Cityscape

A Journal of Policy Development and Research

MEASURING BLIGHT
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PD&R

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Measuring Blight

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Introduction

Communities across the United States struggle with blighted urban environments. Negative associations with blight include crime (Branas, Rubin, and Guo, 2012), falling property values (Han, 2014), poor social determinants of health (Garvin et al., 2013), sprawl (Brueckner and Helsley, 2011), and dwindling tax bases but increased burdens (Tri-COG Collaborative, 2013). Despite substantial research into the negative effects of blight, no single definition of blight emerges (Morckel, 2014). The context of defining blight matters for identifying the proper measurement and data source for evaluating blight. Discussing the ever-evolving definition of blight, Gordon (2004) quotes a California state legislator who said, "defining blight became an art form" which also applies to the measurement of blight.

Measuring blight continues to remain important because during the 2010s, approximately one-fifth of metropolitan areas and one-half of micropolitan areas lost population (Mackun, Comenetz, and Spell, 2021). As communities shrink, structures will be abandoned. Because the definition of blight is ambiguous, measuring this phenomenon is difficult. Measuring blight requires substantial work, which can be labor-intensive and can quickly become outdated (Pagano and Bowman, 2000). Windshield and parcel surveys have been sources of good-quality data but are expensive to produce and maintain. Administrative records are increasingly popular measurements of blight because the information already exists, although this data frequently uses other indicators as a proxy for blight. Efforts to measure blight using administrative records have included housing code violations (Hillier et al., 2003), tax delinquency (Whitaker and Fitzpatrick, 2013), 311 calls-for-service (Athens et al., 2020), and postal delivery status records (Molloy, 2016).

This issue of *Cityscape* explores recent developments in the measurement of blight. Administrative data, particularly housing vacancy data, continue to be a leading proxy for blight. Novel techniques using image classification ameliorate early warnings of housing abandonment, which may enable

blight intervention programs to become more proactive rather than reactive. This symposium also describes how the measurement of blight is also correlated to the measurement of other phenomena, such as sprawl.

Symposium Articles

The first article, "Exploring the Empirical Relationship Between Inner-City Blight and Urban Sprawl in the United States," by Eric Fesselmeyer and Kiat Ying Seah (2022), measures the relationship between center-city residential vacancy and sprawl. Using a compactness score (Hamidi and Ewing, 2014), Fesselmeyer and Seah construct models to compare residential vacancy in center-city census tracts compared with census tracts away from the city center in 162 urbanized areas. The authors find that as compactness scores in these urbanized city centers decrease, rates of residential vacancy increase. This finding contributes to a growing body of literature exploring how policies that promote growth at the urban fringe leave behind deteriorating inner-city neighborhoods (Banai, Antipova, and Momeni, 2021; Ewing and Hamidi, 2015; Hamidi and Ewing, 2014; Wassmer, 2008), although other factors—such as crime and zoning—may also drive flight to the suburbs and exurbs.

Deep learning based on imagery classification continues to improve. The authors of "Deep Learning Visual Methods for Identifying Abandoned Houses" train models to identify abandoned structures with a high success rate (DeLisle et al., 2022). The authors' study tackles the problem that structure abandonment happens over time and cannot be accurately measured from a singular dataset. The authors train a series of models of "what abandonment looks like" by using images of general housing abandonment and imagery specific to the study area, Kansas City, Missouri (KCMO). The authors demonstrate that an ensemble model containing both global and local (KCMO-specific) components outperform the individual models. The authors built a binary classification model to detect and sort abandoned houses into two categories—abandoned and occupied—using only house images. They constructed three models: a global model that accounted for factors other than the KCMO-specific community, a local model that concentrated on the KCMO-specific community, and an ensemble model combining the local and global models. After that, the ensemble model may be generalized to various communities. For the current work, the authors used Google online photos or Google Street View images. The potential of this method for measuring blight is limited only by the available imagery. The authors propose (in future work) that cameras be placed on municipal fleet vehicles (e.g., garbage trucks) that navigate neighborhoods daily. A packaged, automated solution to collect, process, and store images could provide relatively low-cost data while matching the quality of data collected by humans in-person. Communities could use more abundant, quality data to detect and proactively address abandonment as it occurs before it can develop into blight and metastasize.

