

# Assessing the Impact of Gentrification on Eviction: A Spatial Modeling Approach

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Are landlords more likely to attempt to evict tenants in gentrifying neighborhoods? With the demand for and price of rental units in many major metropolitan areas soaring, landlords face strong incentives to replace low-income and rent-stabilized tenants with tenants who can afford to pay higher rents.<sup>2</sup> In cities with few or no protections for renters, landlords can summarily increase rents to meet market rate and demand, displacing renters who cannot afford to pay. While renters in cities with rent control or rent stabilization are less likely to experience dramatic increases in rent prices year to year, the incentives to displace them remain.

In New York City, for example, 45% of rental units are rent-stabilized, and rapid increases in the year-to-year rents of these units typically can only occur after the rent has passed a certain threshold and the unit has been vacated.<sup>3</sup> Until then, yearly rent increases are capped at a relatively low level

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<sup>2</sup> Across the United States, rents increased 32% from 2001 to 2015, *see* ERIN CURRIER ET AL., PEW CHARITABLE TRS., AMERICAN FAMILIES FACE A GROWING RENT BURDEN 6 (2018), [https://www.pewtrusts.org/-/media/assets/2018/04/rent-burden\\_report\\_v2.pdf](https://www.pewtrusts.org/-/media/assets/2018/04/rent-burden_report_v2.pdf), *archived at* <https://perma.cc/Q9NK-RK2P>, and grew higher in large metropolitan areas (such as New York City, Chicago, Los Angeles, Miami, Washington, DC, and San Francisco) than in small and mid-sized cities, *see* Rob Collinson, *Rental Housing Affordability Dynamics, 1990–2009*, CITYSCAPE: J. POL'Y DEV. & RES. 71, 71, 78 (2011). At the same time, real household income remained effectively unchanged over that period, so that the share of all renting households that are “rent-burdened” or “severely rent-burdened” (or that allocate 30% or more or 50% or more of their monthly incomes to rent, respectively) has grown substantially. *See* CURRIER ET AL., *supra*, at 4. The share of all renting households that are rent-burdened increased 19% from 2001 to 2015, from 32% to 38% of all renting households, while the share of severely rent-burdened households increased 42% over the same period from 12% to 17% of all renting households. *Id.* at 11.

<sup>3</sup> NYU FURMAN CENTER, PROFILE OF RENT-STABILIZED UNITS AND TENANTS IN NEW YORK CITY 1 (2011), [http://furmancenter.org/files/FurmanCenter\\_FactBrief\\_RentStabilization\\_June2014.pdf](http://furmancenter.org/files/FurmanCenter_FactBrief_RentStabilization_June2014.pdf), *archived at* <https://perma.cc/TSH3-LLUU>. This type of conversion, called “High-Rent Vacancy Deregulation,” outpaces the other major way rent-stabilized units can transition to market-rate units: “High-Rent High-Income Deregulation.” This form of conversion occurs when the rent of a unit surpasses a (lower) price threshold and has been occupied for two consecutive years by tenants whose income exceeds a certain threshold (\$200,000 in 2018). *See* N.Y. STATE HOMES & CMTY. RENEWAL, DEREGULATION RENT AND INCOME THRESHOLDS 2 (2018), <http://www.nyscr.org/rent/Deregulation-Rent-Income-Threshold.pdf>, *archived at* <https://perma.cc/YVF6-B6QT>; *Fact Sheet #36: High-Rent Vacancy Deregulation and High-Rent High-Income Deregulation*, N.Y. STATE HOMES & CMTY. RENEWAL, <http://www.nyscr.org/Rent/FactSheets/orafac36.htm>, *archived at* <https://perma.cc/3NQ5-7YAZ> (last visited Feb. 8, 2019).

negotiated by the City. Given that the median monthly rent of market-rate units is approximately \$450 per month higher than rent-stabilized units across the city (and almost \$1,500 per month higher in Manhattan), landlords face a strong incentive to displace these tenants.<sup>4</sup>

New York City landlords have been accused of circumventing formal limitations on rent increases by exploiting a law that allows them to raise rents after units have been vacated and renovated. To get tenants to leave, landlords in some of New York City's most rapidly gentrifying neighborhoods have filed hundreds of frivolous eviction notices, hoping that: a) one of the eviction notices will 'slip through the cracks' and result in actual eviction, b) by aggressively pursuing evictions they can get tenants to agree to voluntarily leave their apartments, or c) tenants will choose not to renew their lease at the end of the lease period.<sup>5</sup> Landlords have also harassed tenants, making living conditions hard or impossible to tolerate. Once these tenants leave, landlords attempt to replace them with higher paying and more transient renters so as to break the rent-threshold as soon as possible and convert rent-controlled units into market-rate units.<sup>6</sup>

To media, politicians, community advocates, and everyday residents, it seems clear that landlord harassment and spurious eviction filing are closely linked to gentrification—the process in which urban neighborhoods that had previously suffered municipal neglect, disinvestment, and economic decline come to experience new investment and in-migration from middle and upper-class individuals, and as a result, significantly higher rents.<sup>7</sup> Yet, whether or not gentrification leads to higher rates of eviction is not well established in the empirical literature.<sup>8</sup> While some extant studies have found a strong relationship between displacement and eviction, other work has found little evidence suggesting such a connection, with some studies even finding that

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<sup>4</sup> N.Y. CITY DEP'T OF HOUS. PRES. & HOUS. DEV., RENT REGULATION MEMO #2: AFFORDABILITY OF RENT STABILIZED UNITS 1–2 (2018), <https://www1.nyc.gov/assets/hpd/downloads/pdf/about/rent-regulation-memo-2.pdf>, archived at <https://perma.cc/6UQM-Z8TH>.

<sup>5</sup> See Kim Barker, *Behind New York's Housing Crisis: Weakened Laws and Fragmented Regulation*, N.Y. TIMES, May 20, 2018, <https://www.nytimes.com/interactive/2018/05/20/nyregion/affordable-housing-nyc.html>, archived at <https://perma.cc/L96T-33AT>; Kim Barker et al., *The Eviction Machine Churning Through New York City*, N.Y. TIMES, May 20, 2018, <https://www.nytimes.com/interactive/2018/05/20/nyregion/nyc-affordable-housing.html>, archived at <https://perma.cc/2K2Z-72C4>; N.R. Kleinfeld, *Where Brooklyn Tenants Plead the Case for Keeping Their Homes - The New York Times*, N.Y. TIMES, May 20, 2018, <https://www.nytimes.com/interactive/2018/05/20/nyregion/landlord-tenant-disputes-housing-court.html>, archived at <https://perma.cc/6QDT-N9N7>.

<sup>6</sup> See Barker, *supra* note 5; Barker et al., *supra* note 5; Marcelo Rochabrun & Cezary Podkul, *The Fateful Vote That Made New York City Rents So High*, PROPUBLICA (Dec. 15, 2016), <https://www.propublica.org/article/the-vote-that-made-new-york-city-rents-so-high>, archived at <https://perma.cc/97H3-FSBY>.

<sup>7</sup> See Miriam Zuk et al., *Gentrification, Displacement and the Role of Public Investment: A Literature Review*, 33 J. PLAN. LITERATURE 31, 33 (2015).

<sup>8</sup> See, e.g., Rowland Atkinson, *Measuring Gentrification and Displacement in Greater London*, 37 URBAN STUD. 149, 163 (2000) (finding a strong correlation between professionalization and displacement but not identifying a mechanism of displacement).

involuntary displacement of low-income households is *lower* in gentrifying neighborhoods.<sup>9</sup>

In this Article, I test the link between gentrification and the rate at which landlords file for eviction against tenants. In doing so I suggest that part of the inconsistency in the extant empirical literature may be attributed to a failure of extant research to explicitly model *spatial dependence* in eviction data. Spatial dependence exists when outcomes of interest (e.g., eviction) are systematically affected by their geographic location and when the outcomes in one area are systematically related to outcomes of interest in nearby areas.<sup>10</sup> In the case of eviction filings, we might reasonably expect that gentrification in one neighborhood affects landlord behavior in nearby neighborhoods, as those landlords anticipate that gentrification might spread to the neighborhoods where they own buildings or might otherwise affect their pool of potential renters. If this is the case, then failure to account for the characteristics of nearby tracts may obscure the actual relationship between gentrification and eviction across a city.

To test for spatial dependence in this context—i.e., whether evictions in one geographic area are systemically affected by gentrification in a nearby area—I apply spatial models to eviction data. Spatial models allow analysts to uncover and characterize spatial relationships in data, which may significantly affect outcomes of interest that remain hidden in more standard or commonly-applied regression models. While several different types of spatial models exist in the spatial econometrics literature, I employ a particular type of spatial model—the spatial Durbin model—which usefully permits modelling multiple spatial process at the same time and can accommodate some uncertainty in the underlying data-generating process.<sup>11</sup> Though spatial models in general and the spatial Durbin model in particular have been applied to research problems in political science, health, economics, and other fields,<sup>12</sup> they have rarely been used in housing studies, especially those on gentrification, displacement, or eviction.

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<sup>9</sup> See Japonica Brown-Saracino, *Explicating Divided Approaches to Gentrification and Growing Income Inequality*, 43 ANN. REV. SOC. 515, 517–25 (2017) (reviewing literature); Zuk et al., *supra* note 7, at 36–39 (same).

