to supplement the federal redevelopment initiatives.[29]

Meanwhile, urban redevelopment in the United States is inextricably linked to debates about gentrification. Gentrification refers to "the process by which decline and disinvestments in inner-city neighborhoods are reversed."[30] There is no established definition for gentrification, but at its core, the term describes neighborhoods in transition from a low-income neighborhood to a higher income neighborhood.[31] To many, the term also connotes racial transition, whereby neighborhoods with significant Black or Brown populations turn over to majority white populations.[32]

Though many anti-poverty advocates reflexively oppose gentrification, in the academic literature, "[d]epending on the time and place, gentrification has been seen as a tool, goal, outcome, or unintended consequence of revitalization processes in declining urban neighborhoods, which are defined by their physical deterioration, concentrations of poverty, and racial segregation of people of color."[33] Since an objective of urban redevelopment is to achieve neighborhood improvements by rehabilitating the built environment and spurring new economic activity, gentrification may be viewed as either a goal or a risk of urban redevelopment.

As urban law professor Nestor Davidson explains, "every public investment in a given place not only has a direct impact on the people in that place but more importantly shapes the incentives that people have to remain, leave, avoid, or move to that place."[34] The process by which mobile residents move to achieve their preferred mix of taxes and amenities is called "Tiebout sorting."[35] If Tiebout sorting occurs, then one would expect that any successful urban development program that

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28.   Samantha Jacoby, *Final Opportunity Zone Rules Could Raise Tax Break's Cost*, CTR. ON BUDGET & POL'Y PRIORITIES (Feb. 3, 2020, 2:00 PM), https://www.cbpp.org/blog/final-opportunity-zone-rules-could-raise-tax-breaks-cost [https://perma.cc/E4XD-5BVR].

29.   *State NMTC Programs*, NOVOGRADAC, https://www.novoco.com/resource-centers/new-markets-tax-credits/application-allocation/state-nmtc-programs (last visited Oct. 5, 2021) [https://perma.cc/3TV4-XBWP]; *State Tax Code Conformity – Personal Income*, NOVOGRADAC, https://www.novoco.com/resource-centers/opportunity-zone-resource-center/guidance/state-tax-code-conformity-personal-income (last visited Oct. 5, 2021) [https://perma.cc/A2JL-8XUD].

30.   Lance Freeman, *Displacement or Succession?: Residential Mobility in Gentrifying Neighborhoods*, 40 URB. AFFS. REV. 463, 463 (2005).

31.   Ryun Jung Lee & Galen Newman, *The Relationship Between Vacant Properties and Neighborhood Gentrification*, LAND USE POL'Y, Feb. 2021, at 1, 1.

32.   Jen Douglas, *From Disinvestment to Displacement: Gentrification and Jamaica Plain's Hyde-Jackson Squares*, 23 TROTTER REV. 1, 13–14 (2016). *But see* Daniel J. Hammel & Elvin K. Wyly, *A Model for Identifying Gentrified Areas with Census Data*, 17 URB. GEOGRAPHY 248, 264 (1996) (choosing not to include racial transition in a model to predict gentrification from census data).

33.   Zuk et al., *supra* note 23, at 32.

34.   Nestor M. Davidson, *Reconciling People and Place in Housing and Community Development Policy*, 16 GEO. J. ON POVERTY L. & POL'Y 1, 2 (2009).

35.   *Id.* at 8.

results in meaningful neighborhood improvements would attract new residents to the area.[36]

Some commonly stated goals of urban redevelopment policies—such as growing the local tax base or achieving socioeconomic and racial integration—seem to assume that gentrification and Tiebout sorting will occur.[37] Arguably, the purpose of urban development is to expand the amenities available in distressed neighborhoods, thereby making those neighborhoods more attractive places for people to live and work.[38] Alternatively, gentrification may be viewed as a risk of—or a constraint on—successful urban development initiatives. For example, urban green space strategies to advance social equity "may be paradoxical, in that the creation of green space to facilitate real estate can ultimately lead to gentrification and the displacement of various residents, thus alleviating social inequity by benefiting citizens unequally and pricing out vulnerable residents."[39]

B. Tax Incentives and Urban Redevelopment

1. From Slum Clearance to Enterprise Zones

Today's largest place-based tax incentives, the New Markets Tax Credit and Opportunity Zones laws, grew out of a long history of government policies that have supported gentrification—intentionally or not—by directing public and private capital toward some neighborhoods and away from others.[40] Researchers have noted that "[s]tate policies may amplify already existing gentrification processes, or alternatively seek to spark gentrification in disadvantaged neighbourhoods."[41] Some of the first examples of systematic, state-assisted gentrification were introduced by the Housing Acts of 1949 and 1954.[42] Under these laws, the "federal government provided direct grants, and state governments

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36. *See generally* David Schleicher, *Stuck! The Law and Economics of Residential Stagnation*, 127 YALE L.J. 78 (2017) (describing lower than expected rates of mobility and legal barriers to interstate mobility).

37. *See* Jason M. Knight & Mohammad Gharipour, *Urban Displacement and Low-Income Communities: The Case of the American City from the Late Twentieth Century*, INT'L J. ARCHITECTURAL RSCH., July 2016, at 6, 14–16.

38. *See* Zuk et al., *supra* note 23, at 32.

39. Mengbing Du & Xiaoling Zhang, *Urban Greening: A New Paradox of Economic or Social Sustainability?*, LAND USE POL'Y, Mar. 2020, at 1, 9.

40. Zuk et al., *supra* note 23, at 32.

41. Cody Hochstenbach, *State-Led Gentrification and the Changing Geography of Market-Oriented Housing Policies*, 34 HOUS., THEORY & SOC'Y 399, 400 (2017).

42. *See* Norma Nager, *Continuities of Urban Policy on the Poor: From Urban Renewal to Reinvestment*, *in* BACK TO THE CITY: ISSUES IN NEIGHBORHOOD RENOVATION 239, 242 (Shirley Bradway Laska & Daphne Spain eds., 1980); Jason Hackworth & Neil Smith, *The Changing State of Gentrification*, 92 J. ECON. & HUM. GEOGRAPHY 464, 466 (2001) ("Systematic gentrification dates back only to the 1950s . . . ."); Neil Smith, *Toward a Theory of Gentrification: A Back to the City Movement by Capital, Not People*, 45 J. AM. PLANNING ASS'N 538, 546 (1979) (describing the state's role in early gentrification schemes, in which the state assembled properties at fair market value and sold to developers at lower assessed prices).

aggressively assisted their corporate-led local urban renewal authorities in gentrification by 'assembling properties at fair market value and returning them to developers at the lower assessed price.'"[43]

These early urban renewal policies relied heavily on slum clearance, which inflicted significant harm on low-income communities through widespread displacement of residents.[44] As of June 30, 1966, over 400,000 units had been cleared (or scheduled for clearance), "forcing the relocation of over 300,000 families."[45] For this reason, "urban renewal became synonymous with a clearance project of any sort."[46] Moreover, the disproportionate numbers of minorities affected by these policies led some critics to argue that "urban renewal really meant [Black] removal,"[47] which was often accomplished by constructing interstate highways.[48]

For example, in Hamtramck, Michigan, the city's 1959 master plan "called for a 'program of population loss,' understood to refer to its small number of African American residents."[49] Pursuant to this plan, the city used federal urban renewal funds to "demolish African American neighborhoods," clearing land for the expansion of a Chrysler automobile manufacturing plant and the Chrysler Expressway (I-75).[50] In Miami, Florida, a similar highway project was used to reduce "a community of 40,000 African Americans to 8,000," and in Camden, New Jersey, interstate highway projects "destroyed some 3,000 low-income housing units from 1963 to 1967."[51] In Los Angeles, the "routing of the Santa Monica Freeway in 1954 destroyed the city's most prosperous Black middle class area, Sugar Hill."[52]

Frustration over the destruction caused by these policies "provoked a political revolt against 'urban renewal,'"[53] which became a flash point in the Civil Rights Movement of the 1960s.[54] Ultimately, the urban renewal program was terminated in 1974.[55] After the early urban renewal program was discontinued, subsequent urban redevelopment strategies relied on public-private partnerships and, increasingly, indirect support for gentrification through tax incentives.[56]

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43.   Michelle D. Layser, *The Pro-Gentrification Origins of Place-Based Investment Tax Incentives and a Path Toward Community Oriented Reform*, WIS. L. REV. 745, 776 (2019).

44.   William J. Collins & Katharine L. Shester, *Slum Clearance and Urban Renewal in the United States*, 5 AM. ECON. J.: APPLIED ECON. 239, 241–42 (2013).

45.   *Id.*

46.   Alexander von Hoffman, *The Lost History of Urban Renewal, in* THE AFFORDABLE HOUSING READER 14, 25 (J. Rosie Tighe & Elizabeth J. Mueller eds., 2013).

47.   *Id.* at 26.

48.   RICHARD ROTHSTEIN, THE COLOR OF LAW 127 (2017).

49.   *Id.* at 128.

50.   *Id.* at 128–29.

51.   *Id.* at 129.

52.   *Id.* at 130.

53.   von Hoffman, *supra* note 46, at 26.

54.   Layser *supra* note 43, at 777.

55.   *Id.* at 778.

56.   *Id.*

Among the earliest examples of tax incentives used to support urban redevelopment were state enterprise zone laws.[57] States began introducing versions of enterprise zone laws in 1981, and "by the early 1990s, thirty-eight states and the District of Columbia had adopted their own enterprise zone legislation."[58] Under the typical enterprise zone statute, government leaders designated census tracts as tax-favored zones.[59] Though states emphasize different zone designation criteria, most include some combination of poverty rate and unemployment rate thresholds among the relevant factors.[60]

The laws generally provide for tax relief (e.g., hiring or investment tax credits, capital gains relief, sales tax exemptions, or property tax abatements) and regulatory relief (e.g., relaxed permit requirements) for businesses that are located within the zones.[61] The tax-based subsidies provide a boost to businesses in enterprise zones and an incentive for businesses to locate in (or shift to) the zones.[62] However, these subsidies do not provide for the large capital infusions typically needed to fuel new real estate construction or rehabilitation.[63]

A federal version of enterprise zone laws was passed by the Clinton Administration in 1993.[64] The new tax law created nine "empowerment zones" and ninety-five "enterprise communities."[65] Although the enterprise zone concept had long been popular among conservatives, Clinton's version drew criticism from conservative circles. Republican Congressman Jack Kemp, one of the earliest proponents of the enterprise zone approach, "called Clinton's plan 'anemic' and 'anti-capitalistic'" and criticized the incentives as "weak and incomplete, with virtually no incentives to encourage entrepreneurs or small businesses."[66] The Heritage Foundation strategist who first brought the enterprise zone idea from Great Britain called the program "worse than nothing."[67]

The law also drew criticism from within Clinton's own party. Democrat Senator Joseph Lieberman argued that the law offered "excessive benefits for the nine empowerment zones and a lack of capital incentives."[68] For these reasons, Sen. Lieberman proposed the creation of "enterprise zone development funds," which would enable larger subsidies to flow into the zones.[69]

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57. *Id.*
58. *Id.* at 780.
59. Layser, *supra* note 16, at 416.
60. *Id.* at 422 n.83.
61. *Id.* at 417.
62. Ellen P. Aprill, *Caution: Enterprise Zones*, 66 S. CALIF. L. REV. 1341, 1344 (1993).
63. Layser, *supra* note 16, at 417.
64. I.R.C. § 1391; Jeffrey M. Euston, *Clinton's Empowerment Zones: Hope for the Cities or a Failing Enterprise?*, 3 KAN. J.L. & PUB. POL'Y 140, 140 (1994).
65. I.R.C. § 1391.
66. Euston, *supra* note 64, at 140.
67. *Id.*
68. *Id.* at 146.
69. *Id.*

Under the proposal, enterprise zone development funds would be "specialized investment funds that would direct investment exclusively in enterprise zones."[70] They would be closed-end funds and tradeable on stock exchanges, and they "would permit investors to defer the tax on gains realized from sales of securities and other capital assets to the extent that they used the proceeds to acquire shares of the funds."[71] (Lieberman's proposal never became law, but its parallels to the Opportunity Zones law introduced in 2017 are undeniable.) Though enterprise zone development funds were not adopted, another federal tax incentive was enacted in 2000 for the same general purpose of driving large infusions of capital to low-income areas: the New Markets Tax Credit.[72]

2. Tax Incentives for Debt and Equity Investment

a. New Markets Tax Credit

New Markets Tax Credits (NMTCs) are tax credits claimed by investors who contribute capital to Community Development Entities (CDEs), which in turn invest in projects located in eligible low-income census tracts.[73] The NMTC statute currently authorizes five billion dollars in tax credits to be allocated to CDEs nationwide.[74] These tax credits are awarded pursuant to a competitive application process administered by the Community Development Financial Institutions (CDFI) Fund, which is an office within the Department of the Treasury.[75] Each year, CDEs apply to the CDFI Fund for NMTC allocations.[76]

After the CDFI Fund allocates the tax credits to a CDE, the CDE solicits investors, which are almost always large financial institutions, to make so-called qualifying equity investments in the CDE.[77] In exchange for that investment, the

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70. *Id.*

71. *Id.* at 147. The NMTC was introduced in Community Renewal Tax Relief Act of 2000, Pub. L. No. 106-554, 114 Stat. 2763, with a total of $15bil authorized for allocation from 2001 to 2007; extended by Protecting Americans from Tax Hikes (PATH) Act, Pub. L. No. 114-113, 129 Stat. 2242, which extended authorization through 2019 at $3.5 bil/year.

72. DONALD J. MARPLES & SEAN LOWRY, CONG. RSCH. SERV., RL34402, NEW MARKETS TAX CREDIT: AN INTRODUCTION NOTE 1 (2016).

73. I.R.C. § 45D(e); Roger M. Groves, *The De-Gentrification of New Markets Tax Credits*, 8 FLA. TAX REV. 213, 220 (2007). To be eligible, census tracts generally must have a poverty rate of twenty percent or higher. *Id.*

74. I.R.C. § 45D(f)(1)(G).

75. MARPLES & LOWRY, *supra* note 72, at 1.

76. *See generally* CDFI FUND, U.S. DEP'T OF THE TREASURY, NEW MARKETS TAX CREDIT PROGRAM: ALLOCATION APPLICATION FREQUENTLY ASKED QUESTIONS (2020) (describing the NMTC application process).