"Are Housing Vacancy Rates a Good Proxy for Physical Blight?" by Adam Berland (2022) tests the use of housing vacancy data from the American Community Survey (ACS) and the HUD Aggregated United States Postal Service (USPS) Administrative Data on Address Vacancies (USPS address data) to predict blighted property rates derived from a physical parcel survey in Toledo, Ohio. The purpose of this analysis is to assess whether national datasets are accurate compared

with local, higher quality data. The author finds both datasets, the ACS and USPS address data, to be strongly correlated to rates of physical blight in the parcel survey dataset from Toledo; however, the relationship is not perfect, and the national datasets tended to overestimate blight in areas of high vacancy. In the absence of local, quality data or to facilitate comparisons across jurisdictions, both datasets may be a quality proxy for measuring blight.

In the final article, Peter Han and this guest editor (2022) explore using HUD Aggregated USPS Administrative Data on Address Vacancies (USPS address data) by postal carrier route type. These data contrast with the data provided to researchers by HUD because that data aggregation is not broken out by letter carrier type. The authors perform a special tabulation of the data that is broken out by postal carrier route type (city or rural) and investigate a note from USPS that vacant addresses along rural postal routes are marked as "not-a-statistic" ("no-stat"). Because the authors investigate rural postal carrier routes, the authors include a measurement of rurality using Rural-Urban Commuting Areas (RUCA) codes, a census tract-level delineation of Office of Management and Budget (OMB) definitions of metropolitan, micropolitan, and nonmetropolitan or micropolitan areas based on commuting patterns. As the population size of communities becomes smaller and commute time to nearby urban centers and clusters takes longer, an increasingly higher share of residential addresses is served by rural postal routes, although this measure of USPS-defined rurality does not exactly align with other, more common measures of rurality. The authors then use the vacancy rate from the ACS to benchmark two measures of vacancy rates derived from USPS address data: (1) the more common metric of long-term (6 months or greater) vacancy and (2) long-term vacancy plus residential addresses labeled no-stat along rural postal carrier routes (rural no-stats). The authors find that the inclusion of the rural no-stat addresses in the vacancy rate estimate more closely approximates the ACS vacancy rate, particularly as rurality increases. When measuring housing vacancy as estimated by USPS address data, analysts and researchers should exercise caution in non-core census tracts—particularly in metropolitan counties—if using only the long-term vacancy rate estimates because housing vacancy may not be counted as expected in those areas.

Acknowledgments

The guest editor thanks the authors of each article for their contributions to knowledge and for contributing their manuscripts to this symposium; the referees for their timely blind peer reviews; Mark Shroder for the opportunity to make this symposium possible; and Todd Richardson for beginning the interagency agreement to share administrative address data between the United States Postal Service and the U.S. Department of Housing and Urban Development long before my professional career began.

Guest Editor

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Exploring the Empirical Relationship Between Inner-City Blight and Urban Sprawl in the United States

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Abstract

Urban blight has been found to cause a variety of problems, including negatively affecting the value of surrounding properties and increasing neighborhood crime rates. If the same externalities that give rise to urban sprawl also contribute to urban blight, as is suggested by Brueckner and Helsley (2011), city center vacancy rates—an indication of blight—would increase with the extent of urban sprawl. This study adds to the sparse literature on the empirical relationship between urban sprawl and blight by finding that the city-center census tract vacancy rate is higher in more sprawling cities. The results of this article, therefore, provide support for the argument that policies designed to contain urban sprawl could have the advantage of also mitigating urban blight.

Introduction

Urban blight, a term used to describe the unacceptable condition of older central-city properties due to deficient reinvestment, is akin to a poverty magnet. It is associated with a variety of unfavorable outcomes, including negatively affecting the value of surrounding properties and neighborhood vitality; decreasing tax revenue and increasing costs for local government; and increasing crime rates, including violent crime, arson, and vandalism (Accordino and Johnson, 2000; HUD PD&R, 2014). Often, municipalities attempt to reverse urban blight using methods such as eminent domain, code enforcement, and tax foreclosure to reclaim vacant housing and properties and sell them to new owners (HUD PD&R, 2014). In some cities, such as Detroit and Buffalo, vacant properties have deteriorated to the point that the government has turned to demolition (Lyons, 2009; Schilling and Pinzón, 2016).