<sup>10</sup> See generally JAMES P. LESAGE & R. KELLEY PACE, INTRODUCTION TO SPATIAL ECONOMETRICS (2009); J. Paul Elhorst, *Applied Spatial Econometrics: Raising the Bar*, 5 SPAT. ECON. ANAL. 9–28 (2010).

<sup>11</sup> Specifically, estimates from a spatial Durbin model will return unbiased coefficient estimates when then the underlying data generating process follows a spatial error model. Elhorst, *supra* note 10.

<sup>12</sup> See, e.g., Corinne Autant-Bernard & James P. LeSage, *Quantifying Knowledge Spillovers Using Spatial Econometric Models*, 51 J. REG. SCI. 471–96 (2011); Donald J. Lacombe, Garth J. Holloway & Timothy M. Shaughnessy, *Bayesian Estimation of the Spatial Durbin Error Model with an Application to Voter Turnout in the 2004 Presidential Election*, 37 INT. REG. SCI. REV. 298–327 (2014); Tse-Chuan Yang, Aggie J. Noah & Carla Shoff, *Exploring Geographic Variation in US Mortality Rates Using a Spatial Durbin Approach*, 21 POPUL. SPACE PLACE 18–37 (2015).

I run two spatial Durbin models on 2014 eviction filing data from Brooklyn, New York, collected by Princeton's Eviction Lab. The results are mixed. Using one standard proxy for gentrification which categorically identifies previously marginalized tracts that have experienced rapid change in rent prices and class composition,<sup>13</sup> I find that gentrification is strongly and negatively associated with eviction filing rates. Using a second proxy, the change in the share of a tract's residents who work in 'post-industrial' occupations associated with gentrification (e.g., professional, scientific, and management occupations), however, I find that gentrification is positively associated with eviction filing rates. Importantly, both models find significant evidence that the effect of gentrification on eviction filing rates spills over to neighboring tracts and that there is significant spatial clustering in eviction filing rates. In other words, when one tract experiences gentrification, we observe changes in the eviction filing rates of neighbors and eviction filing rates generally in one tract are correlated with eviction filing rates in surrounding tracts.

Beyond gentrification, I find evidence that eviction filing rates increase as the Black and Latino share of the population increases, as racial diversity in a neighborhood increases, and as levels of economic inequality increase. My analysis further finds that increases in income inequality in one neighborhood are significantly and positively correlated with eviction filings in adjacent neighborhoods and neighborhoods some distance away. Generally, the results suggest that spatial dependence is at work in local eviction filing rates such that the characteristics of one neighborhood or community spill-over and affect eviction filing rates of another. These results may be particularly useful for legal aid providers as they suggest that legal aid providers might anticipate greater eviction filing rates in communities that lie proximal to or some distance away from areas where income inequality is increasing. This is an important insight for those interested in counteracting and preventing eviction and tenant harassment occurring through spurious eviction filing.

The remainder of the Article proceeds as follows. In Part I, I characterize the emergence of gentrification and urban revitalization in the United States, debates over their causes, and the expectation that gentrification leads to higher rates of eviction. In Part II, I juxtapose these expectations with mixed findings from empirical research on gentrification and eviction filing rates. In Part III, I argue that spatial models are important to understand the relationship between gentrification and eviction. In Part IV, I describe my empirical approach, while in Part V, I discuss the results and their implications.

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<sup>13</sup> Lance Freeman, *Displacement or Succession? Residential Mobility in Gentrifying Neighborhoods*, 40 URBAN AFF. REV. 463–91 (2005).

## I. THE EMERGENCE OF GENTRIFICATION AND ITS CONSEQUENCES FOR DISPLACEMENT AND EVICTION

“Gentrification” was coined in the academic literature by Ruth Glass in 1964, who first noted the migration of upper- and middle-class professionals to historically low- and working-class neighborhoods in London.<sup>14</sup> Since Glass’s early work, many of the hallmark characteristics of gentrification and urban revitalization have been observed in major cities in North America, Europe, and beyond. Extant scholarship on cities as far flung as Toronto, New York, Seattle, Paris, and Cape Town, for example, have described the movement of upper- and middle-class professionals to redeveloped neighborhoods and the subsequent displacement of working-class, low-income, or poor tenants and the re-valorization of previously distressed and declining districts and neighborhoods.<sup>15</sup>

No consensus exists over the cause of gentrification. Generally, however, explanations fall into two frameworks.<sup>16</sup> Studies in the ‘cultural preferences’ framework have argued that changing patterns of consumption, self-expression, personal preference, and culture are the root causes of gentrification and have stressed that individual choices lie at the center of the larger demographic transformation involved in gentrification. According to this framework, the ‘first-wave’ of gentrifiers were relatively small groups of families or individuals (typically professionals) who committed to purchasing and redeveloping homes in relatively small and defined parts of the city.<sup>17</sup> The choice for these and subsequent waves of gentrifiers to live in urban neighborhoods was rooted in a fundamental rejection of suburban life, aesthetics, and expectations and the appeal of urban aesthetics and the excitement of urban life.<sup>18</sup>

In contrast, studies in the ‘economic structure’ framework have stressed the structural and economic conditions that made gentrification possible in the first place. According to work in this framework, gentrification arises because of the profitability of private and public investment in urban neighborhoods and global economic restructuring. Wide-scale gentrification

<sup>14</sup> See RUTH LAZARUS GLASS, *LONDON: ASPECTS OF CHANGE 3* (1964).

<sup>15</sup> See, e.g., TIMOTHY A. GIBSON, *SECURING THE SPECTACULAR CITY: THE POLITICS OF REVITALIZATION AND HOMELESSNESS IN DOWNTOWN SEATTLE* (2004); Juliet Carpenter & Loretta Lees, *Gentrification in New York, London and Paris: An International Comparison*, 19 INT’L J. URB. REGIONAL RES. 286 (1995); John Paul Catungal, Deborah Leslie & Yvonne Hii, *Geographies of Displacement in the Creative City: The Case of Liberty Village, Toronto*, 46 URB. STUD. 1095 (2009); Mark Davidson & Loretta Lees, *New-Build ‘Gentrification’ and London’s Riverside Renaissance*, 37 ENV’T & PLAN. A 1165 (2005); 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); Gustav Visser & Nico Kotze, *The State and New-build Gentrification in Central Cape Town, South Africa*, 45 URB. STUD. 2565 (2008).

<sup>16</sup> See generally Sharon Zukin, *Gentrification: Culture and Capital in the Urban Core*, 13 ANN. REV. SOC. 129 (1987) (reviewing the literature).

<sup>17</sup> See *id.* at 130.

<sup>18</sup> See *id.* at 139.

would have been impossible if the profitability of rehabilitating urban properties was not significant enough to lure or justify individual gentrifiers, redevelopers and larger institutional actors.<sup>19</sup> Scholars in this framework have also stressed that gentrification emerged within the larger context of post-industrialism, the decline of manufacturing in Western economies, and the centralization of new jobs in central cities.<sup>20</sup> The decline of manufacturing—often located in central cities—not only made the position of working-class individuals more precarious, but compelled municipal leaders to attract other industries to make up the losses.<sup>21</sup> As scholars have documented in Seattle and other cities, many municipal political elites courted service, technology, creative, and cultural industries, and the strategy of attracting these industries, and their well-educated and well paid employees, to central cities should be understood as a direct cause of gentrification.<sup>22</sup>

Whether due to individual demand, economic structure, or both, gentrification has had significant consequences for rental markets. Gentrification has introduced to some rental markets renters who can afford to pay significantly higher rent prices than the working class and poorer residents who had once inhabited many changing neighborhoods.<sup>23</sup> Combined with housing shortages in many cities, this seems to have produced an acute crisis in housing affordability and substantially higher rent prices that ultimately leads to significant resident displacement.<sup>24</sup> Yet while politicians, members of the media, advocates in the non-profit sector, and everyday residents intuitively and rationally link gentrification to this crisis, as I describe in the following section, the empirical linkages between gentrification, displacement, and eviction are not well established.

## II. EMPIRICAL EVIDENCE OF GENTRIFICATION, DISPLACEMENT, AND EVICTION

### *Gentrification and Displacement*

Empirical research on the effect of gentrification on displacement is decidedly mixed.<sup>25</sup> A large set of studies conducted in major cities in the United States and Europe have argued that the combined actions of municipi-

<sup>19</sup> *Id.* at 137, 141. For more detail on the shifting profitability of urban property, see generally NEIL SMITH, *THE NEW URBAN FRONTIER: GENTRIFICATION AND THE REVANCHIST CITY* (1996).

<sup>20</sup> See Zukin, *supra* note 16, at 138–40.

<sup>21</sup> *Id.* at 141; see also GIBSON, *supra* note 15, at 53.

<sup>22</sup> RICHARD FLORIDA, *THE RISE OF THE CREATIVE CLASS—REVISITED: REVISED AND EXPANDED* 11 (2014); GIBSON, *supra* note 15, at 72; Zukin, *supra* note 16, at 138–39.

<sup>23</sup> Newman & Wyly, *supra* note 15, at 26–27.

<sup>24</sup> See Matthew Desmond, *Heavy is the House: Rent Burden Among the American Urban Poor*, 42 INT'L J. URB. REGIONAL RES. 160, 160 (2018); CURRIER ET AL., *supra* note 2, at 4–5; Collinson, *supra* note 2 at 81.