77. MARPLES & LOWRY, *supra* note 72, at 2–3. Investors generally do not expect significant market returns on these investments. HOLLAND & KNIGHT LLP, NEW MARKET TAX CREDIT BASICS 3 (2013), http://services.housingonline.com/nhra_images/NMTC%20Basics.pdf [https://perma.cc/3KGP-7YR4]. Rather, they expect to profit primarily from the use of tax credits, which the CDE is authorized to pass along to investors. *Id.* To achieve this result, investors size their capital contributions according to the value of tax credits that they expect to receive in connection with the investment. *Id.* According to the Congressional Research Service, the "tax credit markets historically set a price of 70

CDE promises to pass the NMTCs along to the investors, who will claim the tax credits on their tax returns.[78] The CDE then uses the newly raised capital to make capital contributions to developers or businesses in the tax-favored zones.[79] In practice, these contributions are called "Qualified Low-Income Community Investments" (QLICIs), and they almost always take the form of debt.[80] The basic transaction structure is summarized in the diagram below.
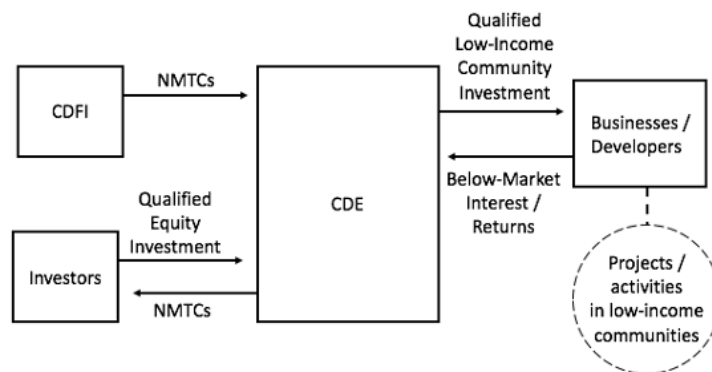
Through this structure, the NMTC helps provide large infusions of capital into projects, helping to support new construction, rehabilitation, and large development projects, among others.[81] An analysis of all NMTC allocations made through 2019 reveals that the average QLICI equaled 73.6% of estimated project costs, with the median QLICI covering 84.56% of estimated project costs.[82] For the 39.8% of projects that were real estate transactions, the average QLICI equaled 68.1% of project costs, and the median QLICI covered 75.7%.[83] These QLICIs, which are

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to 80 cents per dollar of tax credit," with lower valuation in years when credit markets are tight and corporate profits are small. MARPLES & LOWRY, *supra* note 72, at 7. This result is achieved using leveraged structures. In a basic transaction, the tax equity investor and a debt lender will contribute to an investor-owned fund that, in turn, makes a qualified equity investment in the CDE. For example, a tax equity investor may contribute 31 cents of every dollar, while the lender provides 69 cents of every dollar. Every dollar of qualified equity investments generates 39 cents, the entire amount of which is passed to the tax equity investor. In this way, the tax equity investor is able to generate a larger return on its investment.

    78.   MARPLES & LOWRY, *supra* note 72, at 3.

    79.   *Id.*

    80.   *Id*; *see also* John Sciarretti, Michael Novogradac & Peter Lawrence, *New Opportunity Zones Could be Used to Finance Rental Housing*, NOVOGRADAC (Feb. 23, 2018, 12:00 AM), https://www.novoco.com/notes-from-novogradac/new-opportunity-zones-could-be-used-finance-rental-housing [https://perma.cc/QF8V-KNJW] (noting that "business investments under the NMTC program are almost always debt").

    81.   Layser, *supra* note 43, at 768.

    82.   Data on file with author.

    83.   Data on file with author.

provided to real estate developers in the form of loans, are subsidized through the tax credit program.[84]

The NMTC has been criticized for failing to ensure that benefits flow to residents of low-income communities.[85] Because the statute places few restrictions on the types of projects that can be supported through the program,[86] it has been used to subsidize projects like museums and opera houses that are not well targeted to benefit poor residents.[87] Meanwhile, the census tract eligibility criteria permit a significant proportion of census tracts to qualify for NMTC financing in many cities.[88] Inevitably, the pool of eligible census tract includes gentrifying neighborhoods, and the NMTC has the potential to subsidize further investment in those areas. For reasons like these, critics have long called for the "de-gentrification" of the NMTC,[89] though limited research has explored the relationship between the NMTC and gentrification empirically.[90]

b. Opportunity Zones

Despite the relatively large infusions of capital provided by the NMTC, many community development industry participants consider the tax credit to be a relatively small subsidy compared to project costs, particularly in the context of real estate development.[91] Since the NMTC is a debt-subsidy, it typically is not the lead source of project financing.[92] For this reason, some community development industry participants saw a continued need for a subsidy for equity investment in low-income areas.[93] The new Opportunity Zones tax incentive introduced in the Tax Cuts and Jobs Act of 2017 filled this gap.

Under the law, state governors chose from a pool of eligible census tracts—roughly defined as NMTC-eligible tracts, Empowerment Zones, and certain contiguous census tracts—to designate 8,764 census tracts as Opportunity

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84.   *See* John Sciarretti & George Barlow, *Pairing NMTCs with Opportunity Zone Incentives,* 9 NOVOGRADAC J. TAX CREDITS, April 2018, at 2, https://www.novoco.com/periodicals/articles/pairing-nmtcs-opportunity-zone-incentives [https://perma.cc/YDK9-3JLT] (explaining that NMTCs are generally used to subsidize loans to qualified active low-income businesses).

85.   Groves, *supra* note 73, at 223.

86.   I.R.C. § 45D(d)(2)(a).

87.   Groves, *supra* note 73, at 216.

88.   *See* I.R.C. § 45D(e). For example, in Chicago 527 out of 808 census tracts (65%) were eligible for NMTC allocations in 2018. Data on file with author.

89.   Groves, *supra* note 73, at 216.

90.   Henderson, *supra* note 12, at 101–21.

91.   Democracy Collaborative, *Policy Guide: New Markets Tax Credit*, COMMUNITY-WEALTH.ORG, https://community-wealth.org/strategies/policy-guide/nmtc.html [https://perma.cc/C2FF-6GDW] (last visited Oct. 6, 2021).

92.   *Id.*

93.   *See* Bulusu, *supra* note 3 (describing the ways that Opportunity Zones incentives were envisioned to supplement earlier incentives like the New Markets Tax Credit).

Zones.[94] The law provides tax benefits to individual or institutional investors who make eligible investments in so-called Opportunity Funds that make equity investments in the designated Opportunity Zones.[95] In this way, the Opportunity Zones law enables large capital infusions like the NMTC. But unlike the NMTC, which is used to provide debt capital to qualifying businesses, the Opportunity Zones law promotes equity capital investment in low-income communities.[96] By providing tax benefits to third-party investors, the law provides a significant boost to downstream businesses by enabling them to attract equity capital that may otherwise be unavailable.[97]

The low-income tracts that were designated as Opportunity Zones varied with respect to factors that may indicate need—such as income level, poverty rates, and the prevalence of vacant or abandoned properties.[98] Analyses of designated tracts have shown that, for the most part, governors selected tracts with lower income, higher poverty rates, and higher unemployment than those that were not selected.[99]

However, multiple news reports have described Opportunity Zones in gentrifying neighborhoods that were already on an upward trajectory.[100] Critics fear that these designations will attract investment away from the areas that need it most[101] or even fuel the gentrification process.[102] Among the most commonly proposed reforms is to add safeguards to the Opportunity Zones law akin to those included in the NMTC.[103] These include regulatory oversight by the CDFI Fund, a competitive application process, and a certification requirement for Opportunity Funds.[104]

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94.   *Opportunity Zones Resources,* CMTY. DEV. FIN. INSTS. FUND, https://www.cdfifund.gov/ Pages/Opportunity-Zones.aspx   [http://web.archive.org/web/20210123202534/https://www. cdfifund.gov/Pages/Opportunity-Zones.aspx] (last visited Jan. 23, 2021).

95.   I.R.C. § 1400Z-2(a) ("In the case of gain from the sale to, or exchange with, an unrelated person of any property held by the taxpayer, at the election of the taxpayer gross income for the taxable year shall not include so much of such gain as does not exceed the aggregate amount invested by the taxpayer in a qualified opportunity fund during the 180-day period beginning on the date of such sale or exchange . . . .").

96.   Sciarretti et al., *supra* note 80.

97.   Melissa Doell & Sunrita Sen, Opinion, *Are Opportunity Zones Really Creating Opportunities?,* IND. LAW. (Apr. 2, 2019), https://www.theindianalawyer.com/articles/49870-doell-sen-are-opportunity-zones-really-creating-opportunities [https://perma.cc/9CFA-8U6Z].

98.   Layser, *supra* note 18, at 56.

99.   Eldar & Garber, *supra* note 5, at 2.

100.   Borland, *supra* note 6.

101.   *See supra* note 9 and accompanying text.

102.   Melody Carter, Federal Opportunity Zones: The Newest Gentrification Tool? (May 2019) (Master's thesis, Georgia Institute of Technology), https://smartech.gatech.edu/bitstream/ handle/1853/61326/carter_melody_-_op_final.pdf?sequence=1&isAllowed=y   [https://perma.cc/ F2PS-TMB7] (last visited Oct. 5, 2021).

103.   *See, e.g.,* Joseph Bateman, *How Do Opportunity Zones Differ from Existing Federal Tax Incentives for Community Development?,* SUMMIT LLC (Feb. 26, 2018), https://www.summitllc.us/blog/ how-do-opportunity-zones-differ-from-existing-federal-tax-incentives-for-community-development [https://perma.cc/U97Y-AYE9]; Layser, *supra* note 18.

104.   Bateman, *supra* note 103; Layser, *supra* note 18.

The next Part provides new, empirical evidence that such reforms may be insufficient to prevent Opportunity Funds from investing in gentrifying neighborhoods. Specifically, a spatial analysis of NMTC projects shows that NMTC investment has disproportionately flowed to places with strong indicia of gentrification, even with statutory safeguards. These findings, which cast serious doubt on the effectiveness of place-based tax incentives, have important implications for policymakers considering whether to use tax incentives to aid in the recovery from the COVID-19 pandemic.[105]

II. A SPATIAL ANALYSIS OF NEW MARKETS TAX CREDIT PROJECTS

Despite the long history of place-based tax incentives, limited research has analyzed where investments are made within tax-favored zones.[106] If gentrifying census tracts attract a disproportionate share of tax subsidies, this would raise significant questions about the efficiency, equity, and administration of place-based tax incentives. It would also provide strong evidence that the designation of gentrifying census tracts as Opportunity Zones may be cause for concern.

Data about the locations of Opportunity Zones investment is not yet available, and a lack of robust reporting requirements may prevent researchers from accessing such information for the foreseeable future.[107] For this reason, this study focuses instead on the NMTC. Insights about the NMTC program are relevant for at least three reasons. First, they are relevant to evaluate the ongoing federal NMTC program and many state-level NMTC incentives modeled after the federal law.[108] To the extent that inefficiencies and inequities exist at the federal level, those problems may additionally impact many state policies, thereby necessitating both federal and state reforms.

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105.   Michael J. Novogradac, *Community Development Tax Incentives Poised to Help Spur COVID-19 Recovery*, 11 NOVOGRADAC J. TAX CREDITS, May 2020, https://www.novoco.com/periodicals/articles/community-development-tax-incentives-poised-help-spur-covid-19-recovery [https://perma.cc/T2TA-9YXY].

106.   *But see* Henderson, *supra* note 12.

107.   Early versions of the Opportunity Zones legislation that were introduced by Sen. Scott and Sen. Booker had included provisions for annual data collection, but those provisions were removed from the final version of the law. Lydia O'Neal, *Senators to Introduce Opportunity Zone Data Mandates Bill (2)*, BLOOMBERG TAX (Apr. 12, 2019, 10:12 AM), https://news.bloombergtax.com/daily-tax-report/senators-file-bill-to-reinstate-opportunity-zone-data-mandates [https://perma.cc/ZH6C-S8VT]; Bob Ibanez, *Impact Reporting Is Key Ingredient to Ensuring Successful Implementation of Opportunity Zone Incentive*, NOVOGRADAC (Oct. 10, 2018, 12:00 AM), https://www.novoco.com/notes-from-novogradac/impact-reporting-key-ingredient-ensuring-successful-implementation-opportunity-zone-incentive [https://perma.cc/QWR9-D56Y]. Some commentators predict that a new reporting and public disclosure framework will be introduced and enacted under the Biden Administration. *See* Rachel Reilly, *EIG OZ Webinar Series | Election Analysis: What Lies Ahead for Opportunity Zones*, ECONOMIC INNOVATION GRP. (Nov. 20, 2020), https://eig.org/news/eig-oz-webinar-series-election-analysis-what-lies-ahead-for-opportunity-zones [https://perma.cc/9QRS-82Z5].

108.   *State NMTC Programs*, *supra* note 29.

Second, NMTC siting patterns can help predict investment patterns under the Opportunity Zones program.[109] The NMTC incentive is structurally analogous to the Opportunity Zones incentive, making it a good candidate for generating generalizable findings.[110] However, as discussed in Part III below, the Opportunity Zones law also contains multiple features that one would expect to increase the likelihood of subsidies flowing to gentrifying neighborhoods, as compared to the NMTC. For this reason, even slight evidence that NMTC investment flows to gentrifying census tracts would make it highly probable that Opportunity Funds will invest in gentrifying tracts.

Third, studying the NMTC can help evaluate the effectiveness of safeguards that are built into that program. Critics often point to a lack of safeguards in the Opportunity Zones law as a reason to expect poor outcomes, and some have suggested that the law be reformed to include guardrails akin to those included in the NMTC.[111] However, if NMTC investment has flowed to gentrifying areas, that would provide evidence that the safeguards built into the NMTC are insufficient to prevent this problem. For that reason, Opportunity Zones proposals that rely on NMTC as a model are likely to fail in this context.

A. Empirical Strategy

Accordingly, this study asks whether NMTC subsidies flow disproportionately to census tracts that may be experiencing gentrification. I employ two forms of spatial statistics to analyze location patterns of NMTC allocations in twenty cities to explore whether NMTC investment has been directed to areas that may be experiencing gentrification. For reasons explained below, both steps of the analysis

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109.   *See* Lester et. al., *supra* note 13 (using an analysis of the NMTC to help predict Opportunity Zones outcomes).

110.   Place-based tax incentives can be designed as direct or indirect tax incentives. Where direct tax incentives provide tax benefits directly to entities that invest in low-income communities by operating businesses in the area or otherwise engaging with the low-income community, indirect tax incentives provide tax benefits to third party investors who help finance such businesses. Layser, *supra* note 16, at 417–18. Both the NMTC and Opportunity Zones incentives provide capital subsidies to third-party investors who choose to invest in entities that extend capital to businesses in tax-favored zones. Under both the NMTC and Opportunity Zones laws, the value of the tax subsidy is shared between third-party investors (who claim the tax preference on their tax returns and therefore receive a tax reduction) and downstream entities that receive subsidized financing (and can therefore access financing that may otherwise be unavailable, or can secure such financing more cheaply).

111.   *See, e.g.,* Anthony Veerkamp, *Opportunity Zones Come into Focus*, NAT'L TR. CMTY. INV. CORP., https://ntcic.com/news-blog/opportunity-zones-come-into-focus/ [https://perma.cc/L9YQ-WDFZ] (last visited Oct. 6, 2021) (advocating for reforms to promote "twinning" Opportunity Zones with NMTCs in order to "create guardrails by proxy"); *The Promise of Opportunity Zones: Hearing Before the Joint Economic Comm. Cong. of the United States*, 115th Cong. (2018) (statement of Maurice A. Jones, President & CEO, Local Initiatives Support Corporation), https://www.govinfo.gov/content/pkg/CHRG-115shrg30384/html/CHRG-115shrg30384.htm [https://perma.cc/AS6U-VUGF] (advocating for more active administration of the Opportunity Zones incentive "in a manner similar to the process for allocating the new markets tax credit").

consider how NMTC allocation patterns relate to two variables known to correlate to gentrification: vacancy rates and rent increases.

First, I use a descriptive quadrat density analysis to describe the point density of NMTC allocations within each city.[112] This geographic research method was chosen because it produces descriptions of NMTC project data that take into account the different sizes of census tracts. As a result, the quadrat analysis reveals whether allocations cluster in areas that may be gentrifying. As described in Part II.C, the results of the quadrat analysis show that the density of NMTC projects is consistently highest in census tracts that exhibit signs of gentrification.

Second, I fit a negative binomial regression model to the data to describe the strength of the relationship between NMTC allocation locations and variables associated with gentrification.[113] This form of regression model is commonly used to analyze count data, such as the number of projects per census tract. Here, the model is used to determine whether vacancy rates or rent increases are predictive of the spatial patterns observed through the quadrat density analysis, after controlling for other variables that may affect the outcome (e.g., race, income, and changes in racial or income attributes). As described in Part II.D, the results show that, in many cities, vacancy rates or rent change are the largest statistically significant predictor of NMTC allocations.