A more preemptive approach is to rectify policies that discourage maintaining and investing in properties in certain areas of a city, thereby creating blight. For example, Brueckner and Helsley (2011) developed a theoretical model to illustrate that the same externalities that cause urban sprawl, such as unpriced traffic congestion and the failure to account for open-space amenities in development decisions, also contribute to inner-city blight. Such externalities increase the payoff to building on the city edge while simultaneously decreasing the payoffs to investing in the city center. This conclusion suggests that policies designed to mitigate urban sprawl also mitigate urban blight. Little empirical work, however, examines whether a relationship between urban sprawl and blight holds empirically.[1] This article attempts to answer that question by collecting and combining several different datasets, including geographic data on Census-defined urbanized areas, census tracts, and city centers; residential vacancy rates; and Hamidi and Ewing's (2014) compactness/sprawl index. With vacancy rate as the indicator of blight, this article estimates how a city's compactness/sprawl affects the vacancy rate of census tracts near the city center relative to the vacancy rate of census tracts away from the center. Findings reveal that the vacancy rate of city-center census tracts is relatively higher in more sprawling cities. The empirical result presented in this article provides evidence supporting Brueckner and Helsley's (2011) theory that externalities that cause sprawl also cause blight.

Data

This section describes the data used in this analysis. Summary statistics are reported in exhibit 1, which is referred to in the following discussion on the various data sources.

Exhibit 1

Summary Statistics

Variable	Mean	St. Dev.
Vacancy rate (%)	8.02	7.45
Compactness index, 2000 and 2010	106.90	27.22
Compactness index, 2000	106.52	26.65
Compactness index, 2010	107.31	27.69
Distance to city center, miles	12.45	10.38
Census tract within 2 miles of city center	0.07	0.25
Census tract within 4 miles of city center	0.18	0.39
Census tract within 6 miles of city center	0.30	0.46
Observations	81,907	

St. Dev. = standard deviation.
Source: Author calculations

[1] A notable exception is an interesting study by Hortas-Rico (2015) that finds that urban containment policies reduce central-city blight. That study and this article display several key differences in approach; the following are the most important ones. First, this article focuses on vacancy rates as the measure of blight, whereas Hortas-Rico focused on building conditions. Second, whereas Hortas-Rico focused solely on the central-city comparisons, this article considers the amount of blight in the city center relative to outside the city center, which should provide a more informative picture of whether investment differs by location within an area. Finally, rather than an indicator variable of whether the area has implemented an urban containment policy, as used by Hortas-Rico, this article uses a direct measure of sprawl in the analysis, which should more directly account for the amount of sprawl within an area.

The study's measure of sprawl comes from Hamidi and Ewing (2014), who developed a *compactness index* for 2000 and 2010 for the 162 largest urbanized areas with a population of 200,000 or more in 2010.[2] The index measures how compact an area is, which is simply another way of measuring the sprawl of an area—that is, the larger the value of the compactness index, the more compact the area is, which means that the area is less sprawling.

Hamidi and Ewing chose Census-defined urbanized areas as the unit of analysis over other census geographies, such as metropolitan areas or counties, because urbanized areas are the only census geographies that expand over time as rural areas are converted to urban areas. By contrast, metropolitan areas and counties generally have fixed geographic boundaries that do not change often, and, when they do, the changes tend to be more discrete.

To compute their compactness index, Hamidi and Ewing used principal component analysis applied to 15 variables in four dimensions of sprawl: (1) development density, (2) land use mix, (3) activity centering, and (4) street accessibility. The raw compactness index values were transformed, so the final index reported by the authors has a mean of 100 and a standard deviation of 25. They found that the most compact (or the least sprawling) urbanized area in 2010 was San Francisco, with a value of 180.94, and the least compact (or the most sprawling) urbanized area was Atlanta, with a value of 37.45. An overview of the method used to construct the index, including a list of the 15 variables used with descriptions, can be found in appendix A.1, and the 10 most compact and the 10 most sprawling urbanized areas in 2010, along with their compactness index value, can be found in exhibit A.1. Further details of the method can be found in Hamidi and Ewing (2014).