<sup>25</sup> Brown-Saracino suggests that the division in the extant empirical literature can be explained partially by method, finding that while early, qualitative researchers typically found

pal political elites, real-estate developers, and in-moving gentrifiers have dislocated or displaced entire communities. Based on interviews with realtors, developers, non-profit leaders, and local politicians in Chicago, for example, researchers have argued that city-led urban renewal projects and inflationary rent pressure driven by an influx of upper- and middle-class white residents resulted in the widespread involuntary displacement of families, small businesses, and community organizations, especially in Chicago's Mexican and Puerto Rican neighborhoods.<sup>26</sup> Other studies have identified similar processes in Los Angeles, New York, Washington, DC, London, Toronto, and other large metropolitan cities.<sup>27</sup>

Other studies, however, have found significantly lower levels of displacement or no displacement at all as a result of gentrification. Research on displacement of renters and relocation in New York City and Boston, for example, presented evidence that poor households in gentrifying neighborhoods are no more or even less likely to move than similarly situated households in non-gentrifying neighborhoods.<sup>28</sup> A national level analysis conducted by Freeman similarly argued that the effect of gentrification on displacement is minor, if it exists at all.<sup>29</sup> Some of these studies have even argued that non-moving poor households may benefit financially from the potential employment opportunities that gentrification can bring to previously marginalized neighborhoods and have tentatively suggested that these gains may offset some (but certainly not all) of the negative consequences of gentrification.<sup>30</sup>

While the majority of the extant literature has focused on displacement caused by inflationary rent prices and urban renewal, fewer studies focus specifically on landlord action. This is surprising for at least three reasons. First, landlord action accounts for a significant share of the reasons why renters move. In their study of the effect of gentrification on involuntary displacement in New York City between 1989 and 2002, Newman and Wyly

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evidence of widespread displacement in US cities, more recent quantitative studies typically find significantly less evidence of displacement. Brown-Saracino, *supra* note 9, at 525–30.

<sup>26</sup> See generally FELIX M. PADILLA, *PUERTO RICAN CHICAGO* (Univ. of Notre Dame Press 1987); John Betancur, *Gentrification and Community Fabric in Chicago*, 48 *URB. STUD.* 383, 394–99 (2011); John J. Betancur, *The Politics of Gentrification: The Case of West Town in Chicago*, 37 *URB. AFF. REV.* 780, 793–806 (2002).

<sup>27</sup> See, e.g., LORETTA LEES, HYUN BANG SHIN & ERNESTO LÓPEZ-MORALES, *GLOBAL GENTRIFICATIONS: UNEVEN DEVELOPMENT AND DISPLACEMENT* 265 (2015); SMITH, *supra* note 19; Atkinson, *supra* note 8, at 163; Catungal, Leslie, and Hii, *supra* note 15, at 1110; Ellen Reese, Geoffrey Deverteuil & Leanne Thach, "Weak-Center" *Gentrification and the Contradictions of Containment: Deconcentrating Poverty in Downtown Los Angeles*, 34 *INT'L J. URB. REGIONAL RES.* 310, 310 (2010); Alex S. Vitale, *The Safer Cities Initiative and the Removal of the Homeless*, 9 *CRIMINOLOGY & PUB. POL'Y* 867, 868–69 (2010).

<sup>28</sup> See Lance Freeman & Frank Braconi, *Gentrification and Displacement New York City in the 1990s*, 70 *J. AM. PLAN. ASS'N* 39, 45–50 (2004); Terra McKinnish, Randall Walsh & T. Kirk White, *Who Gentrifies Low-Income Neighborhoods?*, 67 *J. URB. ECON.* 180, 181 (2010); Jacob L. Vidor, *Does Gentrification Harm the Poor?*, *BROOKINGS-WHARTON PAPERS ON URB. AFF.* 133, 135 (2002).

<sup>29</sup> Freeman, *supra* note 13, at 487.

<sup>30</sup> See McKinnish et al., *supra* note 28, at 180; Vidor, *supra* note 28, at 171–73.

estimated a conservative involuntary displacement rate<sup>31</sup> of between 6.2% and 9.9%, of which between 23% to 43% were attributed to landlord harassment, eviction, or another landlord action.<sup>32</sup> In substantive terms, this suggests that annually 1,900 and 4,500 households were displaced due to landlord action.<sup>33</sup>

But given that tenant harassment and eviction may be strategies landlords use to vacate apartments and *then* raise rents, this number likely underestimates the overall effect of landlord action on involuntary displacement. Indeed, the empirical pattern Newman and Wyly presented suggests that this might be the case: landlord harassment, eviction, and other actions collectively constituted a significantly higher share of all involuntary displacement in the earliest part of their of the sample (43% between 1989 and 1991) than in the later periods (for example, 23% between 1999 and 2002).<sup>34</sup> Landlords in many neighborhoods in New York City may have used eviction, harassment, and other private actions in order to displace renters and raise rents past the necessary rent thresholds in this early period in order to bring rent-stabilized units to market rates, and as a result, use of these harassment techniques may have subsequently decreased.

### *Gentrification and Eviction*

Among the relatively large number of studies exploring gentrification and displacement, Matthew Desmond and Carl Gershenson's study of renters in Milwaukee, Wisconsin stands out as one of the few studies which focuses specifically on eviction.<sup>35</sup> These authors explored the impact that individual-, neighborhood-, and network-level factors play in determining the likelihood of eviction, and the study presents one of the first and most comprehensive analyses of eviction determinants. At the individual level, families with children were significantly more likely to face eviction, and the likelihood of eviction increased with each additional child in the unit. The authors suggested that because households with children "can cause added stress on property, disturb neighbors, and attract unwanted state scrutiny," landlords may be more willing to evict these households relative to adult-only households.<sup>36</sup>

The relationship between family composition and eviction that Desmond and Gershenson identified may be generalizable beyond their sam-

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<sup>31</sup> The displacement rate here is defined as the share of moving households that moved because of unaffordable rent or mortgage, harassment by landlord, some other private action by the landlord (such as condominium conversion), eviction, or displacement by public activity such as urban renewal. See Newman & Wyly, *supra* note 15, at 29

<sup>32</sup> Newman & Wyly, *supra* note 15, at 30.

<sup>33</sup> *Id.*

<sup>34</sup> *Id.*

<sup>35</sup> Matthew Desmond & Carl Gershenson, *Who Gets Evicted? Assessing Individual, Neighborhood, and Network Factors*, 62 SOC. SCI. RES. 362 (2017).

<sup>36</sup> *Id.* at 372.



ple and magnified in cities with more stringent rent control. As described above, every time a rental unit in New York City becomes vacant, landlords have some ability to increase the rent. What's more, once the rent hits a certain level, the constraints of rent-control are no longer applicable. The combination of these factors makes it such that owners of rent-controlled units prefer to rent to short-term renters. Given that families with children are less likely to leave a unit than single, unmarried, and childless renters,<sup>37</sup> landlords in New York City have an additional incentive to evict families with children (either through tenant harassment, formal eviction proceedings, or at their discretion if the tenant falls behind on rent) and the relationship Desmond and Gershenson observed in Milwaukee might be stronger in New York City. Put differently, families with children in New York City may have two factors working against them that may lead to higher rates of eviction compared to other family types: the potential disturbance and distress they cause identified by Desmond and Gershenson *and* their longer occupancy of apartments, which runs counter to the preference landlords in rent-stabilized units have for shorter-occupancy tenants.

At the individual level, Desmond and Gershenson found few other factors predictive of eviction. Job loss—which interrupts the ability of renters to consistently pay their rent—increased the likelihood of eviction. But other individual characteristics like education level, past history of contact with the criminal justice system, gender, race, and age did not.<sup>38</sup> Perhaps most striking is the lack of evidence of racial and ethnic discrimination. To explain this, the authors suggested that the highly segregated nature of the housing market in Milwaukee reduces the incentives of landlords to discriminate between renters based on race as an evicted tenant would almost certainly be replaced by a tenant of the same race.<sup>39</sup>

Importantly for this analysis, the authors did not uncover a relationship between gentrification and likelihood of eviction; rather, they found that evictions were more common in marginalized city neighborhoods than in transitioning cities.<sup>40</sup> They also observed that individuals living in higher-crime neighborhoods faced higher eviction rates and suggested that individuals in high-crime neighborhoods view eviction as an opportunity to relocate.<sup>41</sup> Interestingly, they also uncovered evidence that evictions are spatially clustered or dependent.<sup>42</sup> Specifically, they found that neighborhood-level eviction rates affect the likelihood that an individual will experience eviction. In other words, controlling for all other factors, if people in a specific

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<sup>37</sup> See Claudia Geist & Patricia A. McManus, *Geographical Mobility over the Life Course: Motivations and Implications*, 14 *POPULATION SPACE & PLACE* 283, 292–93 (2008); Gary D. Sandefur & Wilbur J. Scott, *A Dynamic Analysis of Migration: An Assessment of the Effects of Age, Family and Career Variables*, 18 *DEMOGRAPHY* 355, 362 (1981).

<sup>38</sup> Desmond & Gershenson, *supra* note 35, at 372.

<sup>39</sup> *Id.* at 372.

<sup>40</sup> *Id.* at 373.