Taken together, the quadrat density analysis and the negative binomial regression analysis will answer the question of whether NMTC investment has flowed to places that exhibit signs of gentrification. Significantly, the purpose of this analysis is not to test whether tax incentives *cause* gentrification. Instead, the purpose is to describe the spatial patterns of NMTC investment to help evaluate whether the incentive has produced efficient and equitable outcomes. In addition, the results of this study can help predict how investors will respond to other place-based tax incentives, including Opportunity Zones.

1. *High Vacancy Rates as an Indicator of Gentrification*

The vacancy rate variable was selected as a key indicator of gentrification rooted in both theoretical and empirical literatures. Though the presence of vacant properties may seem counterintuitive to the concept of gentrification,[114] such conditions are consistent with one of the most established supply-side theories about the gentrification process. Supply-side theories posit that "an oversupply of

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112.   Y. Yuan, Y. Qiang, K. Bin Asad & T.E. Chow, *Point Pattern Analysis*, *in* GEOGRAPHIC INFORMATION SCIENCE & TECHNOLOGY BODY OF KNOWLEDGE (1st Quarter 2020 ed., John P. Wilson ed., 2020), https://gistbok.ucgis.org/bok-topics/point-pattern-analysis [https://perma.cc/9Y7Z-R74G] (describing quadrat analysis methodology).

113.   Jerald F. Lawless, *Negative Binomial and Mixed Poisson Regression*, 15 CANADIAN J. STAT. 209 (1987) (describing negative binomial regression models).

114.   Peter Marcuse, *Gentrification, Abandonment, and Displacement: Connections, Causes, and Policy Responses in New York City*, 28 WASH. U. J. URB. & CONTEMP. L. 195, 195 (1985) ("Abandonment results from demand declining to zero, gentrification from high and increasing demand.").

undervalued urban housing drives investors to redevelop in the hope of tapping into a latent demand."[115] These theories can be traced to Neil Smith's rent gap theory, which predicted "that gentrification is most likely to happen in areas where there is a wide gap between the potential value of a parcel of land and the current actual prices."[116]

Specifically, Smith argued that capital investment will flow to places where the rate of return is highest.[117] Property is abandoned in some places as capital is deployed in other, more profitable, locations.[118] As structures are abandoned and left to decay, the market value of property may drop below its potential use value, creating what Smith calls the "rent gap."[119] When the rent gap is wide enough, developers can purchase property cheaply, incur rehabilitation costs, and then resell the property at a profitable rate of return that is satisfactory to the developer.[120]

Although rent gaps can be found in many neighborhoods that have experienced decline, Smith argued that reinvestment in any given place rarely occurs without some form of collective social action.[121] Accordingly, "builders, developers, landlords, mortgage lenders, government agencies, real estate agents, and tenants" all play important roles in initiating processes of revitalization and gentrification.[122] In the context of urban redevelopment initiatives, neighborhoods with significant rent gaps may gentrify due to the collective action of the state, which bears some of the risk of investment by providing subsidies, and private developers. Though Smith's rent gap theory has been the subject of decades of debate, it remains a "dominant explanation of the creation of gentrifiable property, which is generally viewed as an important facet of gentrification."[123]

Given the rent gap theory, "[i]t makes sense that gentrification might relate to abandonment because a certain level of abandonment may be necessary for the first wave of gentrification to occur."[124] Two recent studies have found that high vacancy rates are positively correlated with gentrification.[125] Geography professor Victoria Morckel found that, in statistical models, as gentrification increases, abandonment also increases.[126] Morkel notes:

> Although counterintuitive, perhaps the gentrification factor indicates that neighborhoods with a high value on the gentrification factor are

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115.   Adam Eckerd, *Cleaning Up Without Clearing Out? A Spatial Assessment of Environmental Gentrification*, 47 URB. AFFS. REV. 31, 35 (2011).

116.   *Id.*

117.   Smith, *supra* note 42, at 546.

118.   *Id.*

119.   *Id.* at 545.

120.   Smith, *supra* note 117, at 545.

121.   *Id.*

122.   *Id.* at 540.

123.   Daniel J. Hammel, *Gentrification and Land Rent: A Historical View of the Rent Gap in Minneapolis*, 20 URB. GEOGRAPHY 116, 119 (1999).

124.   Morckel, *supra* note 21, at 488.

125.   Lee & Newman, *supra* note 31; Morckel, *supra* note 21.

126.   Morckel, *supra* note 21, at 489.

neighborhoods in transition—that is, neighborhoods with abandonment that are also experiencing redevelopment and socioeconomic change. If so, the gentrification factor might predict abandonment by default because abandonment may covary in the early stages of gentrification as previously stated. Another potential explanation is that in some neighborhoods experiencing gentrification, low-income residents move out more quickly than high income residents move in, leaving vacant units.[127]

Urban planning professors Ryun Jung Lee and Galen Newman asked whether clustered vacant properties were associated with the neighborhood gentrification process and if certain types of vacant properties were more likely to serve as catalysts for gentrification.[128] They found that "clustered residential and commercial vacancies . . . are positively associated with neighborhood gentrification."[129] Based on the theoretical and empirical evidence that high vacancy rates are associated with gentrification, this study uses vacancy rate as an indicator of possible gentrification.

2. Increasing Rent as an Indicator of Gentrification

The rent increase variable was also selected as a key indicator of gentrification rooted in theoretical and empirical literatures. Where the vacancy rate variable is grounded in supply-side theories focused on preconditions for the gentrification process, rent inflation is associated with demand-side theories and the later stages of gentrification. One articulation of demand-side theories for gentrification posits that "changing culture and increased costs of commuting have encouraged people who desire certain amenities and housing close to the urban core to drive prices up in previously lower class communities."[130]

In other words, as demand for living in a neighborhood increases, so does the price to live there—including rental rates. For this reason, some gentrification studies have used rent inflation as a standalone proxy for gentrification.[131] Professors Lance Freeman and Frank Braconi use increase in market rate rents as an independent indicator of possible gentrification, noting that "it is the notion that gentrification leads to increased demand in a neighborhood, and consequently to rising rents, that is thought to spur displacement."[132] Hammel and Wyley have developed a model for identifying gentrified areas with census data.[133] Though their model contained nine independent variables, they note that income, occupation,

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127. *Id.*
128. Lee & Newman, *supra* note 31.
129. *Id.* at 9.
130. Eckerd, *supra* note 115, at 35.
131. Lance Freeman & Frank Braconi, *Gentrification and Displacement: New York City in the 1990s*, 70 J. AM. PLAN. ASS'N 39 (2004).
132. *Id.* at 45.
133. *See generally* Hammel & Wyly, *supra* note 32.

and rent contributed most to the model.[134] Rent change, viewed independently, was a significant variable for accurately predicting gentrification.[135]

Rent increases have also been observed in case studies of gentrifying neighborhoods.[136] To the extent there is debate over the role of rent change in gentrification, it relates to the degree of displacement it causes. For example, one study found that "although rental inflation is related to displacement in gentrifying neighborhoods, the magnitude of the relationship is rather modest."[137] Another gentrification study found little, if any, mobility out of gentrifying neighborhoods.[138] However, others have noted that the apparent stability in gentrifying neighborhoods may reflect heightened efforts by residents to remain in their improving neighborhoods, "even if it means paying more rent or doubling up."[139] Since "higher rent burdens are unlikely to be sustainable over the long term," it is possible that displacement may occur at later stages of gentrification.[140] For these reasons, this study uses rent increase as an indicator of possible gentrification.

B. Data

1. NMTC Project Data

Two sources of NMTC project data are examined in this study. The regression analysis is performed using government data available from the Community Development Financial Institution (CDFI) Fund's 2019 public data release.[141] The dataset contains the census tract locations of 5,799 NMTC allocations made from 2003 to 2017.[142] This comprehensive dataset provides a complete account of where NMTC investments have flowed during the program's history.

However, the dataset available from the CDFI Fund does not include project addresses and is therefore unsuitable for the quadrat analysis performed here. For this reason, the quadrat analysis is performed using a separate dataset of NMTC project addresses published online by the accounting firm Novogradac LLP (the "Novagradac dataset").[143] The dataset contains 5,497 entries that describe projects that received allocations prior to 2010.[144] Using R code, the project addresses were

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134. *Id.*

135. *Id.*

136. *See, e.g.*, Douglas, *supra* note 32.

137. Freeman, *supra* note 30, at 482.

138. *Id.*

139. Zuk et al., *supra* note 23, at 37.

140. *Id.*

141. This data is available for download at https://www.cdfifund.gov/sites/cdfi/files/2021-05/FY2019_Data_Documentation_Instruction.zip [https://perma.cc/4YNF-8T3P]. Note that the file also contains data about four projects with allocation origination years prior to 2003.

142. *Id.*

143. *QLICIs by State*, NOVOGRADAC, https://www.novoco.com/resource-centers/new-markets-tax-credits/application-allocation/qlicis-state [https://perma.cc/BX8G-8TS2] (last visited Oct. 6, 2021).

144. *See id.* (data on file with author).

converted to latitude and longitude coordinates, and duplicate points were removed.[145] This yielded 2,978 unique, geocoded projects suitable for spatial analysis.[146]

The study sample includes all cities that had at least thirty projects in the Novogradac dataset. This threshold was intended to ensure sufficient sample size. The following twenty cities met this cutoff: Milwaukee, New Orleans, Chicago, Portland, Cleveland, Los Angeles, Jackson, St. Louis, Phoenix, Baltimore, New York, Cincinnati, Denver, Boston, Columbus, Louisville, Minneapolis, Philadelphia, Pittsburgh, and Seattle. These urban study areas are drawn from Northeast, South, Midwest, and West regions of the United States, providing opportunities for regional comparisons.

2. Census Tract Data

For each study city, 2010 census tract boundaries were obtained from the census TIGER/Line shapefiles database.[147] Census tract attributes were obtained via an API pull from the relevant five-year (2006–2010 or 2013–2017) American Community Survey (ACS) datasets.[148] This data includes vacancy rates (2010),[149] median gross rent (2010 and 2017),[150] median gross income (2010 and 2017),[151]

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145. The R code used to perform this step is located at https://uofi.box.com/s/ kh7zalt1n1bnp7j7j1lo5g1s39fykgmu [https://perma.cc/67HF-RKRH].

146. A csv file containing the unique project data is available at https://uofi.box.com/s/ 3006ilx5taki2ru1edxy0ptoj46078d7 [https://perma.cc/SJ5P-YMF5].

147. The R code used to perform this step is located at https://uofi.box.com/s/ fnjhee3zwsklyc6z8lubua3z2mrbfk9b [https://perma.cc/XHE3-8W79].

148. The R code used to perform this step is available at https://uofi.box.com/s/ dya64az31w01dypxf5r5bmj2btoj8w12 [https://perma.cc/G2TW-Z2GW].

149. The 2010 vacancy rate variable is listed as acs5/profile variable number DP04_0003P. *See Census Data API: Variables in /data/2010/acs/acs5/profile/variables*, U.S. CENSUS BUREAU, https:/ /api.census.gov/data/2010/acs/acs5/profile/variables.html [https://perma.cc/5GPW-GKL7] (last visited Oct. 6, 2021) [hereinafter *Data Profile Variables (2010)*].

150. The 2010 median gross rent variable is listed as acs5/profile variable number B25064_001E. *See Census Data API: Variables in data/2010/acs/acs5/variables*, U.S. CENSUS BUREAU, https://api.census.gov/data/2010/acs/acs5/variables.html [https://perma.cc/97NY-8ZLG] (last visited Oct. 6, 2021). The 2017 median gross rent variable is listed as acs5/profile variable number B25031_001E. *See Census Data API: Variables in data/2017/acs/acs5/variables*, U.S. CENSUS BUREAU, https://api.census.gov/data/2017/acs/acs5/variables.html [https://perma.cc/K4RL-YV34] (last visited Oct. 6, 2021).

151. Both the 2010 and 2017 median gross income variables are listed as acs5/profile variable number DP03_0086 (median family income). *See Data Profile Variables (2010)*, *supra* note 149; *Census Data API: Variables in /data/2017/acs/acs5/profile/variables*, U.S. CENSUS BUREAU, https:// api.census.gov/data/2017/acs/acs5/profile/variables.html [https://perma.cc/9NKY-CYWY] (last visited Jan. 1, 2021) [hereinafter *Data Profile Variables (2017)*]. Both the 2010 and 2017 median gross income variables are listed as acs5/profile variable number DP03_0086 (median family income). *See Data Profile Variables (2010)*, *supra* note 149; *Data Profile Variables (2017)*, *supra.*

percent Black population (2010),[152] percent white population (2010 and 2017),[153] and total households (2010).[154]

The eligibility status of census tracts for NMTC allocations was determined using PolicyMap's dataset of "New Markets Tax Credit (NMTC) eligibility status, for CY 2017 using 2006–2010 eligibility data."[155] After joining the data to the census tract shapefiles, I extracted the subset of tracts that were eligible for NMTC allocations.[156] Limiting the sample in this way helps avoid excess zeros caused by zero counts in ineligible census tracts.[157]

C. Quadrat Density Analysis

1. Methods

A quadrat density analysis was used to describe the spatial patterns of NMTC project locations in each city in order to determine whether investment appears to cluster in areas that exhibit signs of gentrification. To perform a quadrat density analysis, each study area is "divided into smaller sub-regions (i.e., quadrats), and then the point density is computed for each sub-region."[158] For each quadrat, the point density is computed by dividing the number of points in the quadrat by the quadrat's area.[159] In this analysis, two quadrat analyses were performed for each study city, with quadrats defined with reference to census tract attributes.[160] In the

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152. The 2010 percent black population variable is listed as acs5/profile variable number DP05_0033P. *See Data Profile Variables (2010)*, *supra* note 149.

153. Both the 2010 and 2017 percent white population variables are listed as acs5/profile variable number DP05_0032P. *See Data Profile Variables (2010)*, *supra* note 149; *Data Profile Variables (2017)*, *supra* note 151.

154. The 2010 total households variable is listed as acs5/profile variable number DP02_0001E. *See Data Profile Variables (2010)*, *supra* note 149.

155. POLICY MAP, https://illinois.policymap.com/maps?i=9894665&btd=6&period=2006-2010&lind=111&cx=-96.68649857479217&cy=35.65445151828503&cz=2 [https://perma.cc/XN3A -DNU2] (New Markets Tax Credit (NMTC) eligibility status, for CY 2017 using 2006–2010 eligibility data).

156. The R code for this step is available at https://uofi.box.com/s/ vohi3exf3tbcxgrhimylv2hmbnwxcod6 [https://perma.cc/C4XV-D8FQ].

157. An analysis of all census tracts would produce two types of zero counts. The first would be counts of zero projects in tracts that were not eligible for NMTC allocations. The second would be counts of zero projects in tracts that *were* eligible, but were not chosen by investors. Only the latter category is of interest in this study, which is focused on understanding which *eligible* census tracts are most likely to be selected for tax-subsidized investment. The former category is referred to as "excess zeros," which can skew regression results. *See* Peter A. Lachenbruch, *Analysis of Data with Excess Zeros*, 11 STAT. METHODS MED. RSCH. 297 (2002).

158. Yuan et al., *supra* note 112.

159. MANUEL GIMOND, INTRO TO GIS AND SPATIAL ANALYSIS ch. 11 (2021) (ebook), https:/ /mgimond.github.io/Spatial/index.html [https://perma.cc/7R9Z-7WB9].