The vacancy rate is the dependent variable in the model, as it is a commonly used measure of blight, although vacancy and blight refer to slightly different concepts. Blight does not have a precise definition but often refers to properties in disrepair, vacant, or abandoned (Schilling and Pinzón, 2016). Vacancy refers to unoccupied properties that may or may not be maintained. Some vacant properties are vacant due to normal market turnover, whereas others have been abandoned and are no longer maintained. As such, data on abandonment is ideal, but such data are not usually available, particularly on a granular level, and researchers often use vacancy in its place. Including geographic and temporal fixed effects should help control for the natural market turnover, so the relationship between the vacancy rate arising from abandonment and how it correlates with distance to the central business district and sprawl is captured.

The 162 urbanized areas in the sample (listed in exhibit A.2) contained 38,223 census tracts in 2000 and 43,122 census tracts in 2010. For each census tract, the vacancy rate was computed from the number of housing units and the number of vacant units reported in the 100-percent data of Summary File 1 of the 2000 and 2010 U.S. Censuses. The average census-tract vacancy rate is 8 percent in the sample.

[2] The index can be downloaded from http://dx.doi.org/10.1016/j.landurbplan.2014.04.021.

Before classifying census tracts as being *in* the center or *away* from the center of the urbanized area, the term *city center* must first be defined.[3] Neither the U.S. Census Bureau nor any other institution formally identifies city centers, however. This article follows the guidelines provided by Holian (2019), who compares a number of different estimates of city-center location. Holian suggests that the 1982 identification of Central Business Districts for 455 cities in *Central Business Districts: 1982 Census of Retail Trade* is still the most reliable measure of city centers today. This article used the geolocations from the Census study from Fee and Hartley (2013), which supplied the coordinates of the centroid of the census tracts of each identified Central Business District. If a city was not included in the 1982 Census study, the city hall coordinates in the dataset created by Wilson et al. (2012) were used. Finally, if a city did not appear in either of the two previous datasets, the location of the city hall was geocoded using Google Maps.

Exhibit 2 contains two maps. Exhibit 2a maps the 162 urbanized areas in the study. One can see that the urbanized areas in the sample appear throughout the continental United States but are more common in California, Florida, and the Northeast. As an example, exhibit 2b zooms in to show the detail of the urbanized areas in Florida along with their city centers.

Exhibit 2

Maps of Urbanized Areas Used in the Study, 2010 (1 of 2)

A.

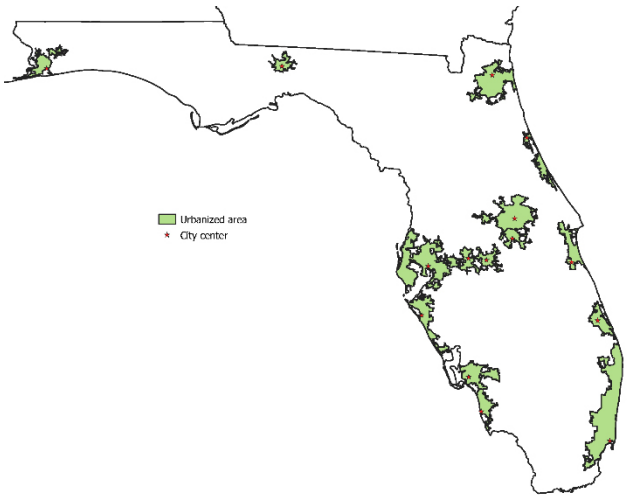
Urbanized Areas

[3] By not making any distinction between city centers and urbanized-area centers, one essentially assumes that the center of the city or metropolitan area in each urbanized area is also the center of the urbanized area, which the authors believe is an innocuous assumption.

Exhibit 2

Maps of Urbanized Areas Used in the Study, 2010 (2 of 2)

B.