<sup>41</sup> *Id.*

<sup>42</sup> *Id.* at 364.

neighborhood are experiencing eviction, the likelihood that other people in that neighborhood will be evicted goes up. Finally, at the network-level, the authors found a strong relationship between the number of downward social ties an individual has (e.g., close social ties with someone who has been incarcerated, evicted, in an abusive relationship, or addicted to drugs) and the likelihood of eviction.<sup>43</sup> They suggested either that individuals with many strong ties to disadvantaged individuals are seen by landlords as undesirable or that individuals with these ties may have ‘normalized’ the experience of eviction and as such go through less effort to avoid it.<sup>44</sup>

### III. THE LIMITATIONS OF FAILING TO ACCOUNT FOR SPATIAL DEPENDENCE IN EVICTION

While this literature has significantly advanced our understanding of the factors that predict eviction, it does not provide a full picture of the effects of gentrification because it fails to consider spatial dependence in the relationship between gentrification and displacement/eviction. As described above, spatial dependence occurs when outcomes of interest are systematically related to or dependent on one another as a function of their spatial location.<sup>45</sup> Existing studies’ failure to account explicitly for this dependence means that the results of their analysis could be incorrect and their conclusions incomplete.

Generally, both scholars and the general public would expect eviction and displacement to exhibit strong and positive *autocorrelation*, meaning that we would expect high levels of eviction or displacement to be clustered in some areas and low levels of eviction or displacement to be clustered in others. Indeed, Freeman and Braconi presented precisely this sort of clustering in their map of gentrification in New York City: neighborhoods identified as gentrifying were clustered near to one another.<sup>46</sup> This suggests that the eviction rates they studied were produced by a spatial process or exhibited spatial dependence, but their analysis does not account for how spatial dependency may affect the results presented in that analysis.

Beyond incorrect estimates or results, failure to explicitly account for spatial dependence obscures interesting spatial processes or mechanisms that may affect neighborhood level eviction rates. Indeed, Desmond and Gershenson gestured towards precisely such processes in their explanation for why tract-level eviction rates exert a positive effect on the likelihood that individuals might experience eviction.<sup>47</sup> Specifically, they suggested that landlords in different parts of the city are exposed to different renting and evicting practices and that sub-municipal renting cultures or proclivities to

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<sup>43</sup> Desmond & Gershenson, *supra* note 35, at 365.

<sup>44</sup> *Id.* at 367.

<sup>45</sup> See LESAGE & PACE, *supra* note 10, at 1–7; Elhorst, *supra* note 10, at 10.

<sup>46</sup> Freeman & Braconi, *supra* note 28, at 43.

<sup>47</sup> Desmond & Gershenson, *supra* note 35, at 364.

evict tenants may manifest in different parts of the city.<sup>48</sup> These neighborhood-level cultures or practices may be of significant practical and theoretical importance. Desmond and Gershenson also noted that the characteristics of social networks can also affect individual eviction rates. But since an individual's social networks typically lie in close proximity to that individual,<sup>49</sup> this finding suggests that characteristics of communities or neighborhoods that lie *near* a renter will affect the likelihood that he will experience eviction. Particularly with gentrification, we may reasonably expect that landlords holding properties in neighborhoods that lie adjacent to or nearby neighborhoods currently experiencing gentrification may be more likely to pursue eviction against tenants with the expectation that the effect of gentrification might *spill-over* to their as-of-yet unchanging neighborhood. As data produced in such a manner violate the assumptions of typical linear regression models, in the following section, I offer an approach to analyzing spatial eviction data using modeling techniques that can more fully capture the spatial nature of eviction.

#### IV. EMPIRICAL APPROACH AND RESULTS

In the following section, I describe my hypothesis, informed by the extant literature and my empirical approach, which argues that models that can account for spatial processes should be utilized in studies of gentrification and eviction. I then describe my data sources, the variables I utilize, and present the results.

##### *Hypothesis*

While extant evidence of gentrification's effect on eviction and displacement rates are mixed, this could be because extant studies fail to account for spatial dependence. Once spatial dependence is accounted for, analysis may identify the positive relationship expected by most studies and the public. At the same time, we may reasonably believe the gentrification in one neighborhood will affect eviction or displacement in nearby neighborhoods. I therefore hypothesize the following:

**H<sub>1</sub>:** Gentrification will be positively associated with or predictive of eviction.

**H<sub>2</sub>:** The effect of gentrification will exhibit significant spatial spill-over, such that gentrification in one tract will be associated with

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<sup>48</sup> *Id.*

<sup>49</sup> See Diana Mok & Barry Wellman with Ranu Basu, *Did Distance Matter Before the Internet? Interpersonal Contact and Support in the 1970s*, 29 *SOC. NETWORKS* 430, 452–54 (2007); Yuri Takhteyev, Anatoliy Gruzd & Barry Wellman, *Geography of Twitter Networks*, 34 *SOC. NETWORKS* 73, 81 (2012).

more aggressive landlord action against tenants in neighboring tracts.

### *Methodology*

I test the relationship between gentrification and tract-level eviction filing rates in a series of spatial Durbin models, a particular type of spatial model that offers distinct advantages relative to models typically used in the literature. Researchers and analysts interested in spatial processes have typically modelled spatial data using either the *spatial lag model* or the *spatial error models*.<sup>50</sup> In the former, the analyst assumes that the outcome of interest is partially the result of endogenous spatial effects, or the effect that outcomes in unit exert on nearby units.<sup>51</sup> In the case of eviction, endogenous spatial effects may be at work if eviction filing rates in one neighborhood affect neighborhood filing rates in others, which we may expect if, for example, local landlords communicate with one another and localized practices, perspectives, or even ‘cultures’ develop or if landlords mimic the behavior of nearby landlords.

With the latter model, the spatial error model, the analyst instead considers the effect that omitted variables may exert on the outcome of interest but allows the effect of the omitted variables to be spatially correlated.<sup>52</sup> A spatial error model may be appropriate for analysts interested in eviction rates across neighborhoods in a city following a hurricane, for example, if: a) there is reason to believe that evictions (specifically for demolition or renovation) are affected by flood-damage, b) such evictions are spatially clustered (e.g., in areas of the city that are more or less flood-prone), and c) there are no data on how flood-prone neighborhoods are. Here, a measure of how flood prone the neighborhood is may be unmeasured and omitted from the model but would be correlated among clusters of neighborhoods.

These two models are limited in their ability to characterize spatial processes.<sup>53</sup> First, and as recent research has stressed, endogenous interaction effects and spatial interaction among omitted variables are not the only spatial processes that might affect spatial variables.<sup>54</sup> Spatial outcomes may also be affected by *exogenous interaction effects*, or the effect that characteristics of one neighborhood may have on outcomes in nearby neighborhoods—as might occur if neighborhood gentrification leads landlords in nearby neighborhoods to act aggressively against current tenants in anticipation of revi-

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<sup>50</sup> See Elhorst, *supra* note 10, at 10. For details of these methods, see generally LESAGE & PACE, *supra* note 10.

<sup>51</sup> See LESAGE & PACE, *supra* note 10 at 16. Note that LeSage and Pace refer to the spatial lag model as the spatial auto-regressive model in their text. See also Elhorst, *supra* note 10, at 11.

<sup>52</sup> See LESAGE & PACE, *supra* note 10 at 29–30; Elhorst, *supra* note 10, at 11–15.

<sup>53</sup> See Yang et al., *supra* note 12, at 20.

<sup>54</sup> See LESAGE & PACE, *supra* note 10, at 32; Elhorst, *supra* note 10, at 11.

talization. Second, and as a technical matter, both the spatial lag and spatial error models restrict the magnitude of the spatial effect, which may induce bias into the model.<sup>55</sup> Finally, neither model permits analysts to characterize how far effects from one neighborhood spillover into another.<sup>56</sup>

The spatial Durbin model accounts for all of these limitations. It models the outcome of interest as the process of endogenous interactions effects, exogenous interaction effects, and direct effects (which refers to how the tract's characteristics affect outcomes in that tract).<sup>57</sup> While the spatial Durbin model does not incorporate correlated effects among omitted variables (and cannot include them, since inclusion of all three types of spatial effects leads to biased coefficient estimates and an inability to distinguish between exogenous and endogenous interaction affects), failure to do so only reduces the *efficiency* of the model, whereas failure to include either of the other two spatial affects may produce model bias.<sup>58</sup> Finally, the spatial Durbin model allows analysts to characterize the spatial extent of spillover.<sup>59</sup>

## DATA AND VARIABLES

### *Dependent Variable*

The focal dependent variable for the analysis is the *eviction filing rate*, which I take as an indicator of the intensity with which landlords seek to evict or displace existing residents and replace them with potentially higher paying, higher status renters. The eviction filing rate equals the number of evictions filed in a Census tract divided by the total number of renter-occupied units in that Census tract. I choose to examine the eviction filing rate rather than the eviction rate itself due to qualitative evidence from New York City, described above, that suggests that the actual eviction rate will significantly underestimate or mischaracterize landlord behavior towards tenants.<sup>60</sup>

Data on the eviction filing rate were collected from the Eviction Lab at Princeton University, a project to gather, clean, and visualize eviction data across the United States.<sup>61</sup> Data were collected by three different processes:

<sup>55</sup> See LESAGE & PACE, *supra* note 10.

<sup>56</sup> See Elhorst, *supra* note 10, at 10.

<sup>57</sup> More specifically, the Spatial Durbin model takes the form:  $Y = \alpha + \rho WY + X\beta + WX\theta + \epsilon$ , where  $Y$  is an  $N \cdot 1$  vector of the logarithmic eviction filing rate or eviction rate,  $\rho$  is a spatial autoregressive coefficient estimated by the model that measures the strength of the endogenous interaction effect (e.g., how closely are landlords in a tract following the eviction rates of their neighbors),  $W$  is an  $N \cdot N$  matrix of spatial weights that mark a tract's neighbors,  $X$  is an  $N \cdot K$  vector of covariate values, and both  $\beta$  and  $\theta$  are  $K \cdot 1$  vectors of fixed but unknown parameters to be estimated by the model. In this analysis, a tract is said to be a neighbor of another tract if it shares a boundary or a vertex with that tract. *Id.* at 13.