160. Traditionally, quadrats are defined by regions with equal area. J. López De La Cruz & M.A. Gutiérrez, *Spatial Statistics of Pitting Corrosion Patterning: Quadrat Counts and the Non-Homogeneous Poisson Process*, 50 CORROSION SCI. 1441 (2008). However, quadrats can also be defined with reference to an underlying covariate, such as ranges of elevation, population size, or income level. GIMOND, *supra* note 159. In such cases, the quadrats may have non-uniform shape and

first, quadrats were defined with reference to 2010 vacancy rates. In the second, quadrats were defined with reference to the change in median rents during the period between the 2010 five-year ACS survey and the 2017 five-year ACS survey.[161]

Each city was divided into six subregions—or quadrats—to be analyzed. Dividing the cities into six subregions allows for a more detailed analysis of the spatial patterns than the more traditional four-region division. The six quadrats were defined with reference to standard deviations (denoted by the symbol σ) from the mean value of the underlying variable. For example, Quadrats 1, 2, and 3 include census tracts that experienced lower than average rent increases (or vacancy rates) during the study period, while Quadrats 4, 5, and 6 include census tracts that experienced higher than average rent increases (or vacancy rates). Table 1 summarizes the ranges included in each quadrat.

Quadrat	Range
1	-inf: -2σ from mean
2	-2σ from mean: -1σ from mean
3	-1σ from mean: mean
4	mean: $+1\sigma$ from mean
5	$+1\sigma$ from mean: $+2\sigma$ from mean
6	$+2\sigma$ from mean: inf

Table 1: Quadrat Ranges with Reference to Census Tract Percent Rent Increase (2010–2017) or Vacancy Rate (2010)

For each city, a map of the quadrats was projected using the NAD_1983_StatePlane coordinate system appropriate for its location.[162] I then overlaid the point locations of all NMTC projects for which addresses are available, as described in Part II.B above. For example, figure 1 visualizes the New York City quadrats with NMTC projects overlaid on the map.

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area. *Id.* The R code for the quadrat analyses performed in this study are available at https://uofi.box.com/s/z2g7nkewfodzhc9qgnyp bzl7wd4jf3un [https://perma.cc/34N6-EZVX].

161.   Because the purpose of the quadrat analyses is to describe the locations of NMTC projects within the fiscal geographies eligible for NMTC allocations—not within the cities as a whole—I began by using R code to extract subsets of NMTC-eligible census tracts within city boundaries. The R code used for this step is available at https://uofi.box.com/s/y35ejfq64dg8w4hvje0odtz3kon1nd0d [https://perma.cc/NTK4-GBK8]. This step produced twenty unique shapefiles containing the NMTC fiscal geographies of each study city. Each file was rendered as a raster layer to ensure compatibility with the quadratcount() function from the SPATSTAT package. Himanshu Mathur & Stefania Bertazzon, *Rasterizing Census Geography: Definition and Optimization of a Regular Grid, in* ADVANCES IN GISCIENCE 251–69 (Monica Sester, Lars Bernard & Volker Paelke eds., 2009) http://link.springer.com/10.1007/978-3-642-00318-9_13 [https://perma.cc/3SSJ-Q36D].

162.   *ArcGIS 10.1 Projected Coordinate System Tables*, ESRI, https://desktop.arcgis.com/en/arcmap/10.3/guide-books/map-projections/pdf/projected_coordinate_systems.pdf   [https://perma.cc/YR9C-TB2E] (last visited Oct. 6, 2021).
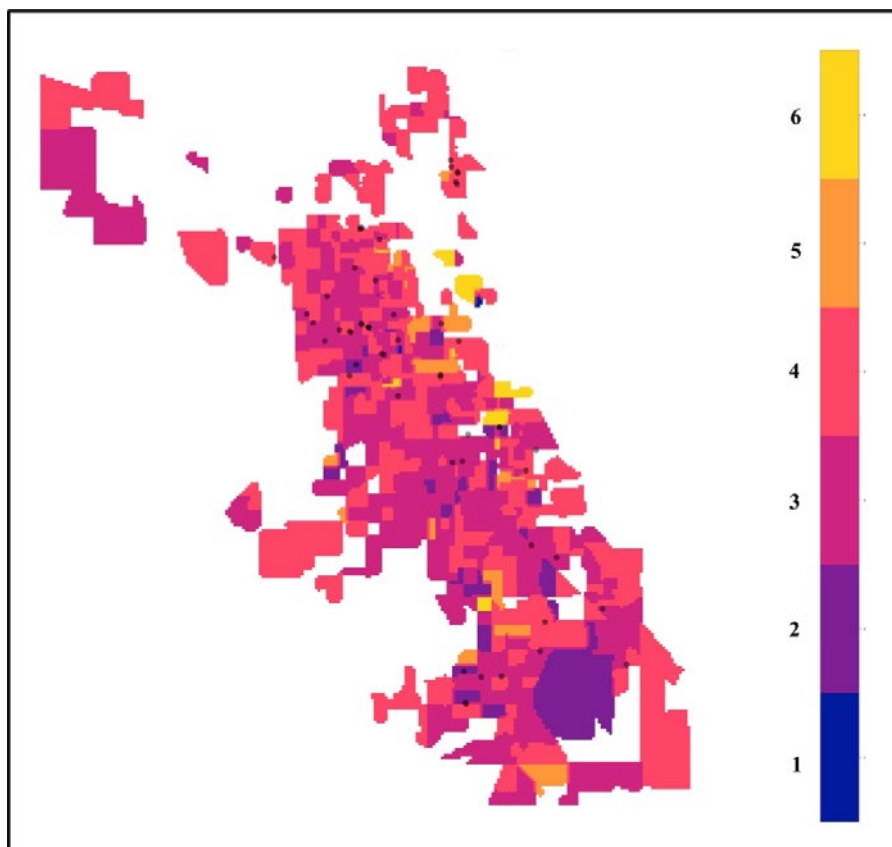
Figure 1: Chicago NMTC Projects (2001–2009) Plotted on Rent Change
Quadrat Map* (Percent Change from 2010–2017†)

* Quadrats 1–6 reflect subregions of NMTC-eligible census tracts defined with
reference to census tract change in median gross rent. Areas in Quadrat 1 experienced
the lowest increase (or a decrease) in median gross rent during the study period. Areas
in Quadrat 6 experienced the highest increase in median gross rent during the study
period.
†Median Gross Rent values for 2010 and 2017 obtained from the 5-year American
Community Survey for years 2006-2010 and 2013-2017.

Finally, the quadratcount() function from the spatstat package in R was used
to generate point counts within each quadrat and compute the point density within
each quadrat. The point density counts are expressed as the number of projects per
square mile.

2. Results

The quadrat analyses describe the point density of NMTC projects, where the
results for each quadrat are expressed in terms of the number of projects per square
mile. As this subsection will explain, the results of the quadrat analysis demonstrate
that the point density of NMTC projects is often highest in eligible census tracts

that either (a) have higher than average vacancy rates or (b) have higher than average rent increases. Because both high vacancy rates and rent increases are known to correlate with gentrification, these results suggest that NMTC investment has clustered in areas that may be experiencing gentrification.

It is important to note that higher point density in a quadrat does not necessarily correspond to higher raw numbers of projects in that quadrat. Since point density is calculated with reference to area—and the sizes of census tracts differ—point density is affected by the size of the quadrat subregions. In many cases, Quadrats 1, 2, 5 and 6 had smaller areas than Quadrats 3 and 4. By way of illustration, figure 2 and figure 3 provide a side-by-side comparison of the Philadelphia rent change quadrat map and the project density in the same quadrats.

Figure 2: Philadelphia NMTC Projects (2001–2009) Plotted on Rent Change Quadrat Map (Percent Change from 2010–2017†) (Q1 = Lowest; Q6 = Highest)

†Median Gross Rent values for 2010 and 2017 obtained from the 5-year American Community Survey for years 2006-2010 and 2013-2017.
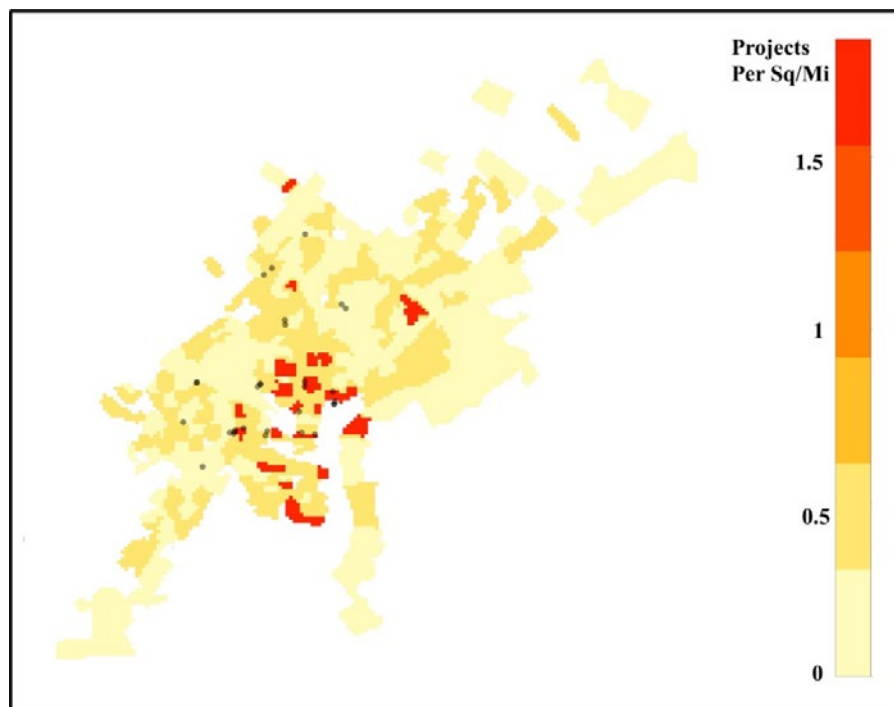
Figure 3: Density of Philadelphia NMTC Projects (2001–2009) (in projects per square mile) by Rent Change Quadrat (Percent Change from 2010–2017†)

†Median Gross Rent values for 2010 and 2017 obtained from the 5-year American Community Survey for years 2006-2010 and 2013-2017.

Moreover, cross-city comparisons of raw point-density values may not be meaningful due to variations in cities' sizes and numbers of projects. However, a comparison of *trends* across the sample is meaningful. As this Section will explain, the results were highly consistent across the twenty cities in the study sample, showing that in nearly every city, NMTC projects were disproportionately located in (a) areas with a higher share of vacant properties relative to other eligible tracts and (b) areas that are experiencing a higher increase in median gross rent relative to other eligible tracts. Both of these trends provide evidence that, in many cities, NMTC allocations have flowed to areas that exhibit at least one of two variables predictive of gentrification: high vacancy rates and rent increases.

As Part III will explain, these results suggest that the NMTC may be an inefficient subsidy in most cities, and it raises important questions about whether its outcomes are equitable. However, some variations across the sample are also notable. As this Section will explain, the quadrat analyses did yield a handful of outliers. For example, in both Milwaukee and New York City, project density was highest in rent change Quadrat 1, where rent increases were smallest (or, in some cases, rental rates were declining) during the period. Possible reasons for this

heterogeneity, and its implications for tax incentive administration, will also be discussed in Part III. The remainder of this Subsection II.C.2 will describe the results of the quadrat density analyses in each region.

a. Point Density and Vacancy Rates

The vacancy rate quadrat analysis showed that project density is consistently highest in quadrats with the highest vacancy rates, suggesting that NMTC projects are most likely to be located in areas that may be experiencing gentrification. In all but two cities (Cleveland and Minneapolis), the density of NMTC projects was highest in Quadrat 5 or Quadrat 6, where vacancy rates were highest. Table 2 shows the density of NMTC projects per quadrat for each city studied. Figures 4–7 display the results in each region using bar charts.

Northeast	Q1	Q2	Q3	Q4	Q5	Q6
Boston	1.499	0.668	1.018	0.094	1.500	0.916
New York	0.000	0.365	0.549	0.690	0.683	0.865
Philadelphia	0.000	0.098	0.049	0.592	0.280	1.354
Pittsburgh	0.000	0.417	0.486	0.398	2.854	0.000
Midwest	Q1	Q2	Q3	Q4	Q5	Q6
Chicago	0.000	0.042	0.274	0.319	0.398	0.325
Cincinnati	0.000	0.000	0.140	0.291	0.612	9.195
Cleveland	0.000	0.163	1.157	0.491	0.154	0.446
Columbus	0.000	0.000	0.088	0.248	0.363	0.456
Milwaukee	0.000	0.000	0.977	1.039	2.832	2.000
Minneapolis	0.000	0.613	0.405	1.266	0.355	1.077
St. Louis	0.000	0.000	0.346	1.121	0.529	4.719
South	Q1	Q2	Q3	Q4	Q5	Q6
Baltimore	0.000	0.062	0.095	0.753	1.066	2.272
Jackson	0.000	0.000	0.456	0.134	0.109	0.753
Louisville	0.000	0.145	0.151	0.244	2.487	1.059
New Orleans	0.366	0.297	0.013	0.009	3.529	0.112
West	Q1	Q2	Q3	Q4	Q5	Q6
Denver	0.000	0.000	0.026	0.337	0.337	1.769
Los Angeles	0.000	0.029	0.286	0.105	0.422	0.504
Phoenix	0.000	0.144	0.148	0.077	0.582	0.757
Portland	0.000	0.042	0.650	0.756	0.047	4.002
Seattle	1.890	0.000	0.449	0.540	1.098	7.204

Table 2: NMTC Project Density (in Number of Projects Per Square Mile)
by Vacancy Rate Quadrat (percent vacancies, 2010)*

*Quadrats 1–6 reflect subregions of NMTC-eligible census tracts defined with reference to census tract change vacancy rate (2010). Areas in Quadrat 1 had the lowest vacancy rates as of the 2010 five-year American Community Survey, and areas in Quadrat 6 experienced the highest vacancy rate during the same period.

Figure 4 shows that in the Northeast cities studied, the point density of NMTC projects was highest in vacancy rate Quadrat 6 in New York, Philadelphia, and

Pittsburgh. In other words, in these cities, the density of NMTC projects was highest in the parts of the cities where vacancy rates were also highest. This pattern was especially notable in the two Pennsylvania cities, Philadelphia and Pittsburgh, suggesting that in those cities, projects tended to cluster in areas with high vacancy rates. In contrast, in Boston, the density of NMTC projects was roughly the same in Quadrat 1 as in Quadrat 5, and the overall point density was skewed toward areas with lower vacancy rates.

Figure 5 shows that in the Midwest cities studied, the point density of NMTC projects was highest in vacancy rate Quadrat 6 in Cincinnati, Cleveland, Columbus, and St. Louis. The point density of NMTC was highest in Quadrat 5 in Chicago and Milwaukee. These results describe spatial patterns in which NMTC projects appear to cluster in the two subregions with the highest vacancy rates. This pattern is especially notable in Cincinnati and St. Louis. Of the seven Midwest cities studied, the only city that did not follow this pattern was Minneapolis, which had a more even distribution of projects across quadrats.

Figure 6 shows that in the Western cities studied, the point density of NMTC projects was highest in vacancy rate Quadrat 6 in all five cities: Denver, Los Angeles, Phoenix, Portland, and Seattle. These results describe spatial patterns in which NMTC projects appear to cluster in the subregion with the highest vacancy rate. This pattern is especially notable in Portland and Seattle, where point density was significantly higher in Quadrat 6 than in any other quadrat.

Figure 7 shows that in the Southern cities studied, the point density of NMTC projects was highest in vacancy rate Quadrat 6 in two cities (Baltimore and Jackson) and in Quadrat 5 in two cities (Louisville and New Orleans). These results describe spatial patterns in which NMTC projects appear to cluster in the two subregions with the highest vacancy rate. This pattern is especially visible in Baltimore, Louisville, and New Orleans. In Jackson, the quadrat with the second-highest point density was Quadrat 3, where census tract vacancy rates were within one standard deviation below the mean.