Urbanized Areas in Florida with City Centers
Source: Authors

Because the location of each city center is approximate and somewhat subjective, and the definition of how close a census tract needs to be to the city center to be considered a "city-center census tract" is arbitrary, three different definitions were used to ensure that the results are robust. The first definition assumes that any census tract within 2 miles of a city center is a city-center census tract (7 percent of the census tracts in the sample). The second definition uses a radius of 4 miles (18 percent of the census tracts in the sample). The third definition uses a radius of 6 miles (30 percent of the census tracts in the sample). The study's results show that the estimated effects are similar for each of the three definitions.

Empirical Model

The goal of this study was to test whether less compact/more sprawling urbanized areas have more inner-city blight. This theory was tested using three linear regression models. The first two models measured how the relative vacancy rates of city-center census tracts and those of census tracts away from the city center vary with city sprawl. Census-tract-level data were used in one model and urbanized-area-level data in the other. The third model compares how city-center census-tract vacancy rates vary with the amount of sprawl in an urbanized area. All models include urbanized-area fixed effects that control for fundamental differences in vacancy rates across urbanized areas. These differences are caused by time-constant unobserved factors, such as regulations and vacancy levels that differ across areas and would otherwise cause endogeneity issues. Also included is a census-year-2010 fixed effect that controls unobserved factors that affect vacancy rates nationally and over time.

The first model is a census-tract-level fixed effects model:

$$vacancy\ rate_{ist} = \alpha_s + \beta_1\ center_{is} + \beta_2\ CI_{st} + \beta_3\ center_{is} \times CI_{st} + \delta_{2010} + u_{ist}\ (1)$$

where $vacancy\ rate_{ist}$ is the vacancy rate of a particular census tract in an urbanized area in a census year, indexed by the subscripts i, s, and t. Here, for a particular observation, subscript i identifies the census tract of the observation, subscript s identifies the urbanized area in which the census tract is located, and subscript t identifies whether the observation is the census year 2000 or 2010. The fixed effect α_s is indexed by urbanized area and allows the regression intercept to differ by urbanized area, which controls for unobserved, time-constant factors that differ across urbanized areas. The fixed effect for 2010, δ_{2010}, allows the regression intercept to differ by year and controls for unobserved factors that affect all urbanized areas similarly in a given year but vary from 2000 to 2010. The dummy variable $center_{is}$ equals 1 if the census tract indexed by i in urbanized area s is within the city center and equals 0 if it is outside the city center. CI_{st} is the compactness index for urbanized area s in census year t. Finally, u_{ist} is an idiosyncratic error term that contains other factors that affect the vacancy rate but are not captured by the variables in the model.

The coefficient β_3 on the interaction term, $center_{is} \times CI_{st}$ is the main parameter of interest. It measures how the city center vacancy rate varies with the amount of sprawl in the urbanized area. This can be seen mathematically by taking the partial derivative of the vacancy rate with respect to the compactness index, which yields the following:

$$\frac{\partial vacancy\ rate_{ist}}{\partial CI_{st}} = \beta_1 + \beta_3 center_{is}$$

If a less sprawling (more compact) city experiences lower vacancy rates in the city center, then $\beta_3 < 0$ supports Brueckner and Helsley's (2011) theory.

The second model is estimated using urbanized-area-level data:

$$\frac{vacancy\ rate_{near,st}}{vacancy\ rate_{far,st}} = \alpha_s + \beta_1 CI_{st} + \delta_{2010} + u_{ist}\ (2)$$

where $vacancy\ rate_{near,st}$ is the average vacancy rate of census tracts near the city center in urbanized area s in census year t = 2000 or 2010; $vacancy\ rate_{far,st}$ is defined similarly for census tracts away from the city center. When estimating this regression, observations are weighted by the number of housing units in the urbanized area. $\beta_1 < 0$ supports Brueckner and Helsley's (2011) theory that a more compact/less sprawling city has lower vacancy rates near the city center.