<sup>58</sup> See *Id.* at 14; Yang, Noah, and Shoff, *supra* note 12.

<sup>59</sup> See LESAGE & PACE, *supra* note 10; Elhorst, *supra* note 10, at 10.

<sup>60</sup> See Barker, *supra* note 5; Barker et al., *supra* note 5; Kleinfield, *supra* note 5.

<sup>61</sup> The Eviction Lab is directed by Matthew Desmond and designed by Ashley Gromis, Lavar Edmonds, James Hendrickson, Katie Krywokuski, Lillian Leung, and Adam Porton.

bulk requests filed to the courts, automated collection of data hosted publicly online, and manual collection from courts themselves.<sup>62</sup> While the Eviction Lab's data are the most comprehensive repository of eviction-related data in the United States, the records hosted do not cover the entire universe of evictions and are limited in at least two respects. First, involuntary displacement may occur through landlord-initiated actions that do not make it to court, as when landlords pay renters to vacate their apartment or illegally lock renters out of their apartments.<sup>63</sup> Second, the data omit many counties and cities for which data are still currently being collected or not available.<sup>64</sup>

Both of these issues affect the study of New York City. In the first instance, media reporting on eviction and landlord harassment of tenants in New York City suggests that landlords commonly employ tactics to drive renters out of their homes; the results of these tactics may fall short of completed evictions. A series of investigations conducted in 2018, for example, revealed the extent to which landlords in New York City are willing to engage in illegal actions such as illegal construction and failing to maintain repairs.<sup>65</sup> Landlords also negotiate and settle with renters—sometimes making deals in the hallways of eviction court—in order to persuade the tenants to vacate the space.<sup>66</sup> Further, New York City eviction data are limited only to Brooklyn; data are not available for the other four boroughs of the city.

Despite these limitations, the Eviction Lab's data are the best available, and the limitations of the data may not unduly affect the results. Use of the eviction filing rate mitigates against the omitted informal displacements. While the eviction filing rate will not capture or measure displacements that occur through illegal construction or failing to maintain repairs, Nathan Kleinfield's characterization of agreements between landlords and tenants suggested that many of them occur after eviction proceedings have been initiated by landlords.<sup>67</sup> Similarly, the lack of data from the other boroughs of New York City, while not ideal, does not strip the analysis of the variation in tract-level gentrification or eviction rates needed to estimate a potential relationship. Brooklyn, while the epicenter of gentrification in New York City, contains communities and tracts that have historically been relatively affluent and marginalized tracts that have not experienced gentrification.

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The Eviction Lab is funded by the JPB, Gates, and Ford Foundations, as well as the Chan Zuckerberg Initiative. ABOUT EVICTION LAB, <https://evictionlab.org/about>, archived at <https://perma.cc/R8P2-TXHS>.

<sup>62</sup> Matthew Desmond et al., *Eviction Lab Methodology Report: Version 1.1.0*, EVICTION LAB 4, 7–8 (2018), <https://evictionlab.org/methods>, archived at <https://perma.cc/VGC7-ZNHU>.

<sup>63</sup> See *id.* at 2.

<sup>64</sup> See *id.* at 32.

<sup>65</sup> See Barker, *supra* note 5; Barker et al., *supra* note 5; Kleinfield, *supra* note 5.

<sup>66</sup> See Kleinfield, *supra* note 5.

<sup>67</sup> *Id.*

*Independent Variable*

There is no academic consensus on how to measure gentrification, and approaches vary widely across existing studies.<sup>68</sup> Gentrification generally characterizes both the economic and demographic transformation of formerly marginalized neighborhoods. Gentrification occurs specifically in neighborhoods that have historically suffered from neglect and disinvestment from state and private capital but have experienced or are now experiencing rapid public and private investment.<sup>69</sup> At the same time, gentrification refers to the rapid demographic transition that typically accompanies this re-investment and describes the processes wherein the previous working class and minority inhabitants of these neighborhoods are displaced or replaced by upper-class individuals and white Americans.<sup>70</sup> As in other studies, I test the relationship between gentrification and adverse landlord actions using multiple codings of gentrification drawn from the extant literature.

The first measure of gentrification employed in this study is a categorical variable that distinguishes between wealthy and affluent Census tracts that never could have experienced gentrification (“gentrification-ineligible”), marginalized tracts that could have gentrified but did not (“marginalized-non-gentrifying”), and tracts that did experience gentrification (“gentrified”). I code tracts as being eligible to gentrify if in the year 2000, they had populations over 500 (to exclude parks and industrial districts), rank in the bottom 50% of all New York City tracts by median household income, and rank in the bottom 50% by median rent price. Gentrified or gentrifying tracts are a subset of these eligible tracts that from 2000 to 2014 experienced an increase in inflation-adjusted median rent prices, ranked in the top tercile in terms of growth in the size of the population holding a bachelor’s degree, and ranked in the top tercile in terms of median rent price increase.<sup>71</sup>

The second measure of gentrification employed in this study is a continuous demographic measure designed as a proxy for class-turnover or change. Specifically, I measure the percentage change in the population that is employed in ‘post-industrial occupations’ or those employed in professional, scientific, and management occupations from 2000 to 2014.<sup>72</sup>

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<sup>68</sup> See Zuk et al., *supra* note 7, at 32.

<sup>69</sup> See Freeman, *supra* note 13, at 464.

<sup>70</sup> See *id.*

<sup>71</sup> Note that this process of gentrification codes tracts as ineligible for gentrification, eligible but non-changing, and gentrifying for all tracts in New York City, including those omitted for the analysis.

<sup>72</sup> See Elaine B. Sharp, *Politics, Economics, and Urban Policing: The Postindustrial City Thesis and Rival Explanations of Heightened Order Maintenance Policing*, 50 URBAN AFF. REV. 340, 353 (2014).

*Control Variables*

In addition to gentrification, I control for other factors—such as ability to pay, crime, the Black and Latino shares of the population, racial diversity, and income inequality—that might explain the eviction filing rate.

Intuitively, we would expect neighborhood level eviction rates to be strongly determined by the ability of neighborhood residents to pay rent. To account for this, I include tract level measures for the share of households that are rent-burdened—defined as the share of households that devote 30% or more of their incomes towards rent—and the family poverty rate.<sup>73</sup> We would expect that as the share of households in a tract that is rent-burdened or as the experience of poverty increases, so too will the eviction filing rate. And further, that increases in one tract will increase the eviction rate in nearby, marginalized tracts, as nearby familial and social networks are less able to aid the individuals suffering from eviction. Desmond and Gershenson's study similarly suggested that fiscal shocks, like job loss, that affect ability to pay rent are significantly correlated with eviction.<sup>74</sup> Accordingly, I include a measure of the tract-level unemployment rate and expect it will exert a similar spatial relationship to the eviction filing rate as the share of rent-burdened households and the poverty rate.

Desmond and Gershenson also presented evidence suggesting eviction is more common in areas with higher crime rates, consistent with qualitative evidence that families facing eviction in high crime areas are less likely to contest eviction filings.<sup>75</sup> I therefore also include a measure of tract-level violent crime in my regressions.

I also control for the share of the population that is Black and Latino, predicting that independent of other factors, race and ethnicity will affect the aggregate eviction rate. Here, tract-level measures of the Black and Latino share of the population might capture racial discrimination towards nonwhite tenants or discrimination that would affect members of these groups' ability to pay rent or contest eviction proceedings in court. I also include measures of the share of the tract headed by single mothers to control for the higher rates of eviction found among these households.<sup>76</sup> I also include a measure of the share of the tract that is non-citizens, hypothesizing generally that the comparative precariousness of non-citizens relative to citizens will lead to higher eviction filing rates as the non-citizen share of the tract increases.

Finally, I include measures of tract racial diversity, measured using entropy,<sup>77</sup> and income inequality, measured using the Gini coefficient, in order

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<sup>73</sup> See Desmond, *supra* note 24, at 160.

<sup>74</sup> Desmond & Gershenson, *supra* note 35, at 369.

<sup>75</sup> *Id.* at 370.

<sup>76</sup> See Matthew Desmond, *Eviction and the Reproduction of Urban Poverty*, 118 *Am. J. Soc.* 88, 117 (2012).

<sup>77</sup> I use Theil's H as a measure of tract-level racial diversity, which offers a measure of the representativeness of different racial and ethnic groups in a geographic area. It is calculated



to capture the effect that greater racial and ethnic diversity and income diversity may have on eviction and landlord behavior. In their analysis of individual evictions in Milwaukee, Desmond, Gershenson, and Barbara Kiviat found that race does not predict eviction in highly segregated neighborhoods and suggested that in rental markets where buyers do not cross racial boundaries, landlords are less likely and less able to replace Black renters with white renters.<sup>78</sup> The implication is that where racial homogeneity at the neighborhood level is higher, eviction is lower. I therefore expect eviction filing rates to be significantly higher in tracts with higher racial diversity. Income inequality may influence eviction in a similar fashion. In areas of Brooklyn where most renters earn similar incomes, landlords may have little incentive to pursue evictions against tenants, reasoning that the next renter will likely be just as unable to pay the rent. Conversely, in areas with high levels of income inequality, landlords have a much stronger incentive to displace (low income) renters.