Figures 4-7: Density of NMTC projects (in number of projects per mile) by vacancy rate quadrat (2010) (Q1 = Lowest; Q6 = Highest)
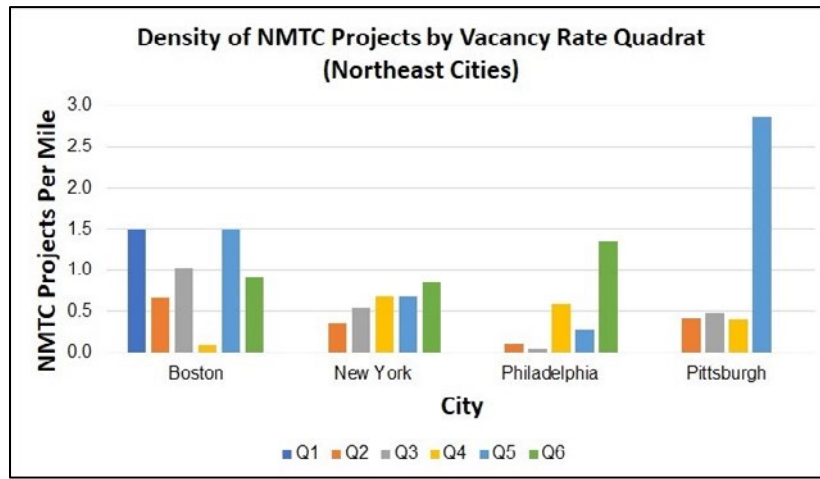
Figure 4: Northeast
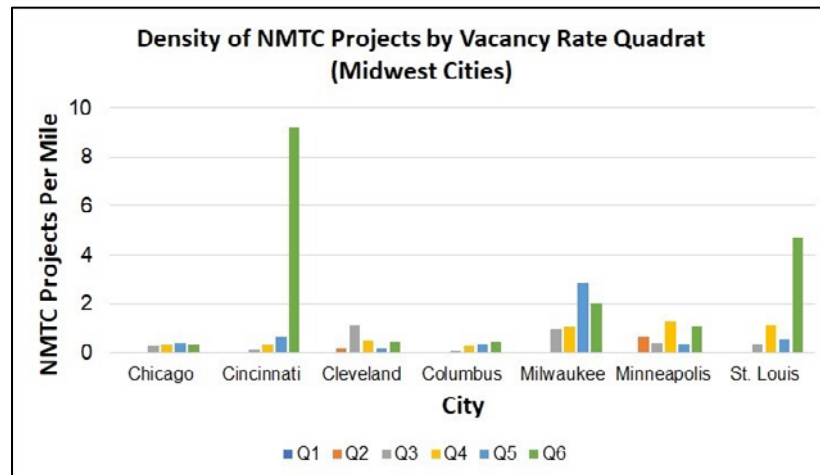
Figure 5: Midwest
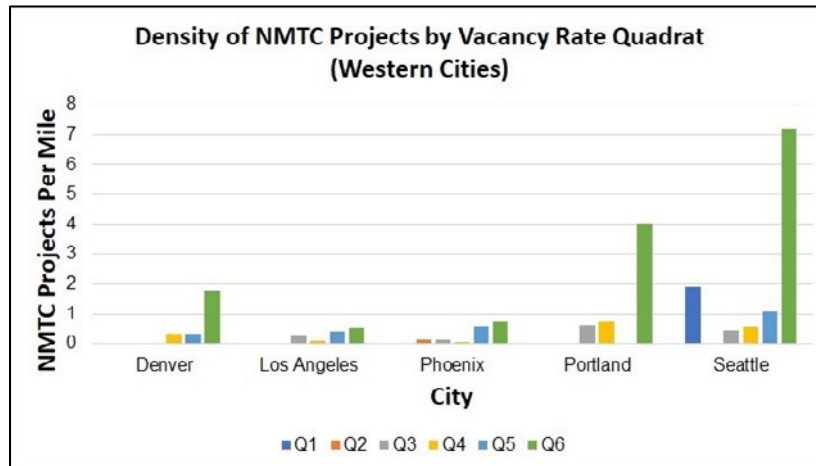
Figure 6: West
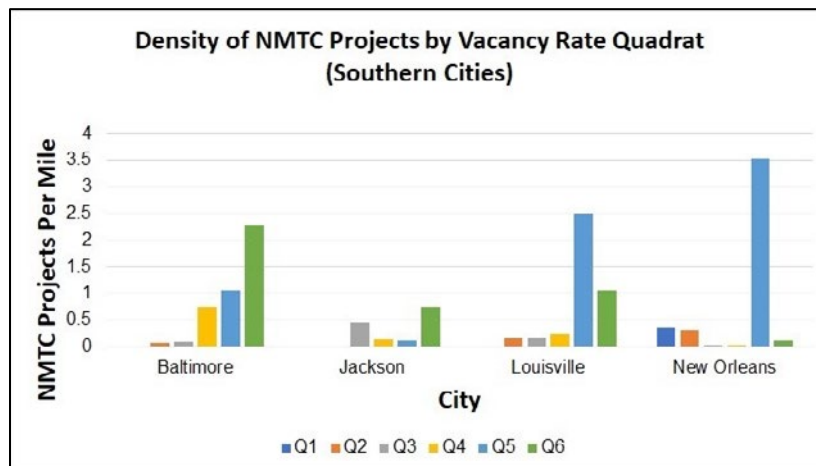
Figure 7: South

b. Point Density and Rent Increase

In most cities, project density is also highest in quadrats with the highest increase in gross median rent, providing further evidence that NMTC projects are most likely to be located in areas that may be experiencing gentrification. In all but six cities (Boston, Chicago, Louisville, Milwaukee, Phoenix and New York), the density of NMTC projects was highest in Quadrat 5 or Quadrat 6, where rent increases were highest. Table 3 shows the density of NMTC projects per quadrat for each city studied. Figures 8 and 9 visualize the results for each region using bar charts.

Northeast	Q1	Q2	Q3	Q4	Q5	Q6
Boston	0.000	1.246	0.977	1.242	1.103	0.000
New York	2.550	0.080	0.465	0.736	1.944	1.346
Philadelphia	0.000	0.129	0.097	0.409	0.445	1.839
Pittsburgh	0.000	0.000	0.242	1.364	1.251	1.728
Midwest	Q1	Q2	Q3	Q4	Q5	Q6
Chicago	0.000	0.127	0.367	0.257	0.000	0.000
Cincinnati	1.019	0.199	0.076	0.341	0.518	9.865
Cleveland	0.000	0.607	0.449	0.557	0.952	2.744
Columbus	0.000	0.050	0.112	0.128	0.348	1.517
Milwaukee	3.355	1.659	1.139	0.630	1.697	2.011
Minneapolis	0.000	0.000	0.573	0.536	2.281	0.000
St. Louis	0.000	0.111	0.249	0.724	1.145	5.285
South	Q1	Q2	Q3	Q4	Q5	Q6
Baltimore	0.000	0.000	0.347	0.838	2.031	0.000
Jackson	0.000	0.067	0.219	0.057	0.000	2.660
Louisville	0.000	0.000	0.861	0.048	0.000	0.000
New Orleans	0.176	0.206	0.006	0.177	0.660	1.911
West	Q1	Q2	Q3	Q4	Q5	Q6
Denver	0.264	0.092	0.191	0.155	0.575	0.645
Los Angeles	0.000	0.000	0.042	0.240	0.523	0.359
Phoenix	0.000	0.115	0.220	2.951	0.000	0.000
Portland	0.000	0.597	0.117	0.266	4.912	7.646
Seattle	0.000	0.111	0.249	0.724	1.145	5.285

Table 3: NMTC Project Density (in Number of Projects Per Square Mile)
by Rent Change Quadrat (percent change, 2010–2017)*

*Quadrats 1–6 reflect subregions of NMTC-eligible census tracts defined with reference to census tract change in gross median income (2010–2017). Areas in Quadrat 1 had the lowest increase in gross median rent (or a decrease in gross median rent) during the period between the 2010 five-year American Community Survey (2006–2010 average values) and the 2017 five-year American Community Survey (2013–2017 average values), and areas in Quadrat 6 experienced the highest increases in gross median rent during the same period.

Figure 8 shows that in the Northeast cities studied, the point density of NMTC projects was highest in rent change rate Quadrat 6 in both Philadelphia and Pittsburgh. In these cities, the point density was highest where rent increases were also highest. In contrast, in Boston and New York, point density was highest in Quadrat 2 and Quadrat 1, respectively. In these cities, point density was highest in parts of the cities where rents were increasing most slowly (or, in some cases, declining). However, it is worth noting that in Boston, the NMTCs were relatively evenly distributed across rent change Quadrats 2–5, and in New York, the second and third highest point densities were found in Quadrats 5 and 6. These patterns suggest that projects are not clustered in the lowest quadrats of either city.

Figure 9 shows that in the Midwest cities studied, the point density of NMTC projects was highest in rent change rate Quadrat 6 in Cincinnati, Cleveland, Columbus, and St. Louis. Point density was highest in rent change Quadrat 5 in Minneapolis. In each of these cities, the spatial patterns suggest that projects cluster in areas where rent is increasing. In contrast, in Chicago, no projects were located in either of Quadrats 5 or 6, and point density was highest in Quadrat 3. This suggests that projects do not cluster in areas where rent is increasing in Chicago. In Milwaukee, point density was highest in Quadrat 1, but it was second highest in Quadrat 6, and no clear pattern is evident.

Figure 10 shows that in the Southern cities studied, the point density of NMTC projects was highest in rent change rate Quadrat 6 in Jackson and New Orleans. Point density was highest in rent change Quadrat 5 in Baltimore. In each of these cities, the NMTC investment has clustered in areas where rent is increasing. In Louisville, no projects were located in either of Quadrats 5 or 6. In that city, point density was highest in Quadrat 3, where the rate of rent increase was within one standard deviation below the mean. This suggests that projects do not cluster in areas where rent is increasing in Louisville.

Figure 11 shows that in the Western cities studied, the point density of NMTC projects was highest in rent change rate Quadrat 6 in Denver, Portland, and Seattle. Point density was highest in rent change Quadrat 5 in Los Angeles. In Phoenix, no projects were located in Quadrats 5 or 6. However, the point density in Phoenix was significantly higher in Quadrat 4, where rent increases were within one standard deviation above the mean, than in any of the lower quadrats. This suggests that projects did cluster in parts of the city with higher-than-average rent increases but not in areas with the *highest* rent increases during the period.

Figures 8-11: Density of NMTC projects (in number of projects per mile) by rent change rate quadrat (2010–2017) (Q1 = Lowest; Q6 = Highest)
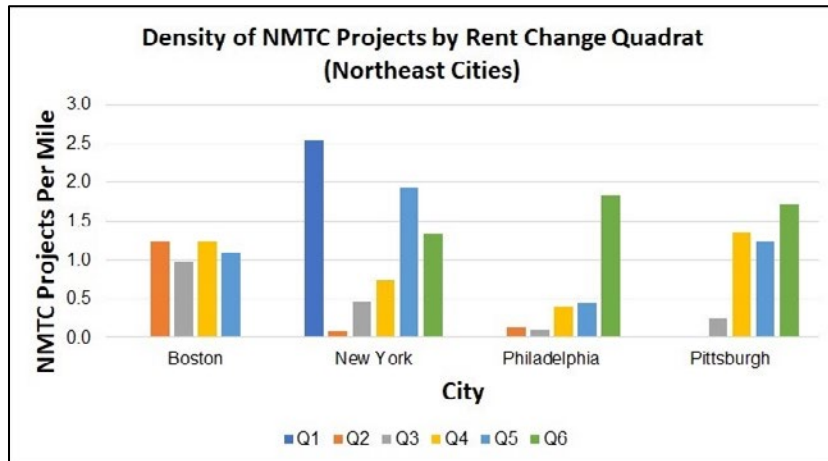
Figure 8: Northeast
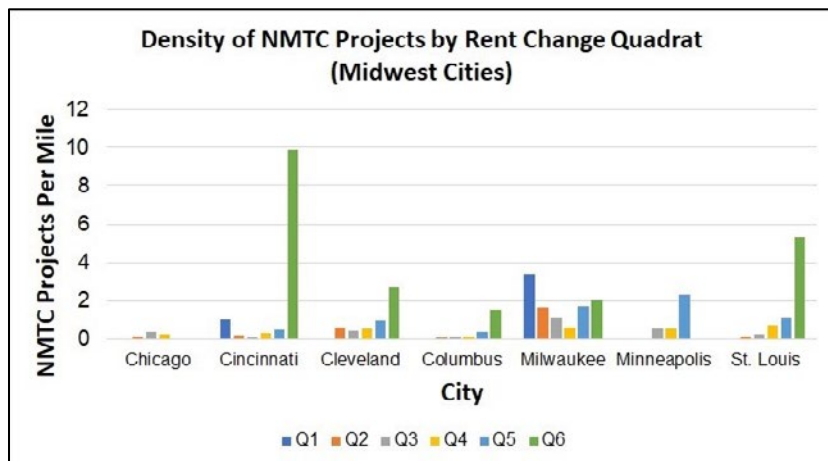
Figure 9: Midwest
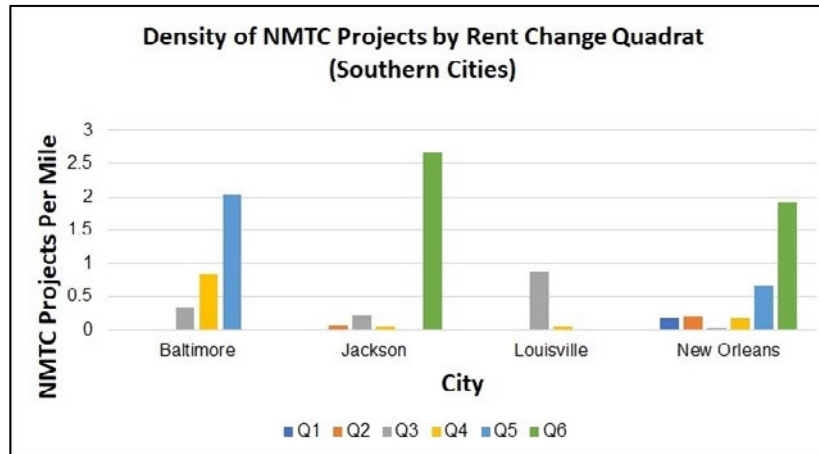
Figure 10: South
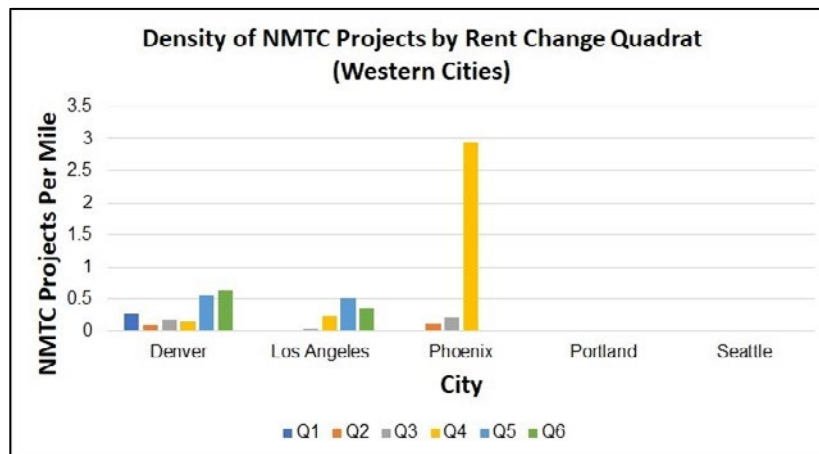
Figure 11: West

D. Negative Binomial Regression Analysis

1. Model

The quadrat density analyses above are useful to describe relative point distributions across subregions, but they may not provide a reliable indication of how they relate to the explanatory variables studied. For example, it can tell us that in Philadelphia, NMTC projects appear to be clustered in parts of the city where rent is increasing the most. However, it cannot tell us how *much* the count of NMTC projects increases as a function of increasing rent. For this, a negative binomial regression analysis was used to model the relationship between project frequency and the vacancy rate and rent change variables. This analysis describes the strength

of the relationship between project frequency and key indicators of gentrification, including vacancy rates and rent increases. Specifically, the results of the analyses provide information about how much the observed count of projects has increased with each unit change in vacancy rate or rent increase.