The final model is a census-tract-level fixed effects model that includes only city-center census tracts instead of all census tracts, as in model (1), which allows a cross-urbanized-area comparison of the vacancy rate and the compactness index:

$$vacancy\ rate_{ist} = \alpha_s + \beta_1 CI_{st} + \delta_{2010} + u_{ist}\ (3)$$

where vacancy $rate_{ist}$ is the vacancy rate of census tract i in urbanized area s in census year t = 2000 or 2010. As in model (2), $\beta_1 < 0$ supports Brueckner and Helsley's (2011) theory because it means that a more compact/less sprawling city has lower vacancy rates near the city center.

Results

Exhibits 3, 4, and 5 contain estimates of the various models. The three columns of estimates in each exhibit differ by the definition of the city center, which is varied to show that the results do not rely on using any particular definition. In column (1), the city-center census tracts are defined as census tracts within 2 miles of the city center. In column (2), the city-center census tracts are within 4 miles of the city center. In column (3), the city-center census tracts are within 6 miles of the city center. All regressions support Brueckner and Helsley's (2011) theory: more compact/less sprawling urbanized areas experience less urban blight.

Exhibit 3 contains the results of model (1), which are estimated using vacancy rates at the census-tract level and including urbanized-area fixed effects. The estimates indicate that city-center census tracts have higher vacancy rates, ranging from 3.5 to 6 percentage points, with the more restrictive definition of *city center* in column (1) having the highest estimate and the least restrictive definition of *city center* in column (3) having the lowest estimate. This result was expected because vacancy rates tend to be highest around the city center and then fall as the distance from the city center increases. More compact cities have lower vacancy rates: a 1-standard-deviation increase in compactness decreases the average vacancy rate by about 2 percentage points. The estimate of the interaction on the city center dummy and the compactness index suggests that more compact cities see lower relative vacancy rates at the city center: a 1-standard-deviation increase in the compactness index is associated with a lower average city center vacancy rate of one-half a percentage point or more relative to vacancy rates outside the city center.

Exhibit 3

Vacancy Rate Census-Tract-Level Regressions

	(1) Within 2 Miles	(2) Within 4 Miles	(3) Within 6 Miles
City Center Dummy	6.096***	4.388***	3.579***
	(0.118)	(0.070)	(0.058)
Compactness Index (Standardized)	-1.973***	-1.842***	-1.769***
	(0.192)	(0.192)	(0.193)
City Center Dummy × Compactness Index (Std.)	-0.469***	-0.829***	-0.684***
	(0.114)	(0.070)	(0.058)
Year 2010 Fixed Effect	2.584***	2.612***	2.614***
	(0.047)	(0.047)	(0.047)
Observations	81,907	81,907	81,907

Std. = standardized.

*Notes: ***p<0.01, **p<0.05, *p<0.1. The dependent variable is the vacancy rate. An observation is a census tract in 2000 or 2010. Regressions differ by the definition of the city center. Column (1) defines a city center census tract as within 2 miles of the city center, column (2) uses a 4-mile definition, and column (3) uses a 6-mile definition. Robust standard errors are in parentheses.*

Source: Author estimates

Exhibit 4 contains the results of model (2), which are estimated using the ratio of the average vacancy rate of city-center census tracts and the vacancy rate of the areas away from city-center census tracts for each urbanized area, including urbanized-area fixed effects. The average city-

center vacancy rates are about one-third lower than the vacancy rates for areas away from the city-center census tracts for a 1-standard-deviation increase in the compactness index.

Exhibit 4

Relative Vacancy Rate Urbanized Area-Level Regressions

	(1) Within 2 Miles	(2) Within 4 Miles	(3) Within 6 Miles
Compactness Index (Standardized)	-0.292***	-0.361***	-0.369***
	(0.000)	(0.000)	(0.000)
Year 2010 Fixed Effect	-0.275***	-0.168***	-0.131***
	(0.000)	(0.000)	(0.000)
Urbanized-Area Fixed Effects	Yes	Yes	Yes
Observations	324	324	324

*Notes: ***p<0.01, **p<0.05, *p<0.1. The dependent variable is the relative vacancy rate of census tracts near the city center and census tract away from the city center. An observation is an urbanized area in either 2000 or 2010. Regressions differ by the definition of the city center. Column (1) defines a city center census tract as within 2 miles of the city center, column (2) uses a 4-mile definition, and column (3) uses a 6-mile definition. Robust standard errors are in parentheses.*
Source: Author estimates

Finally, exhibit 5 contains the results of model (3), which are estimated using vacancy rates at the census-tract level only for the census tracts in the city center, including urbanized-area fixed effects. Here, we see again that more compact/less sprawling urbanized areas have lower vacancy rates near the city center: a one standard deviation increase in the compactness index results in a decrease in the vacancy rate of around 3 to 4 percentage points.