#### MAPPING GENTRIFICATION AND EVICTION FILING RATES IN BROOKLYN, NEW YORK

Figure 1 depicts a cartogram of gentrification in Brooklyn using the classification scheme in which tracts are classified as ineligible for gentrification, non-gentrified, or gentrified. Figure 2 depicts a cartogram of the (logged) eviction filing rate.

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according to the following formula:  $E_t = -\sum_r p_r \log(p_r)$  where  $t$  indexes each Census tract,  $r$  indexes each racial group, and  $p$  denotes the population share of each racial/ethnic group. In application, here racial groups are Black, White, Latino, Asian, and other. With five groups, the minimum possible entropy for any tract is zero and is achieved when only one racial group is present in a tract, while the maximum value is  $\log(5)$  or 1.61. See John Iceland, *The Multigroup Entropy Index (Also Known as Theil's H or the Information Theory Index)* (2004), [https://www2.census.gov/programs-surveys/demo/about/housing-patterns/multigroup\\_entropy.pdf](https://www2.census.gov/programs-surveys/demo/about/housing-patterns/multigroup_entropy.pdf), archived at <https://perma.cc/4X6X-LQDJ>; Lance Freeman, *Neighborhood Diversity, Metropolitan Segregation, and Gentrification: What Are the Links in the US?*, 46 URBAN STUD. 2079–2101 (2009).

<sup>78</sup> Matthew Desmond, Carl Gershenson & Barbara Kiviat, *Forced Relocation and Residential Instability Among Urban Renters*, SOC. SERV. REV. 227, 227 (June 2015).

FIGURE 1: GENTRIFICATION IN BROOKLYN, 2014

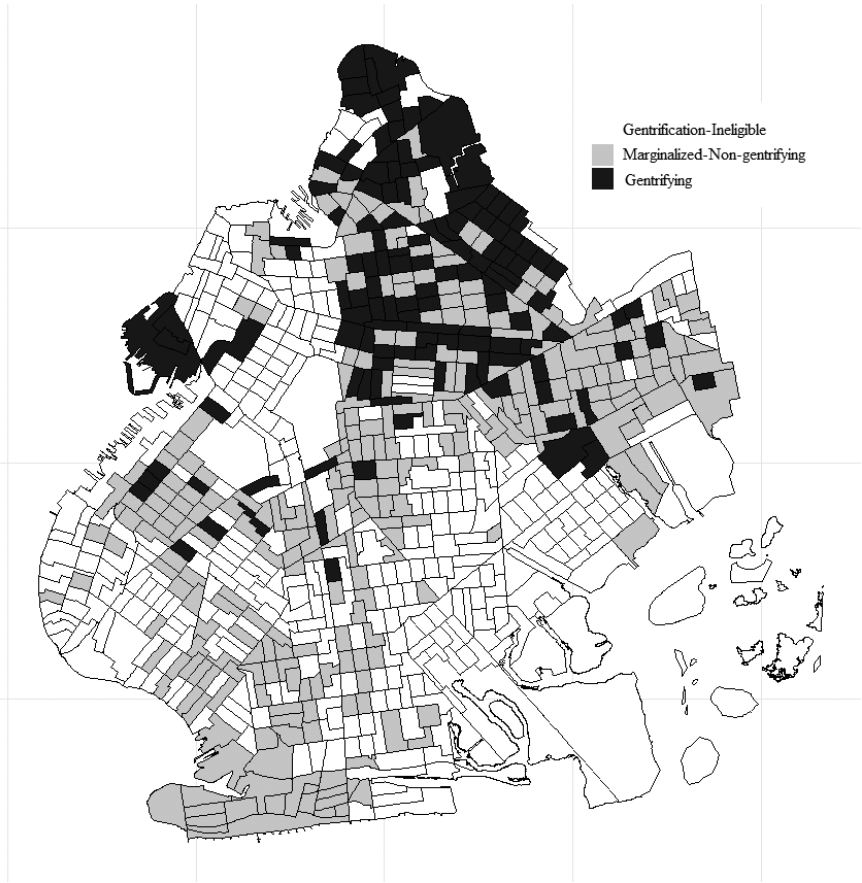


FIGURE 2: EVICTION FILING RATE IN BROOKLYN 2014 (LOGGED)



The map of gentrification in Brooklyn identifies a large portion of the borough as eligible for gentrification or gentrified. Out of a total of 760 Census tracts, 37% were eligible for gentrification (e.g., marginalized-non-eligible tracts and gentrified tracts) and 17% experienced gentrification. The spatial extent of gentrification identified in this coding procedure appears consistent with qualitative reports, with a majority of the tracts in the neighborhoods of Greenpoint and Williamsburg coded as experiencing gentrification, and large portions of Bushwick, Bedford-Stuyvesant, and Crown Heights coded as experiencing gentrification as well. Large portions of these latter three neighborhoods are identified as eligible for gentrification, alongside large portions of Flatbush, Prospect-Lefferts Gardens, Coney Island, East New York, Sunset Park, and Brownsville. Tracts in Borough Park, Bensonhurst, and other portions of south-central Brooklyn appear to have been too affluent in 2000 to experience gentrification.

It is not immediately clear from a visual inspection of Figures 1 and 2 whether eviction filings are more frequent in gentrifying tracts. For example, while the eviction filing rate is high in gentrifying tracts in Bushwick, Bed-

ford-Stuyvesant, and Crown Heights, it is low in the neighborhoods of Greenpoint and Williamsburg. The eviction filing rate is also particularly high in marginalized tracts that did not gentrify in Flatbush, East Flatbush, Brownsville, and East New York. It is therefore not entirely clear whether the eviction filing rate is higher in gentrifying tracts or in marginalized tracts. In order to test systematically whether or not it is, while controlling for the direct and indirect effect of other covariates, I now turn to the multivariate analyses.

## MULTIVARIATE RESULTS

### *Results from Categorical Coding of Gentrification*

Table 1 presents the results from Model 1, which employs the categorical measure of gentrification that distinguishes between the three different types of tracts. The results offer little evidence that gentrification is associated with higher eviction filing rates, either directly or indirectly. Indeed, the overall results suggest that gentrification is associated with *reductions* in the overall eviction filing rate. Taking the direct effects first, the point estimates returned from Model 1 suggest that the direct effect of gentrification on tract-level eviction filing rates in Brooklyn is small, negative, and statistically indistinguishable from zero. Unsurprisingly, the results also suggest that being gentrification-ineligible is associated with a significantly lower eviction filing rate. Specifically, a hypothetical switch from a marginalized-non-gentrifying tract to a gentrification-ineligible tract would have induced a 21% reduction in the eviction filing rate.

TABLE 1: EFFECT OF GENTRIFICATION ON EVICTION FILING RATES (LOGGED) IN BROOKLYN, NEW YORK (2014)

|                            | Direct Effect | Indirect Effect | Total Effect |
|----------------------------|---------------|-----------------|--------------|
| Gentrified                 | 0.018         | -0.490***       | -0.471**     |
| Gentrification-ineligible  | -0.286***     | -0.625***       | -0.911***    |
| % Black                    | 0.013***      | 0.009**         | 0.021***     |
| % Latino                   | 0.000         | 0.016***        | 0.015***     |
| % Non-citizen              | -0.003        | -0.013***       | -0.016***    |
| % Family poverty           | -0.020***     | -0.010          | -0.030***    |
| % Unemployed               | -0.020*       | 0.015           | -0.005       |
| % Rent burdened            | 0.022***      | 0.028***        | 0.050***     |
| % Single mother households | -0.017***     | -0.012          | -0.029*      |
| (Log) crimes per capita    | 0.212***      | -0.203*         | 0.008        |
| Gini                       | 1.453***      | 2.867**         | 4.320***     |
| Entropy                    | 0.507***      | 0.050           | 0.556**      |

Note:  $\rho = .29$ .  $N = 734$

Table 1 also depicts the average indirect effect that gentrification in a tract had on eviction filing rates. Here, the model identifies a statistically significant relationship between neighborhood gentrification from 2000 to 2014 and eviction filing rates, but not in the anticipated direction. Specifically, Model 1 estimates that across all tracts in the sample, gentrification among a tract's neighbors would have been associated with a 44% reduction in the eviction filing rate in that tract. Similarly, a hypothetical switch among a tract's neighbors from marginalized-non-gentrifying to gentrification-ineligible would be associated with a 38% reduction in the eviction filing rate in that tract.<sup>79</sup>

The pattern of effects among the control variables varies in its consistency with expectations. For example, Table 1 suggests that increase in the Black share of the neighborhood population is positively associated with higher eviction filing rates and that the effect of race works directly and indirectly. Specifically, the results suggest that a unit increase in the Black share of the population would be associated with a 1.1% increase in the eviction rate in that tract and a 1% increase in the eviction rate in neighboring tracts. In total, Model 1 estimates that a unit increase in the Black share of the population is associated with a 2.1% increase in the eviction filing rate overall. The effect of increases in the Latino share of the population does not evince a statistically significant direct effect but a statistically significant indirect effect, such that a unit increase in the Latino population would indirectly increase the eviction filing rate by 1% in neighboring tracts.