Count data, like the project count data analyzed in this study, is often modeled using the Poisson point process model.[163] In its most fundamental form, the Poisson point process describes a random benchmark against which point patterns, such as the count of items within a given area, can be compared.[164] Specifically, a Poisson distribution assumes that the probability of an observed outcome (e.g., the count of NMTC allocations in a census tract) can be expressed as follows:

$$\text{Prob}(Y_i = y_i | x_i) = \frac{e^{-\lambda_i} \lambda_i^{y_i}}{y_i!} \qquad (1)$$

where "Y_i is the random variable representing a count, y_i is a particular count value (e.g., 3), λ_i is the sole parameter representing the expected value of the count, and $i = 1, 2, \ldots N$ indexes the N cases."[165]

The Poisson point process has been used to develop various models to define point patterns, including a model to describe "*changes* in point density as a function of a covariate."[166] For example, the Poisson process model has been used to model the frequency of gun violence relative to segregation and poverty rates.[167] Here, a version of the Poisson point process model can be used to describe how frequently NMTC projects occur in census tracts with attributes associated with gentrification (e.g., vacancy rate, rent change). When, as here, the objective is to capture "systematic variation in λ_i, the value of λ_i is most commonly placed within a loglinear model."[168] The basic model has been expressed as follows[169]:

$$\ln(\lambda) = \sum_{i=0}^{K} \beta_k x_k \qquad (2)$$

163.   Andreas Lindén & Samu Mäntyniemi, *Using the Negative Binomial Distribution to Model Overdispersion in Ecological Count Data*, 92 ECOLOGY 1414 (2011).

164.   López De La Cruz & Gutiérrez, *supra* note 160.

165.   Richard Berk & John M. MacDonald, *Overdispersion and Poisson Regression*, 24 J. QUANTITATIVE CRIMINOLOGY 269, 277 (2008).

166.   GIMOND, *supra* note 159.

167.   *See* David A. Larsen, Sandra Lane, Timothy Jennings-Bey, Arnett Haygood-El, Kim Brundage & Robert A. Rubinstein, *Spatio-Temporal Patterns of Gun Violence in Syracuse, New York 2009-2015*, PLOS ONE (Mar 20, 2017), https://doi.org/10.1371/journal.pone.0173001 [https://perma.cc/EZ6H-ZDD5].

168.   Berk & MacDonald, *supra* note 165. A traditional linear regression is disfavored for modeling counts since count values cannot drop below zero, but linear models often predict negative values.

169.   Jeffrey Fagan, Garth Davies & Adam Carlis, *Race and Selective Enforcement in Public Housing*, 9 J. EMPIRICAL LEGAL STUD. 697, 708 (2012).

where $\ln(\lambda)$ is the natural logarithm of the expected count of NMTC projects in a given location. This value, which is sometimes referred to as "point intensity,"[170] is expressed relative to "a vector of explanatory variables, x_k and their associated regression coefficients, β_k."[171] The equation describes a point pattern as a loglinear function of the underlying covariates, whereby "intensity is exponentially increasing or decreasing as a function of the covariate."[172]

However, the NMTC data used for this study does not meet a key assumption of the general Poisson point process model, which requires that "the residual variance be equal to the fitted values, λ."[173] A preliminary analysis of the sample data showed that, in most cities, the residual variance significantly exceeds the mean. This result, which is referred to as "overdispersion," violates the assumption required by the Poisson process model.[174] Overdispersion is likely when there are potentially important variables that are not captured by the model or when error exists in the estimates of variables that are considered.[175] In this case, there are variables that would be nearly impossible to capture, such as variations in nontax legal frameworks or political dynamics that may affect investment decisions.

For this reason, this analysis employs a common method for addressing overdispersion, which is "to specify that the probability of the observed outcome, y, follows a negative binomial distribution."[176] The resulting model is a negative binomial regression model, which has been shown to fit data better than other models when counts are infrequent, as they are in the case of NMTC allocations. The resulting model is a negative binomial regression model, which has been shown to fit data better than other models when counts are infrequent, as they are in the case of NMTC allocations.[177] The negative binomial regression is a version of the Poisson process model that includes the negative binomial distribution parameter. The negative binomial distribution has been expressed as:

$$\text{Probability}(Y = y|\ \lambda,\ \alpha) = \frac{\Gamma(y+\alpha^{-1})}{y!\Gamma(\alpha^{-1})}\left[\frac{\alpha^{-1}}{\alpha^{-1}+\lambda}\right]^{\alpha^{-1}}\left[\frac{\lambda}{\alpha^{-1}+\lambda}\right]^{y} \qquad (3)$$

where "Γ is the gamma function, λ is the mean or expected value of the distribution, and α is the overdispersion parameter."[178]

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170. GIMOND, *supra* note 159.
171. Fagan et al., *supra* note 169, at 708.
172. GIMOND, *supra* note 159.
173. Fagan et al., *supra* note 169, at 708.
174. *Id.*
175. Haibin Liu, Rachel A. Davidson, David V. Rosowsky & Jery R. Stedinger, *Negative Binomial Regression of Electric Power Outages in Hurricanes*, 11 J. INFRASTRUCTURE SYS. 258, 262 (2005).
176. Fagan et al., *supra* note 169, at 708.
177. *See* Kevin M. Swartout, Martie P. Thompson, Mary P. Koss & Nan Su, *What Is the Best Way to Analyze Less Frequent Forms of Violence? The Case of Sexual Aggression*, 5 PSYCH. VIOLENCE 305 (2015).
178. Fagan et al., *supra* note 169, at 708.

In addition, variability in census tract population is accounted for through use of an exposure variable, or offset, that reflects the number of households per census tract. Use of the exposure variable enables an analysis of rates instead of counts.[179] To this end, equation (2) is modified by adding *n* to the denominator

$$\ln\left(\frac{\lambda}{n}\right) = \sum_{i=0}^{K} \beta_k x_k \qquad (4)$$

where "the exposure variable, ln(*n*), is assigned a fixed coefficient of 1, and the negative binomial regression is transformed into an analysis of rates."[180] In this case, the exposure variable is the natural logarithm of the number of households per census tracts.

I use the spatstat package in R to fit the negative binomial regression model to the data.[181] In addition to the two variables of interest—census tract vacancy rates (2010) and the percent change in gross median rent (2010–2017)—the model includes four additional variables that may influence NMTC project citing patterns. The additional variables include census tract median gross income (2010), census tract Black population (2010), the change in census tract white population (2010–2017), and the change in census tract median gross income (2010–2017). These variables are potentially relevant since resident demographics may constitute alternate drivers for investment decisions in addition to the economic variables studied here. The purpose of this analysis is to produce regression estimates of the relative strength of vacancy rates and rent change, controlling for possible effects of race and income.

2. Results

As this Subsection will explain, the negative binomial regression analysis provides further evidence that vacancy rates and rent change are predictive of NMTC allocation patterns in many cities. In over half of the cities studied (thirteen of twenty), vacancy rate or rent change was the largest statistically significant predictor of NMTC allocations. Rent change was the strongest statistically significant predictor in seven cities: Cleveland, Columbus, Jackson, New Orleans, New York, Philadelphia, and Phoenix. Vacancy rate was the strongest statistically significant predictor in six cities: Baltimore, Cincinnati, Denver, Los Angeles, Louisville, and St. Louis.

In negative binomial regressions, as in general Poisson point process models, coefficients reflect the amount by which the logs of expected project counts are expected to change with every unit change in the explanatory variable.[182] For this

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179.   Fagan et al., *supra* note 169, at 708.

180.   *Id.* at 709 (emphasis omitted).

181.   The R code for this step is available at https://uofi.box.com/s/gp6ndv02rw2f9rrf2idd66tnh2o0n9su [https://perma.cc/B4A5-GDLH].

182.   *Poisson Regression, Stata Annotated Output*, UCLA INST. DIGIT. RSCH. & EDUC., https://stats.idre.ucla.edu/stata/output/poisson-regression/#:~:text=We%20can%20interpret%20the%20

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reason, coefficients are typically interpreted by exponentiating the values, where $(\exp(b) - 1)*100$ = percent change in count per unit change in the explanatory variable.[183] For example, the rent change coefficient for New York City ($b = 1.764$) is interpreted as stating that, controlling for the other explanatory variables in the model, for every unit change in rent increase, the percent of NMTC allocations increases by $(e^{1.764} - 1)*100 = (5.836 - 1)*100 = 483.57\%$. This means that, in New York City, the density of NMTC allocations is exponentially increasing as a function of rent change. Tables 4–7 report the results of the negative binomial regression analysis for each region.

Poisson,the%20model%20are%20held%20constant [https://perma.cc/JZ7C-4DRP] (last visited Oct. 6, 2021).

183. Hao Wang, *Interpret Poisson Regression Coefficient*, HAO WANG, http://haowang.pw/blog/Poisson-Coefficient-Interpretation/ (last visited Jan. 11, 2021) [https://perma.cc/TRT2-4FW5]; PAUL ROBACK & JULIE LEGLER, BEYOND MULTIPLE LINEAR REGRESSION: APPLIED GENERALIZED LINEAR MODELS AND MULTILEVEL MODELS IN R ch. 4 (2021) (ebook), https://bookdown.org/roback/bookdown-bysh/ch-poissonreg.html [https://perma.cc/D9VD-UDN7].

	Northeast					
	Boston			New York		
Variable	*b*	SE	p	*b*	SE	p
Rent Change	-0.791	0.756		1.764	0.505	***
Vacancy Rate	0.037	0.034		0.063	0.020	***
Median Gross Income	<0.001	<0.001		<0.001	<0.001	**
Black Population	-0.002	0.007		0.005	0.005	
White Population Change	0.043	0.023	*	-0.005	0.012	
Median Income Change	<0.001	<0.001	*	<0.001	<0.001	
Chi-Square Test	*0.901*			*1*		

*p<0.1; **p<0.05; ***p<0.01

	Northeast (continued)					
	Philadelphia			Pittsburgh		
Variable	*b*	SE	p	*b*	SE	p
Rent Change	3.025	0.970	***	1.598	1.033	
Vacancy Rate	0.041	0.029		0.040	0.030	
Median Gross Income	<0.001	<0.001		<0.001	<0.001	
Black Population	-0.003	0.007		0.001	0.010	
White Population Change	0.028	0.024		0.037	0.029	
Median Income Change	<0.001	<0.001		<0.001	<0.001	
Chi-Square Test	*1*			*0.996*		

*p<0.1; **p<0.05; ***p<0.01

Table 4: Negative Binomial Regression of NMTC Allocations in
Northeast Cities by Census Tract Rent Change (2010–2017), Vacancy
Rate (2010), Median Gross Income (2010), Black Population (2010),
White Population Change (2010–2017), and Median Gross Income
Change (2010–2017)

Table 4 shows that in the Northeast cities, rent increase was the strongest statistically significant predictor of NMTC projects in two of the four cities, New York and Philadelphia. In New York, high vacancy rates were also a statistically significant predictor of NMTC projects. These results are consistent with the results of the quadrat density analysis, and they provide further evidence that NMTC investment in the Northeast has occurred in areas that exhibit signs of gentrification. However, in Boston, where the spatial patterns reflected in the quadrat analyses were less conclusive, the regression analysis showed no statistically significant relationships between project counts and rent change or vacancy rates. In that city, demographic characteristics were stronger predictors. Finally, no statistically significant predictors were observed in Pittsburgh. Reasons for this variation will be considered in Part III below.

| | Midwest | | | | | |
| | Chicago | | | Cincinnati | | |
Variable	b	SE	p	b	SE	p
Rent Change	-0.715	0.843		0.133	1.199	
Vacancy Rate	0.031	0.020		0.084	0.022	***
Median Gross Income	<0.001	<0.001	*	<0.001	<0.001	
Black Population	0.001	0.005		-0.010	0.011	
White Population Change	-0.004	0.017		0.030	0.024	
Median Income Change	<0.001	<0.001		<0.001	<0.001	
Chi-Square Test	*1*			*0.988*		

*p<0.1; **p<0.05; ***p<0.01

| | Midwest (continued) | | | | | |
| | Cleveland | | | Columbus | | |
Variable	b	SE	p	b	SE	p
Rent Change	2.133	1.065	**	1.471	0.770	*
Vacancy Rate	-0.008	0.026		0.071	0.021	***
Median Gross Income	<0.001	<0.001		<0.001	<0.001	
Black Population	<0.001	0.007		0.007	0.010	
White Population Change	0.006	0.026		0.073	0.029	**
Median Income Change	<0.001	<0.001		<0.001	<0.001	***
Chi-Square Test	*0.993*			*1*		

*p<0.1; **p<0.05; ***p<0.01

| | Midwest (continued) | | | | | |
| | Minneapolis | | | St. Louis | | |
Variable	b	SE	p	b	SE	p
Rent Change	0.856	1.556		0.102	0.927	
Vacancy Rate	0.030	0.040		0.035	0.019	*
Median Gross Income	<0.001	<0.001		<0.001	<0.001	
Black Population	0.024	0.019		0.008	0.008	
White Population Change	-0.005	0.028		-0.037	0.025	
Median Income Change	<0.001	<0.001		<0.001	<0.001	***
Chi-Square Test	*0.653*			*0.220*		

*p<0.1; **p<0.05; ***p<0.01

| | Midwest (continued) | | | |
| | Milwaukee | | | |
Explanatory Variable	b	SE	p	
Rent Change	0.049	1.766		
Vacancy Rate	0.026	0.032		
Median Gross Income	<0.001	<0.001		
Black Population	-0.006	0.007		

White Population Change	0.004	0.024
Median Income Change	<0.001	<0.001
Chi-Square Test	*0.869*	

   *$p<0.1$; **$p<0.05$; ***$p<0.01$

Table 5: Negative Binomial Regression of NMTC Allocations in Midwest
Cities by Census Tract Rent Change (2010–2017), Vacancy Rate (2010),
Median Gross Income (2010), Black Population (2010), White Population
Change (2010–2017), and Median Gross Income Change (2010–2017)

Table 5 shows that in the Midwest cities, rent increase was the strongest
statistically significant predictor of NMTC projects in two of the seven cities,
Cleveland and Columbus, both of which are located in Ohio. In addition, vacancy
rates were the strongest statistically significant predictor of NMTC projects in two
cities, Cincinnati and St. Louis. These results are consistent with the patterns
observed in the quadrat density analysis, and they provide further evidence that in
many Midwest cities, NMTC investment has flowed to areas that exhibit signs of
gentrification. However, in the remaining three cities—Chicago, Minneapolis, and
Milwaukee—no variable was a strong, statistically significant predictor of NMTC
project counts. Reasons for this variation will be explored in Part III.

| | South | | | | | |
| | Baltimore | | | Louisville | | |
Variable	b	SE	p	b	SE	p
Rent Change	-0.046	0.564		-2.242	1.980	
Vacancy Rate	0.085	0.018	***	0.104	0.052	**
Median Gross Income	<0.001	<0.001		<0.001	<0.001	
Black Population	-0.020	0.008	**	-0.020	0.016	
White Population Change	0.043	0.024	*	0.030	0.046	
Median Income Change	<0.001	<0.001		<0.001	<0.001	
Chi-Square Test	*1*			*0.974*		

***p<0.01; **p<0.05, *p<0.1

| | South (continued) | | | | | |
| | New Orleans | | | Jackson | | |
Variable	b	SE	p	b	SE	p
Rent Change	1.304	0.658	**	5.728	2.658	**
Vacancy Rate	0.039	0.020	*	0.083	0.055	
Median Gross Income	<0.001	<0.001		<0.001	<0.001	
Black Population	0.003	0.010		-0.003	0.030	
White Population Change	0.022	0.019		0.032	0.077	
Median Income Change	<0.001	<0.001		<0.001	<0.001	
Chi-Square Test	*0.451*			*0.241*		

***p<0.01; **p<0.05, *p<0.1

Table 6: Negative Binomial Regression of NMTC Allocations in Southern Cities by Census Tract Rent Change (2010–2017), Vacancy Rate (2010), Median Gross Income (2010), Black Population (2010), White Population Change (2010–2017), and Median Gross Income Change (2010–2017)

Table 6 shows that in the four Southern cities studied, rent increase was the strongest statistically significant predictor of NMTC projects in two cities, New Orleans and Jackson. In the other two cities, Baltimore and Louisville, vacancy rate was the strongest statistically significant predictor. These results are consistent with the patterns observed in the quadrat density analysis, and they provide further evidence that in the South, NMTC investment has flowed to areas that exhibit signs of gentrification.