Exhibit 5

Vacancy Rate Census-Tract-Level Regressions of City-Center Census Tracts

	(1) Within 2 Miles	(2) Within 4 Miles	(3) Within 6 Miles
Compactness Index (Standardized)	-3.768***	-3.783***	-3.292***
	(0.680)	(0.389)	(0.313)
Year 2010 Fixed Effect	2.758***	3.035***	2.975***
	(0.203)	(0.114)	(0.089)
Urbanized-Area Fixed Effects	Yes	Yes	Yes
Observations	5,539	14,993	24,681

*Notes: ***p<0.01, **p<0.05, *p<0.1. The dependent variable is the vacancy rate. An observation is a census tract near the city center in 2000 or 2010. Regressions differ by the definition of the city center. Column (1) defines a city center census tract as within 2 miles of the city center, column (2) uses a 4-mile definition, and column (3) uses a 6-mile definition. Robust standard errors are in parentheses.*
Source: Author estimates

Conclusion

Blight is a serious problem in many American cities. Removing blight by expropriating abandoned properties and renovating them for habitation or demolishing them requires extensive resources. This article finds empirical support for the notion that cities with less sprawl have lower vacancy rates in the city centers, suggesting an alternative approach.

The hypothesized link between urban sprawl and blight comes from the theory that externalities commonly associated with inefficient urban sprawl, such as unpriced traffic congestion or underpriced suburban development, also cause deficient reinvestment and maintenance of properties in the city centers. In this vein, anti-sprawl policies and policies that promote compact city living, such as infrastructure reinvestment in the city center, will mitigate the incidence of central-city blight. The benefits of policies that curb urban sprawl may be underestimated if they do not include the positive spillovers enjoyed in city centers.

Appendix

A.1 Compactness Index

Hamidi and Ewing (2014) include the following 15 variables over four dimensions in the calculation of their compactness index:

1. ***Density factors:***
    - gross population density of urban and suburban census tracts
    - gross employment density of urban and suburban census tracts
    - percentage of the population living at low suburban densities
    - percentage of the population living at medium to high urban densities
    - net population density of urban lands
2. ***Mix-use factors:***
    - job-population balance
    - degree of job mixing (entropy)
3. ***Centering factors:***
    - percentage of the urbanized-area population in the central business district (CBD) or subcenters
    - percentage of the urbanized-area employment in the CBD or subcenters
    - coefficient of variation in census-block-group population densities
    - coefficient of variation in census-block-group employment densities
4. ***Street factors:***
    - percentage of small urban blocks of less than one-hundredth of a square mile
    - average block size
    - intersection density
    - percentage of four-or-more-way intersections

Hamidi and Ewing (2014) summarized those variables in each dimension using a principal components analysis, a statistical method that reduces a set of variables to a small number of

factors that contain most of the information in the original variables. The authors applied principal components analysis separately to each of the four dimensions, keeping the most informative principal factor of each dimension. The four factors were then summed into a single variable.

To account for differences in metropolitan size, the authors regressed the sum of the sprawl factors on the natural logarithm of population. The standardized residuals from that regression were normalized to have a mean value of 100 and a standard deviation of 25 for easier interpretation. The result of that transformation is the compactness index.

Exhibit A.1.