The results from Table 1 also suggest that neighborhood diversity and economic inequality are both positively and strongly predictive of eviction filing rates. A unit increase in racial/ethnic entropy would have been associated with a 0.58% increase in the eviction filing rate in the tract that experienced it, but would not have affected the eviction filing rate in neighboring tracts.<sup>80</sup> Income inequality as measured by the Gini coefficient was positively associated with higher levels of evictions, such that a unit change in the Gini coefficient would have been associated with a 2.98% increase in the eviction rate of the tract and a 22% increase in the eviction filing rate in surrounding tracts. Put differently, a unit increase in the Gini coefficient of surrounding tracts would have been associated with an increase in the eviction filing rate in a tract by approximately 22%.<sup>81</sup>

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<sup>79</sup> Note that an equally valid interpretation of the indirect effect is that gentrification is associated with a 44% reduction in eviction filing rates borough-wide. Elhorst, *supra* note 10, at 10.

<sup>80</sup> For context, the entropy score of Idaho and South Dakota were approximately .38 in 2015, while the entropy score of Illinois, Virginia and Arizona were .68. Barrett A. Lee et al., *State-Level Changes in US Racial and Ethnic Diversity, 1980 to 2015: A Universal Trend?*, 37 DEMOGRAPHIC RES. 1031, 1035 (2017). Therefore, a tract that went from the racial diversity akin to that of Idaho or South Dakota to that of Illinois, Virginia, or Arizona would have observed a 17.4% increase in the eviction filing rate.

<sup>81</sup> For context, the Gini coefficient for the United States was 41.5 in 2016 while the Gini coefficient for Norway was 26.8. A hypothetical switch from the level of wealth inequality in

The pattern of results among the covariates designed to measure the effect of disadvantage and average ability to pay rent in the tract are significantly less consistent with expectations. On the one hand, the model suggests that crime is positively associated with eviction filing rates, such that a 10% increase in the crime rate would have been associated with a 2.2% increase in the eviction filing rate. Interestingly, the relationship between crime and eviction filing appears to evince a *social relativity effect*, such that while an increase in crime is associated with an increase in the eviction filing rates in the tract in which it occurred, it is simultaneously associated with a *reduction* in the eviction filing rate in nearby tracts. This could be the result of a few factors, but it may be the case that residents in tracts adjacent to high-crime neighborhoods are more aggressive in fighting eviction or more diligent in their desire to stay in their homes out of fear of being displaced to nearby, worse off neighborhoods. Similarly, landlords may be disinclined to pursue eviction in tracts where the crime rate is higher in neighboring tracts, reasoning that their current tenants are better than potential new tenants from nearby.

Like the violent crime rate, inability to pay rent—as measured by the share of tracts that are rent-burdened—is also positively associated with eviction, such that a unit increase in the total share of rent-burdened households would have been associated with a 2.3% increase in the eviction filing rate in the tract in which it occurred and a 2.9% increase in the eviction filing rate of nearby tracts (or, an unit increase in the share of rent burdened households surrounding a tract would be associated with a 2.9% increase in the eviction filing rate in the tract itself).

Strangely, however, Model 1 predicts that the share of single-mother households and share of tracts in poverty were negatively associated with the eviction rate. Specifically, a unit increase in the share of single-mother households in the tract would have been associated with a 1.9% reduction in the eviction filing rate in that tract, while a unit increase in the family poverty rate would have been associated with a 2.1% reduction in the eviction filing rate. As I discuss in more detail below, one potential explanation for these unexpected findings is that rather than directly capturing marginalization and inability to pay rent, these two measures are picking up on the share of households that are eligible for local and federal housing assistance and are therefore less likely to be evicted.

### *Results from Class-Based Measure of Gentrification*

Table 2 reports the results using change in the share of the population employed in ‘post-industrial’ occupations. Here, the findings suggest that gentrification *is* positively associated with higher eviction rates and is con-

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Norway to that of the United States, then, would have been associated with a tremendous 1,336% increase in the eviction filing rate.

centrated in the tract within which it occurs. Specifically, a unit increase in the share of the population employed in the post-industrial sector was associated with a 1.6% increase in the eviction rate in that tract. Like the crime rate, however, the relationship between change in the share of the population employed in post-industrial occupations and eviction filing rates shows evidence of social relativity, so the indirect effect of an increase in this class of workers is associated with reductions in the eviction filing rate in nearby neighborhoods. Controls largely behave as they did before: the black share of the population, rent burden, crime, the Gini coefficient, and entropy are positively associated with tract level eviction filing rates, and poverty and household income are negatively associated with the eviction filing rate.

TABLE 2: EFFECT OF CHANGE IN SHARE OF TRACT EMPLOYED IN POST-INDUSTRIAL OCCUPATIONS ON EVICTION FILING RATES (LOGGED) IN BROOKLYN, NEW YORK (2014)

|                                      | Direct Effect | Indirect Effect | Total Effect |
|--------------------------------------|---------------|-----------------|--------------|
| % Change post-industrial occupations | 0.157***      | -0.298**        | -0.142       |
| % Black                              | 0.014***      | 0.006           | 0.020***     |
| % Latino                             | 0.000         | 0.010*          | 0.011**      |
| % Non-citizen                        | -0.001        | -0.008          | -0.009*      |
| % Family poverty                     | -0.017***     | 0.002           | -0.014*      |
| % Unemployed                         | -0.011        | 0.040           | 0.029        |
| % Rent burdened                      | 0.024***      | 0.033***        | 0.057***     |
| % Single mother households           | -0.016**      | -0.014          | -0.031       |
| (Log) crimes per capita              | 0.200***      | -0.031          | 0.169        |
| Gini                                 | 1.547***      | 3.179**         | 4.726***     |
| Entropy                              | 0.498***      | 0.087           | 0.585**      |

Note:  $\rho = .36$ .  $N = 734$

### *Spatial Partitioning of Direct and Indirect Effects*

In the final portion of the analysis, I partition the estimated direct and indirect effects by neighbors of different orders. As discussed above, Table 1 and Table 2 summarize the indirect effect of covariate changes on the eviction filing rate across the entire sample. Since any one Census tract is “connected” to every other Census tract in Brooklyn through neighbors, the summary of indirect effects does not characterize how covariate changes in a Census tract’s immediate neighbors affect the eviction filing rate in that tract, but rather across all tracts in the sample.<sup>82</sup> In the following section, I partition the results from Tables 1 and 2 in order to determine whether the direct and indirect effects of changes in a tract’s characteristics are concentrated

<sup>82</sup> See Elhorst, *supra* note 10, at 10.

among a tract's immediate neighbors or affect Census tracts some distance away from that tract.

I partition by "order" the direct and indirect effects of covariate changes in the eviction filing rate. I label the "zero order" neighbor (e.g., the Census tract itself)  $W_0$ . First-order neighbors—tracts that immediately border the Census tract—are labeled  $W_1$ , second-order neighbors are labeled  $W_2$ , and third-order neighbors are labeled  $W_3$ .<sup>83</sup> While higher order neighbors do exist in the data set, I exclude them here for space and because their impact on eviction filing rates are negligible (as I demonstrate below).

Tables 3 and 4 present the results from this spatial partitioning. These results suggest that for some variables, spatial spillover and spatial feedback<sup>84</sup> are concentrated among a tract's immediate neighbors and that for others, these spatial effects are more diffuse. Table 3 presents a partitioning of the estimated determinants of the log eviction filing rate when the categorical measure of gentrification that distinguishes between the three different types of tracts is used. Results here suggest that the negative relationship between gentrification-ineligibility and eviction filing rates is a product of both positive feedback and spatial spillover. Taking the direct effect first, spatial partitioning suggests that a majority—approximately 73%—of the direct effect of the effect of gentrification-ineligibility on lower eviction filing rates is attributable to within-tract effects. Model 1 estimates that the remaining 27% of the effect comes from feedback effects or a feedback loop that status as gentrification-ineligible induces on eviction filing rates surrounding tracts that then, in turn, affect the eviction-filing in the tract itself. One substantive interpretation of this feedback effect is that if we switched a marginalized-non-gentrifying tract into one that had never experienced disinvestment, we would not only expect to observe significantly lower eviction filing rates in that tract, but we would also expect that change to induce changes in adjacent tracts that would *feed back* into that tract itself.

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<sup>83</sup> LESAGE & PACE, *supra* note 10, at 22.

<sup>84</sup> In this Article, I use spatial feedback to refer to the effect that changes that some covariate value of a tract have on that tract after first "passing through" neighboring tracts. Spatial feedback might be at work for example, if higher rates of income inequality in tract A leads to higher rates of eviction filing in tract B *and* the subsequent eviction filing rates in tract B lead to higher rates of eviction filing in tract A, producing something of a "feedback loop."