	West					
	Denver			Los Angeles		
Variable	*b*	SE	p	*b*	SE	p
Rent Change	1.230	1.054		-0.097	0.582	
Vacancy Rate	0.171	0.046	***	0.056	0.032	*
Median Gross Income	<0.001	<0.001		<0.001	<0.001	
Black Population	-0.019	0.016		0.007	0.008	
White Population Change	0.031	0.016	**	-0.007	0.010	
Median Income Change	<0.001	<0.001		<0.001	<0.001	
Chi-Square Test	*1*			*1*		

*p<0.1; **p<0.05; ***p<0.01

	West (continued)					
	Phoenix			Portland		
Variable	*b*	SE	p	*b*	SE	p
Rent Change	2.220	0.803	***	0.695	1.103	
Vacancy Rate	0.078	0.032	**	0.061	0.050	
Median Gross Income	<0.001	<0.001		<0.001	<0.001	
Black Population	0.038	0.030		0.117	0.035	***
White Population Change	-0.022	0.017		-0.059	0.034	*
Median Income Change	<0.001	<0.001		<0.001	<0.001	***
Chi-Square Test	*0.993*			*0.604*		

*p<0.1; **p<0.05; ***p<0.01

	West (continued)				
	Seattle				
Variable	*b*	SE	p		
Rent Change	1.681	1.051			
Vacancy Rate	0.035	0.065			
Median Gross Income	<0.001	<0.001			
Black Population	0.005	0.035			
White Population Change	0.016	0.039			
Median Income Change	<0.001	<0.001			
Chi-Square Test	*0.004*				

*p<0.1; **p<0.05; ***p<0.01

Table 7: Negative Binomial Regression of NMTC Allocations in Western
Cities by Census Tract Rent Change (2010–2017), Vacancy Rate (2010),
Median Gross Income (2010), Black Population (2010), White Population
Change (2010–2017), and Median Gross Income Change (2010–2017)

Table 7 shows that in the five Western cities studied, vacancy rates were the
strongest statistically significant predictor of NMTC projects in two cities, Denver

and Los Angeles. In a third city, Phoenix, rent change was the strongest statistically significant predictor. These results, which are consistent with the quadrat density analyses, provide further evidence that in many Western cities, NMTC investment has flowed to areas that exhibit signs of gentrification. However, in two Northwest cities, Portland and Seattle, neither vacancy rates nor rent increase were statistically significant predictors of NMTC projects. In Portland, higher Black populations were predictive of NMTC investment. No variable was a statistically significant predictor of NMTC investment in Seattle. The implications of this cross-city variation will be explored in Part III.

Notably, the demographic variables studied (median gross income, Black population, white population change, and change in median gross income) were not significantly correlated to increasing NMTC project density in most cities. With the exception of Baltimore and Portland, where the percentage of Black residents had a small but statistically significant positive correlation with project density, the percentage of Black residents was not a significant predictor of NMTC projects. This result may reflect the fact that eligible census tracts have relatively similar racial demographics, particularly in segregated cities.

In addition, the change in white population was not a statistically significant variable in fifteen of the twenty cities studied. The exceptions included four cities—Boston, Baltimore, Columbus, and Denver—where an increase in white population was a statistically significant predictor of NMTC allocations.[184] In contrast, in one city—Portland—project counts had a statistically significant negative correlation with change in white population, suggesting that the frequency of NMTC allocations declined as white population increased. In that city, the strongest statistically significant predictor of allocations was the 2010 Black population.

Though these findings may appear to contradict this Article's conclusions that NMTC project allocations have flowed to areas that exhibit signs of gentrification, it is worth noting that demographic change is often excluded from gentrification models since it is an unreliable indicator of the gentrification process.[185] Hammel and Wyly note that "changes in racial composition do not appear to be applicable for the majority of gentrified neighborhoods" and "racial change is not an essential feature of the gentrification process."[186]

Perhaps more surprisingly, neither 2010 median gross income nor the change in median gross income from 2010–2017 appears to play a meaningful role in NMTC allocation patterns. Once again, at first blush, this result appears inconsistent with the larger prediction that NMTC allocations may cluster in areas

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184.   In Boston, the increase in white population was a stronger predictor of NMTC allocations in Boston than either vacancy rates or rent change. In Baltimore, Columbus, and Denver, where vacancy rates and/or rent change were significant predictors, an increase in white population was also a significant predictor of NMTC allocations.

185.   *See, e.g.*, Hammel & Wyly, *supra* note 32, at 256.

186.   *Id.*

experiencing gentrification. However, it is also possible that relevant changes in income are not captured in the sample due to the time period studied. Another possibility is that market conditions, such as the availability of undervalued vacant properties, are more salient and relevant to investment decisions than demographic characteristics.

III. TAX POLICY IMPLICATIONS

This study provides evidence that, in many cities, federal NMTC subsidies have flowed disproportionately to eligible census tracts that exhibit signs of gentrification: high vacancy rates and increasing rent. The quadrat density analysis revealed that, in most cities, NMTC project density was highest in parts of the city that had high vacancy rates, increasing rents, or both. The results of the negative binomial regression analysis confirmed that, in many cities, high vacancy rates or rent increases were statistically significant predictors of NMTC investment. Together, these results provide new evidence that gentrifying census tracts may draw tax-subsidized investment away from other eligible areas.

These findings have important implications for the federal NMTC program, which was recently expanded by the Consolidated Appropriations Act to authorize five billion dollars of tax credit allocations per year from 2020 to 2025.[187] As this Section will explain, the finding that NMTC investment has flowed to areas that exhibit signs of gentrification suggests that the law may be operating inefficiently in many cities. In addition, these findings suggest that the law may produce inequitable outcomes despite its stated purpose to benefit low-income communities. Finally, the findings raise important questions about how the federal tax incentive is administered.

Furthermore, these efficiency, equity, and administration implications are not limited to the NMTC program. First, the critiques raised here are also relevant to state-level NMTC programs, most of which use the federal NMTC as a model for similar tax credit programs administered at the state level. In other words, if the federal NMTC incentive is inefficient, inequitable, and poorly administered, many state-level NMTC programs will suffer from the same problems. Second, these findings are relevant to predict and evaluate the new Opportunity Zones law. As explained above, gentrifying census tracts are among the designated opportunity zones in many cities. Critics fear that those gentrifying tracts will draw investment away from other eligible census tracts, and this study provides evidence to support that prediction.

Before discussing the implications, two points are worth noting. First, this study's findings are somewhat surprising in the context of the NMTC, which includes safeguards that one might expect to reduce the frequency of investment in gentrifying areas. Other place-based tax incentives, including the Opportunity

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187. Consolidated Appropriations Act, 2021, H.R. 133, 116th Cong. § 112 (2020); I.R.C. § 45D(f)(1)(H).

Zones law, lack such safeguards and include incentives that may make investment in gentrifying areas particularly attractive. All place-based tax incentives should be examined and, if necessary, reformed to ensure that they contain features to reduce the likelihood that the subsidies will flow to gentrifying areas. Failure to do so may have devastating consequences for low-income communities given the large size of the program.

Second, this study's findings suggest that resident demographics do not consistently predict NMTC investment patterns, even as other indicators of gentrification—high vacancy rates and rent increases—do predict NMTC investment. This is an important finding because it suggests that a myopic focus on race and income demographics as criteria to evaluate tax incentive investment patterns may be misplaced. When assessing outcomes of place-based tax incentives, researchers and policymakers should pay close attention to economic indicators of gentrification, such as those used in this study. Failure to do so may produce overly optimistic evaluations of tax incentive programs that are, in fact, inefficiently and inequitably flowing to gentrifying areas.

With these two big-picture points in mind, this Part begins by explaining the efficiency, equity, and administrative implications of this study for federal and state NMTC programs. Next, it explores the further implications of this study for the Opportunity Zones program and other place-based tax incentive programs.

A. Implications for the New Markets Tax Credit

This study has provided evidence that NMTC investors have chosen to invest in locations that exhibit signs of gentrification. As this Section will explain, these findings have important efficiency, equity, and administrative implications for the NMTC. First, these findings suggest that NMTC inefficiently subsidizes inframarginal investment and that it inefficiently subsidizes investment in areas where investment is already taking place. Second, these findings suggest that the NMTC may reduce vertical equity within the tax system without increasing equitable outcomes outside the tax system. Third, these findings suggest that the CDFI Fund, which administers the NMTC program, has failed to consistently direct allocations to the most distressed neighborhoods.

1. Efficiency of the NMTC

This study's findings suggest that the NMTC may be an inefficient subsidy in at least two respects. First, disproportionate investment in gentrifying areas may reflect investment decisions driven by market conditions and profit potential. While public investment almost certainly plays a role in initiating and accelerating gentrification,[188] many gentrifying investments are market driven.[189] When capital begins to flow to places with high profit potential—a precondition for

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188.   *See* Zuk et al., *supra* note 23.
189.   Smith, *supra* note 117.

gentrification[190]—economies-of-scale and agglomeration economies may generate an additional "locational dynamic in which new production tends to be drawn to existing production locations."[191] In other words, market dynamics in gentrifying areas may be attractive to investors even without tax subsidies.

Accordingly, the spatial patterns described in this Article may reflect investments driven primarily by market conditions. If this explanation is correct, this would suggest that a meaningful amount of federal NMTC program costs subsidize inframarginal investment that would have occurred without the incentive.[192] The purpose of place-based tax incentives like the NMTC is to promote investment in places where it would not have occurred without a subsidy.[193]

Subsidizing activity that would have occurred without the incentive is inefficient and contrary to sound tax policy at both federal and state levels.[194] When a tax incentive "rewards a producer for production in which he would have engaged anyway . . . the government has acted inefficiently by giving up revenue without inducing more activity."[195] In the context of the NMTC, such inefficiencies are not limited to the federal law. Thirteen state governments supplement the federal incentive with state-level NMTC programs, and two states (California and Minnesota) have proposed NMTC legislation.[196] Under some state NMTC laws, Community Development Entities (CDEs) are eligible for the tax credits only after entering into an allocation agreement with the CDFI Fund.[197] As a result, federal NMTC allocations that subsidize inframarginal investment may have the downstream effect of introducing inefficiencies to state-level incentive programs.

Second, these findings suggest that the NMTC is inefficient because it fails to target places that are likely to produce the greatest public benefit. Place-based tax incentives like the NMTC can be justified as policies that improve places for the benefit of low-income residents.[198] However, if a place is already in the process of improving, then a public subsidy is not necessary. The NMTC statute refers to equity investments for "targeted populations" within "low-income communities,"[199] but not all low-income neighborhoods have equal need for place-based subsidies.

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190.   *Id.*
191.   DAVID HARVEY, SPACES OF GLOBAL CAPITALISM: A THEORY OF UNEVEN GEOGRAPHIC DEVELOPMENT (2006).
192.   *See* Zuk et al., *supra* note 23.
193.   *See id.*
194.   *See id.*
195.   Edward A. Zelinsky, *Efficiency and Income Taxes: The Rehabilitation of Tax Incentives*, 64 TEX. L. REV. 973, 992 (1985).
196.   *State NMTC Programs*, *supra* note 29.
197.   *See, e.g.*, 20 ILL. COMP. STAT. 663/5 (2008) (defining "qualified community development entity").
198.   *See generally* Layser, *supra* note 43 (explaining that ideally, place-based tax incentives would improve places for the benefit of residents who live there).
199.   I.R.C. § 45D(e)(2).

Gentrifying neighborhoods do not need public subsidies because they are already in transition. Therefore, to the extent that NMTC subsidies have disproportionately benefited gentrifying neighborhoods, the law has failed to promote neighborhood improvements that are not otherwise taking place. This problem is distinct from the question of whether a particular *project* would have proceeded but for the subsidy. Even marginal investment may be wasteful if there is no justification for subsidizing new investment in a particular *place*.

A more efficient law would narrowly target neighborhoods with a specific need for place-based investment. The appropriate target for place-based investment depends on the specific objective of the law.[200] However, at a minimum, the geographic scope of a development incentive should exclude places that are already in the process of gentrification. To be sure, this guideline presents challenges for lawmakers, particularly on the federal level.

Defining and identifying gentrifying areas has long eluded academics. The difficulty "stems not only from the complexity of the process, but also from the difficulty of observing and measuring the phenomenon."[201] For this reason, many scholars "eschew census data in favor of intensive field surveys or other qualitative methods to document inner-city reinvestment."[202] However, on the federal level, field studies are not a practical basis for legislating the geographic scope of an incentive.

Nevertheless, census data can be used as an imperfect proxy. For example, a statute may exclude census tracts where rent is increasing more quickly than the city average. In the case of tax incentives like the NMTC, which are administered through a competitive application process, the application procedures may include an inquiry into the income and rent trajectory of proposed project sites. Proposals for projects in neighborhoods that exhibit signs of gentrification should be rejected. Such procedures would reduce the likelihood that the tax incentives subsidize investments in neighborhoods that do not need them.

2. Equity Impact of the NMTC

The fact that the NMTC has disproportionately flowed to gentrifying neighborhoods also suggests that the NMTC may have inequitable outcomes. As this section will explain, the inequity derives from two sources. First, the NMTC violates vertical equity principles by providing tax preferences to high-income taxpayers, thereby undermining progressivity within the tax system. Second, the incentive probably does not deliver sufficient nontax benefits to low-income taxpayers to offset the "cost" of lost vertical equity within the tax system.