TABLE 3: SPATIAL PARTITIONING OF THE EFFECT OF GENTRIFICATION ON EVICTION FILING RATES (LOGGED) IN BROOKLYN, NEW YORK (2014)

|                            | Direct Effect |              |              | Indirect Effect |              |              |
|----------------------------|---------------|--------------|--------------|-----------------|--------------|--------------|
|                            | $W_0$         | $W_1$        | $W_2$        | $W_0$           | $W_1$        | $W_2$        |
| Gentrified                 | 0.08          | -0.06        | 0            | <b>-0.41</b>    | -0.04        | <b>-0.02</b> |
| Gentrification-ineligible  | <b>-0.21</b>  | <b>-0.06</b> | <b>-0.01</b> | <b>-0.44</b>    | <b>-0.12</b> | <b>-0.04</b> |
| % Black                    | <b>0.01</b>   | 0            | 0            | 0               | 0            | 0            |
| % Latino                   | 0             | 0            | 0            | <b>0.01</b>     | 0            | 0            |
| % Non-citizen              | 0             | 0            | 0            | <b>-0.01</b>    | 0            | 0            |
| % Family poverty           | <b>-0.02</b>  | 0            | 0            | 0               | <b>-0.01</b> | 0            |
| % Unemployed               | <b>-0.02</b>  | 0            | 0            | 0.02            | 0            | 0            |
| % Rent burdened            | <b>0.02</b>   | 0            | 0            | <b>0.02</b>     | <b>0.01</b>  | 0            |
| % Single mother households | <b>-0.02</b>  | 0            | 0            | 0               | <b>-0.01</b> | 0            |
| (Log) crimes per capita    | <b>0.24</b>   | <b>-0.03</b> | <b>0.01</b>  | <b>-0.23</b>    | <b>0.03</b>  | -0.01        |
| Gini                       | <b>1.1</b>    | <b>0.27</b>  | <b>0.07</b>  | <b>1.95</b>     | <b>0.6</b>   | <b>0.18</b>  |
| Entropy                    | <b>0.49</b>   | -0.01        | <b>0.02</b>  | -0.09           | <b>0.13</b>  | 0.01         |

Note: coefficient values in bold are significant at  $\alpha = .05$ .

Similarly, if we were to switch a marginalized-non-changing tract to a gentrification-ineligible tract, we would expect that change to be associated with significantly lower eviction filing rate in nearby tracts. Specifically, we would expect 70.5% of the indirect effect to occur in first-order neighbors and the remaining 29.5% to occur from higher-order neighbors. Looking at the indirect effect of gentrification, we can similarly observe that the majority of the indirect effect of gentrification (84%) is concentrated among first-order neighbors. From the pattern of other covariates reported in Table 1, it appears that the direct effect for most significant covariates is concentrated in the tract itself and that indirect effects largely affect a tract's immediate neighbors, with the magnitude of the effects dropping significantly after the first-order neighbor.

The major exception to this pattern is tract level Gini coefficient. Here, the relationship between the Gini coefficient and eviction filing rates appears to exhibit significant positive feedback effects. While approximately 80% of the direct effect is attributable to the tract itself, 20% of the direct effect of income inequality on the eviction filing rate is attributable to feedback effects that higher-income inequality induces in nearby tracts, which in turn affect the eviction filing rate in the tract. The indirect effect of income inequality also exhibits significant spatial spillover. Specifically, Table 3 identifies that approximately 68% of the indirect effect of income inequality, as measured by the Gini coefficient, affects first order neighbors, 21% spills over to second-order neighbors, 6% spills over to third-order neighbors, and a remaining 5% spills beyond the third-order neighbors.

These patterns are largely replicated in Table 4, which shows the spatial partitioning of the effect when change in the share of the population employed in post-industrial occupations is used as a proxy for gentrification.

Here, direct and indirect effects are concentrated in zero- and first-order neighbors, again with the key exception being the Gini coefficient, which exhibits strong feedback effects and broad spatial spill-over.

TABLE 4: SPATIAL PARTITIONING OF THE EFFECT OF CHANGE IN THE SHARE OF THE TRACT EMPLOYED IN POST-INDUSTRIAL OCCUPATIONS ON EVICTION FILING RATES (LOGGED) IN BROOKLYN, NEW YORK (2014)

|                                      | Direct Effect |              |             | Indirect Effect |              |             |
|--------------------------------------|---------------|--------------|-------------|-----------------|--------------|-------------|
|                                      | $W_0$         | $W_1$        | $W_2$       | $W_0$           | $W_1$        | $W_2$       |
| % Change post-industrial occupations | <b>0.21</b>   | <b>-0.05</b> | <b>0.01</b> | <b>-0.30</b>    | 0.02         | -0.02       |
| % Black                              | <b>0.01</b>   | 0.00         | <b>0.00</b> | 0.00            | <b>0.00</b>  | <b>0.00</b> |
| % Latino                             | 0.00          | 0.00         | 0.00        | 0.01            | 0.00         | <b>0.00</b> |
| % Non-citizen                        | 0.00          | 0.00         | 0.00        | -0.01           | 0.00         | 0.00        |
| % Family poverty                     | <b>-0.02</b>  | 0.00         | <b>0.00</b> | 0.01            | <b>0.00</b>  | 0.00        |
| % Unemployed                         | -0.02         | <b>0.01</b>  | 0.00        | <b>0.04</b>     | 0.00         | 0.00        |
| % Rent burdened                      | <b>0.02</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.02</b>     | <b>0.01</b>  | <b>0.00</b> |
| % Single mother households           | <b>-0.01</b>  | 0.00         | <b>0.00</b> | -0.01           | <b>-0.01</b> | 0.00        |
| (Log) crimes per capita              | <b>0.21</b>   | -0.02        | <b>0.01</b> | -0.09           | <b>0.06</b>  | 0.00        |
| Gini                                 | <b>1.04</b>   | <b>0.34</b>  | <b>0.11</b> | <b>1.92</b>     | <b>0.74</b>  | <b>0.29</b> |
| Entropy                              | <b>0.49</b>   | -0.02        | <b>0.03</b> | -0.12           | <b>0.15</b>  | 0.02        |

Note: coefficient values in bold are significant at  $\alpha = .05$ .

#### IV. CONCLUSION

To summarize, this Article examines the effect of gentrification on eviction filing rates in Brooklyn, testing the specific hypothesis that gentrification produces an incentive among landlords to increase the intensity with which they pursue eviction against tenants in changing neighborhoods. This hypothesis was motivated by extant literature and investigative reporting describing how increasing rent prices and New York City's rent stabilization laws created an incentive for landlords in New York City to evict low income tenants in gentrifying units so as to raise the rent and bring rent-stabilized units to market-rate. This analysis is the first to account for and model *spatial dependence* in the relationship between gentrification and eviction.

Results are mixed. Using one proxy of gentrification—which classified tracts as either ineligible for gentrification because they were already wealthy, non-gentrifying, or gentrifying—the analysis uncovers a *negative association* between gentrification and eviction filing rates. Compared to non-gentrifying tracts, gentrified tracts in Brooklyn have significantly lower eviction filing rates. What's more, the analysis finds that most of the effect is indirect, such that a hypothetical switch from a marginalized-non-gentrifying tract to a gentrified tract is associated with fewer eviction filings in surrounding neighborhoods. In that regard, the findings from this analysis are consistent with those found by Freeman, Braconi, and others, suggesting that

low-income households are no more or even less likely to be evicted from gentrifying tracts.

Results from a second proxy of gentrification—which measured change in the share of the tract employed in professional, scientific, and management occupations from 2000 to 2014—however, are decidedly more mixed. Here, the analysis suggests a positive *direct association* between gentrification and eviction filing rates, which suggests that in neighborhoods where the share of the population employed in these professions grew most over that period, eviction filing rates were generally higher. At the same time, however, the results suggest that the *indirect* effect of a change in the share of the population employed in these occupations is associated with lower eviction filing rates. That the immediate effect of gentrification is associated with higher eviction filing rates in the tract where it happened but lower eviction filing rate in nearby tracts is puzzling. Extant literature gives little indication that landlords in neighborhoods surrounding those where high-status individuals are moving into or currently live have any incentive to reduce the rate at which they file evictions in their own tracts. Future work, both qualitative and quantitative, may prove this relationship spurious or provide an explanation of this effect.

The pattern of effects among covariates, while not the direct source of inquiry in this Article, are nevertheless revealing and potentially useful for legal scholars and practitioners. Perhaps most interesting are the strong positive associations between racial diversity, economic inequality, and tract-level eviction filing rates. These results suggest that legal aid practitioners may do well to locate areas with significant income and wealth inequality in order to identify clients and households that may be in need of assistance. And as with the two proxies of gentrification, the results suggest that the effect of income inequality has significant spill-over effects on the eviction filing rate, meaning that as income inequality in one neighborhood increases, eviction filing rates not only increase in that neighborhood but in other neighborhoods as well. Indeed in both models, the estimated indirect effect is larger than the direct effect, offering tentative evidence that as inequality in a neighborhood increases, landlords are more likely to pursue eviction.

In this regard, the findings recall studies on the suburbanization of poverty.<sup>85</sup> Here, extant scholarship has argued that the involuntary displacement of poor families from central cities may have pushed them to inner-ring suburban areas and into worse housing conditions, where other negative outcomes, including further and future displacement, may follow.<sup>86</sup> The results presented here suggest that legal aid practitioners and those who otherwise support individuals experiencing eviction or who may experience eviction may not want to focus solely on highly unequal cities, but to expand services

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<sup>85</sup> See Thomas J. Cooke & Curtis Denton, *The Suburbanization of Poverty? An Alternative Perspective*, 36 URB. GEOGRAPHY 300, 311–12 (2015).

<sup>86</sup> See Desmond, *supra* note 76, at 89.

to nearby suburbs where displaced individuals might relocate or where landlords themselves may anticipate an expanding pool of renters. In the case of Brooklyn, the results suggest that the high concentration of legal aid provided in the city, including recent laws that guarantee city residents the right to legal representation if they are facing eviction, may overlook affected communities *outside* the five boroughs.<sup>87</sup>

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<sup>87</sup> Kriston Capps, *New York City Guarantees a Lawyer to Every Resident Facing Eviction*, CITY LAB (Aug. 14, 2017), <https://www.citylab.com/equity/2017/08/nyc-ensures-eviction-lawyer-for-every-tenant/536508>, archived at <https://perma.cc/LY34-8JTU>.