Tax incentives like the NMTC reduce vertical equity by lowering the tax burden on high-income taxpayers without providing comparable relief to

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200.   Layser, *supra* note 18.
201.   Hammel & Wyly, *supra* note 32, at 248.
202.   *Id.*

lower-income taxpayers. In tax theory, vertical equity is the principle that tax burdens should be distributed according to their ability to pay.[203] In other words, to maintain vertical equity, higher-income taxpayers must pay more in taxes than lower-income taxpayers. Place-based incentives like the NMTC provide tax relief to high-income taxpayers—individuals or institutional—in order to induce them to direct their own capital toward redevelopment efforts. For this reason, place-based tax incentives like the NMTC apparently violate the vertical equity principle.[204]

However, what is lost in vertical equity within the tax system may be justified if these tax laws advance economic and social equity *outside* the tax system. One early commenter stated that Congress intended each party of an NMTC transaction to serve "as a mere conduit to the delivery of equity capital to existing low-income community residents."[205] To the extent that the taxpayers who claim the tax credits on their tax returns do, in fact, serve as mere conduits to pass benefits along to low-income residents, the incidence of the tax benefit may fall on low-income taxpayers. Incidence refers to the person or persons who are "actually made better off on account of the tax provision."[206] If the incidence of the NMTC falls entirely on low-income taxpayers, then a distributional analysis focused on who claims the benefit on their tax returns will be misleading.[207]

There is no theoretical or practical reason to think that *all* of the benefits of the NMTC program should flow to low-income residents. Rather, there is strong evidence that industry participants capture a share of the benefits.[208] Indeed, without a real economic benefit to these parties, there would be little reason for them to participate in NMTC transactions, and the entire incentive program would fail. An open question is *how much* benefit do low-income residents derive from the NMTC program, and does it outweigh the loss of vertical equity? If the answer is "not much," then the incentives may be mere "giveaways to rent-seeking special interests and bad federal policy."[209]

While this study cannot answer the question of how much the NMTC benefits low-income residents, it does provide evidence that the subsidy flows to communities that are experiencing gentrification. This raises at least two equity-related questions. The first is whether low-income residents benefit from the gentrification process—a topic of much debate in the literature. If low-income residents do not benefit from the gentrification process (or worse, if they are harmed by it) then tax incentives that disproportionately flow to gentrifying

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203.   Walter J. Blum & Harry Kalven Jr., *The Uneasy Case for Progressive Taxation*, 19 U. CHI. L. REV. 417 (1952).

204.   Alice G. Abreu, *Taxes, Power, and Personal Autonomy*, 33 SAN DIEGO L. REV. 1 (1996).

205.   Groves, *supra* note 73, at 221.

206.   Linda Sugin, *Tax Expenditures, Reform, and Distributive Justice*, 3 COLUM. J. TAX L. 1, 19 (2011).

207.   *Id.*

208.   Michael Eickhoff & Steve Carter, *Accessing Capital Through the New Markets Tax Credit Program*, J. STATE TAX'N, Jan.–Feb. 2011, at 17.

209.   Sugin, *supra* note 206, at 6.

neighborhoods may produce inequitable outcomes, particularly if they contribute to or accelerate the gentrification process.

It is possible that gentrification provides economic, political, and social benefits to low-income residents.[210] Such benefits may include "expanding employment opportunities," improved "shopping for low-income people," the creation of "an urban political fora in which affluent and poor citizens must deal with each other's priorities in a democratic process," and reduced social isolation of low-income African Americans.[211] If true, then tax incentives that contribute to the gentrification process may advance economic, socioeconomic, and racial equality. These equality gains outside the tax system would potentially justify the loss in vertical tax equity.

However, it is also possible that these benefits to low-income residents who remain in gentrifying neighborhoods may be outweighed by harm to those who are displaced. Gentrification research is inconclusive as to whether the gentrification process results in widespread displacement.[212] On the one hand, the research "consistently shows that rent appreciation predicts displacement" and that "out-movers are more likely to be renters, poorer, and people of color than in-movers."[213] On the other hand, researchers have also found that "[a]lthough displacement was significantly related to gentrification, the substantive size of this relationship is very small" and "poor renters do not appear to be especially susceptible to displacement."[214]

In fact, the apparent stability of gentrifying neighborhoods may be independent evidence that low-income residents *do* benefit from neighborhood improvement. As mentioned previously, some researchers have proposed that the unexpected stability may reflect the fact that "the normal neighborhood turnover process slows in neighborhood that are gaining new amenities."[215] Others have echoed this hypothesis, stating that "[t]he most plausible explanation for this surprising finding is that gentrification brings with it neighborhood improvements that are valued by disadvantaged households, and they consequently make greater efforts to remain in their dwelling units, even if the proportion of their income devoted to rent rises."[216]

On the other hand, the inconclusive evidence of displacement may simply reflect methodological challenges associated with gentrification research. Researchers have long noted that tracking displacement is "a massive undertaking

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210.   J. Peter Byrne, *Two Cheers for Gentrification*, 46 HOW. L.J. 405 (2003).

211.   *Id.* at 419–22. Byrne's essay and others like it drew sharp criticism from scholars who objected to a general turn in the gentrification literature that downplayed the potential for gentrification to harm low-income residents through displacement. *See also* Tom Slater, *The Eviction of Critical Perspectives from Gentrification Research*, 30 INT'L J. URB. REG'L RSCH. 737 (2006).

212.   Zuk et al., *supra* note 23, at 37.

213.   *Id.*

214.   Freeman, *supra* note 30, at 480.

215.   Zuk et al., *supra* note 23, at 37.

216.   Freeman & Braconi, *supra* note 131, at 51.

. . . if indeed it [is] possible at all."[217] Others have echoed this sentiment, observing that "it is difficult to find people who have been displaced, particularly if those people are poor."[218] Compounding this problem, "quantitative analyses have systematically failed to characterize the various stages of gentrification," thereby leaving out "the potential for gentrification-related displacement to precede gentrification, especially when property owners attempt to vacate units in anticipation of rising rents and neighborhood change."[219]

Given the uncertainty, it is difficult to evaluate whether tax incentives that flow to gentrifying areas promote equality outside the tax system, thereby justifying the reduction in vertical tax equity. However, a second equity consideration is more easily analyzed. Even if we *assume* that gentrification benefits low-income residents, the equity gains associated with accelerating gentrification probably are not greater than the potential equity gains associated with improving distressed neighborhoods that are otherwise declining or stagnant. Arguably, residents of a non-gentrifying neighborhood have more to gain from tax-induced improvements than residents of neighborhoods that have already begun to improve.

As such, the strongest case for using place-based tax incentives, despite their detrimental impact on vertical equity, is to promote equality in areas that are not gentrifying.[220] The results of this study suggest that the NMTC law has failed to target such areas. More equitable outcomes could be achieved through statutory or administrative reforms that reduce the frequency by which NMTC allocations are directed to gentrifying neighborhoods.

3. Administration of the NMTC

The results of this study have shown that NMTC investment has disproportionately flowed to areas that exhibit signs of gentrification, despite the fact that the program is actively administered by the CDFI Fund. It is worth noting that the CDFI Fund probably plays at least some role in influencing siting patterns of NMTC projects. The CDFI Fund uses its own set of screening criteria when weighing tax credit applications. For example, the CDFI Fund considers whether food-service projects are targeted to food deserts or whether medical facility projects are targeted to medically underserved areas.[221] It also gives special weight to projects located in areas designated as "severely distressed."[222]

Nevertheless, this study found that in many cities, NMTC allocations have tended to cluster in areas that exhibit signs of gentrification. In addition, this study

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217.   Slater, *supra* note 211, at 748.
218.   Kathe Newman & Elvin K. Wyly, *The Right to Stay Put, Revisited: Gentrification and Resistance to Displacement in New York City*, 43 URB. STUD. 23 (2006).
219.   Zuk et al., *supra* note 23, at 37.
220.   See generally Layser, *supra* note 18, for a discussion of how place-based tax incentives can promote equality in distressed places by reducing geographic inequality.
221.   CDFI Fund, *supra* note 76.
222.   *Id.*

revealed significant variations across cities. Both of these findings raise questions about the role of the CDFI Fund, which administers the program nationally.[223] Because the NMTC is centrally administered, one might expect spatial patterns to be similar across geographies. Variation in the patterns may reflect a limit to the agency's capacity to influence the location of tax-subsidized investment.

One likely explanation relates to the realities of the allocation process itself. I spoke to several CDE professionals with familiarity with the application process.[224] Though some indicated that the chances of a successful application were highest when a specific project pipeline could be described in the application, several indicated that the projects described in the application are not necessarily the same as those that are ultimately funded.[225] A reason for this disparity is the time lag between identifying projects—which are real projects in need of funding—and the receipt of NMTC allocations after an application process that can take six months or more. By the time the allocations are received, the pipeline projects may no longer exist. At that point, the CDE must work to identify new projects and distribute the allocation before it expires. These new projects may be similar to those described in the application, but they are not the same—and may not be in the same places—as the ones reviewed by the CDFI Fund.

Another explanation for the regional variation is that the preferences of investors, CDEs, and other stakeholders outweigh the preferences of the CDFI Fund in some cities. Another possibility is that state-level NMTC laws (or the absence thereof) may impact siting patterns. Further research into the role of state-level NMTC laws and their relationship to federal incentives could help understand the limits on the CDFI Fund's capacity to shape tax incentive program outcomes. To the extent that the CDFI Fund is simply unable to influence siting patterns, recommendations that rely on more active administration of the NMTC may fail to improve outcomes. Instead, statutory amendments may be necessary to specifically exclude gentrifying areas from eligibility.

B. *Predicting the Impact of Opportunity Zones*

This study has demonstrated that when gentrifying tracts are included within the scope of eligible census tracts, they may serve as magnets to attract investment away from other areas. The new Opportunity Zones law may be particularly susceptible to this result—even more than the NMTC. The reasons are twofold.

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223.   MARPLES & LOWRY, *supra* note 72, at 1.

224.   Data is confidential per the terms of Institutional Review Board approval. Transcripts on file with author.

225.   When CDEs apply for NMTC allocations, their application describes a pipeline of projects to be funded through the tax credits. However, the CDE is not required to fund the specific projects described in the application; the projects that are ultimately funded only need to be consistent with those approved by the CDFI Fund. For example, assume a CDE represents to the CDFI Fund that it will use its allocations to fund a hospital project, and it describes a specific project in its application. If the CDE receives an allocation, it may use those tax credits to fund a different hospital that was not specifically described in the application. *See id.*

First, the Opportunity Zones law lacks active administration comparable to the competitive allocation process used to administer the NMTC. As a result, the Opportunity Zones program lacks a potentially moderating regulatory force. The results of this study showed that even *with* a competitive application process, investment tended to cluster in areas with high vacancy rates and increasing rental rates. Such patterns are likely to be even more visible in the context of Opportunity Funds, which are not subject to comparable regulatory oversight.

Second, Opportunity Zone investments are more likely to be profit driven than NMTC investment. The NMTC attracts a reasonably high number of nonprofit and social-benefit minded investors that may not be motivated solely by profit.[226] In fact, "most NMTC investments do not generate significant economic return."[227] Instead, NMTC investors, which are almost always large financial institutions, are motivated by a combination of regulatory benefits and financial returns derived from the tax credits themselves.[228] These types of investors do not need to maximize profits by investing in gentrifying areas.

In contrast, the Opportunity Zones law overwhelmingly rewards profit-motivated investors that are more likely than NMTC investors to actively seek profit opportunities in gentrifying areas.[229] The primary benefit of investing in Opportunity Zones is capital gains relief,[230] which is most valuable to taxpayers whose assets have substantially appreciated. Because the law emphasizes high-profit investment, Opportunity Zones investors are likely to seek out the most profitable locations among eligible census tracts, including gentrifying tracts.

For these reasons, the spatial patterns observed in this study are likely to be even more pronounced in the context of Opportunity Zones. This means that any inefficient patterns of NMTC investment likely foreshadow inefficiencies in Opportunity Zones investment as well. It also means that any inequities caused by these spatial patterns are likely to occur in the Opportunity Zones context. In fact, such inequities may arise on larger scale. Because the NMTC is a capped program, it is claimed by a limited number of taxpayers each year. From 2010 to 2019, Congress authorized $3.5 billion in NMTC allocations annually.[231] From 2004 to 2017, an average of 413 allocations were originated per year.[232]

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226.   U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 11.

227.   HOLLAND & KNIGHT LLP, *supra* note 77.

228.   *Id.* at 3 (explaining how leveraged structures are used to generate positive rates of return from the tax credit investment); OFF. OF THE COMPTROLLER OF THE CURRENCY, FACT SHEET: NEW MARKET TAX CREDITS (2016), https://www.occ.gov/publications-and-resources/publications/community-affairs/community-developments-fact-sheets/ca-fact-sheet-new-markets-tax-credits-feb-2016.html (click "Download PDF") [https://perma.cc/5XYF-7AQA] (explaining that banks may receive credit under the Community Reinvestment Act for NMTC investments).

229.   Edward W. De Barbieri, *Opportunism Zones*, 39 YALE L. & POL'Y REV. 82, 133 (2020); *see also supra* Section I.A (explaining the relationship between gentrification and profitability).

230.   *See supra* Section II.B.2.

231.   *Compare* I.R.C. 45D(f)(1)(G) (authorizing $3.5 billion for years 2010–2019), *with* I.R.C. 45D(f)(1)(H) (raising the authorized amount to $5 billion for years 2020–2025).

232.   *Id.*

The Joint Committee on Taxation has estimated that the Opportunity Zones law will deliver a comparable amount, $3.5 billion, in capital gains relief each year through 2022.[233] However, unlike the NMTC, which provides a single tax credit allocation to each CDE (claimed by investors over a seven-year period), the Opportunities Zones law authorizes a second phase of capital gains relief that is not captured by the Joint Committee on Taxation's estimates.[234] Opportunity Fund investors who hold their investments for ten years will receive an additional exclusion of any post-investment capital gains on their interest[235]—a benefit that may prove extremely valuable to high-income taxpayers and costly to the government.

The capital gains relief provided by the Opportunity Zones law will be claimed almost exclusively by high-net-worth taxpayers. In 2012, well over half of capital gains were reported by individual taxpayers who had adjusted gross incomes of one million dollars or more.[236] That same group was responsible for only 0.27% of tax returns,[237] suggesting that a tiny percentage of taxpayers, comprised of some of the wealthiest Americans, have the greatest need to shelter capital gains in Opportunity Funds. For this reason, the Opportunity Zones law stands to violate vertical equity to a greater degree than the NMTC. Meanwhile, as explained above, it is also likely to result in clustering of investment in gentrifying areas. For these reasons, the Opportunity Zones law stands to be even more inequitable than the NMTC.

To minimize inefficiencies and inequitable outcomes, designated Opportunity Zones should be audited, and gentrifying census tracts should be deemed ineligible for further Opportunity Fund investment. In addition, the tax incentive should be subject to active administrative oversight, whereby Opportunity Funds would be required to obtain preapproval for large investments. These safeguards would help ensure that gentrifying areas do not attract investment away from other Opportunity Zones, ultimately undermining program objectives.

CONCLUSION

This Article has provided evidence that place-based tax incentives have flowed to gentrifying census tracts, even when non-gentrifying tracts were eligible for the same subsidies. Specifically, NMTC projects have been disproportionately located

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233.   *See* Jacoby, *supra* note 28.

234.   *See also* Samantha Jacoby, *Potential Flaws of Opportunity Zones Loom, as Do Risks of Large-Scale Tax Avoidance*, CTR. ON BUDGET & POL'Y PRIORITIES (Jan. 11, 2019), https://www.cbpp.org/research/federal-tax/potential-flaws-of-opportunity-zones-loom-as-do-risks-of-large-scale-tax [https://perma.cc/5HWS-74MU].

235.   *See* 26 U.S.C. §1400Z-2(c) (excluding all post-investment capital gains after ten years).

236.   *SOI Tax Stats - Sales of Capital Assets Reported on Individual Tax Returns*, INTERNAL REVENUE SERV., https://www.irs.gov/statistics/soi-tax-stats-sales-of-capital-assets-reported-on-individual-tax-returns [https://perma.cc/RX2G-RZJZ] (May 14, 2021) (showing that 50.32% of short-term capital gains and 63.75% of long-term capital gains were reported by taxpayers with adjusted gross income above $1 million).

237.   *Id.*

in the eligible census tracts with the highest vacancy rates and increasing rental rates. These findings suggest that the federal NMTC program suffers from inefficiencies and violates equity principles, and they raise new questions about the role regulators have played in its administration. They also provide empirical support to critiques about the newer, larger Opportunity Zones tax incentive. Even a small number of Opportunity Zones in gentrifying census tracts may serve to undermine that program if investment flows disproportionately to those zones, as they have done in the context of the NMTC. For these reasons, statutory and administrative reforms are needed to ensure that place-based tax incentives benefit the neighborhoods that need them most.