Compactness/Sprawl Scores for the 10 Most Compact and the 10 Most Sprawling Urbanized Areas in 2010

Rank	Compactness Index
10 Most Compact Urbanized Areas	
1. San Francisco–Oakland, CA	180.94
2. Reading, PA	169.32
3. Madison, WI	152.87
4. Eugene, OR	152.54
5. Laredo, TX	151.80
6. Oxnard, CA	146.19
7. Atlantic City, NJ	144.25
8. Los Angeles–Long Beach–Anaheim, CA	143.42
9. Lincoln, NE	143.38
10. New York–Newark, NY–NJ–CT	142.71
10 Most Sprawling Urbanized Areas	
153. Baton Rouge, LA	64.38
154. Fayetteville, NC	61.05
155. Chattanooga, TN–GA	60.96
156. Greenville, SC	60.57
157. Nashville–Davidson, TN	60.27
158. Charlotte, NC–SC	57.41
159. Winston–Salem, NC	55.56
160. Victorville–Hesperia, CA	54.15
161. Hickory, NC	48.64
162. Atlanta, GA	37.45

Source: Table 3 of Hamidi and Ewing (2014)

Exhibit A.2.

Urbanized Areas Included in the Study (1 of 2)	
1. Aberdeen–Bel Air South–Bel Air North, MD	47. Evansville, IN–KY
2. Akron, OH	48. Fayetteville, NC
3. Albany–Schenectady, NY	49. Fayetteville–Springdale–Rogers, AR–MO
4. Albuquerque, NM	50. Fort Collins, CO
5. Allentown, PA–NJ	51. Fort Wayne, IN
6. Ann Arbor, MI	52. Fresno, CA
7. Antioch, CA	53. Grand Rapids, MI
8. Appleton, WI	54. Green Bay, WI
9. Asheville, NC	55. Greensboro, NC
10. Atlanta, GA	56. Greenville, SC
11. Atlantic City, NJ	57. Gulfport, MS
12. Augusta–Richmond County, GA–SC	58. Harrisburg, PA
13. Austin, TX	59. Hartford, CT
14. Bakersfield, CA	60. Hickory, NC
15. Baltimore, MD	61. Houston, TX
16. Baton Rouge, LA	62. Huntington, WV–KY–OH
17. Birmingham, AL	63. Huntsville, AL
18. Boise City, ID	64. Indianapolis, IN
19. Bonita Springs, FL	65. Indio–Cathedral City, CA
20. Brownsville, TX	66. Jackson, MS
21. Buffalo, NY	67. Jacksonville, FL
22. Canton, OH	68. Kalamazoo, MI
23. Cape Coral, FL	69. Kansas City, MO–KS
24. Charleston–North Charleston, SC	70. Kennewick–Pasco, WA
25. Charlotte, NC–SC	71. Killeen, TX
26. Chattanooga, TN–GA	72. Kissimmee, FL
27. Chicago, IL–IN	73. Knoxville, TN
28. Cincinnati, OH–KY–IN	74. Lafayette, LA
29. Cleveland, OH	75. Lakeland, FL
30. Columbia, SC	76. Lancaster, PA
31. Columbus, GA–AL	77. Lancaster–Palmdale, CA
32. Columbus, OH	78. Lansing, MI
33. Concord, CA	79. Laredo, TX
34. Concord, NC	80. Las Vegas–Henderson, NV
35. Conroe–The Woodlands, TX	81. Lexington–Fayette, KY
36. Corpus Christi, TX	82. Lincoln, NE
37. Dallas–Fort Worth–Arlington, TX	83. Little Rock, AR
38. Davenport, IA–IL	84. Los Angeles–Long Beach–Anaheim, CA
39. Dayton, OH	85. Louisville–Jefferson County, KY–IN
40. Denton–Lewisville, TX	86. Lubbock, TX
41. Denver–Aurora, CO	87. Madison, WI
42. Des Moines, IA	88. McAllen, TX
43. Detroit, MI	89. Memphis, TN–MS–AR
44. Durham, NC	90. Miami, FL
45. El Paso, TX–NM	91. Milwaukee, WI
46. Eugene, OR	92. Minneapolis–St. Paul, MN–WI

Exhibit A.2.

Urbanized Areas Included in the Study (2 of 2)

93. Mission Viejo–Lake Forest–San Clemente, CA	128. Rockford, IL
94. Mobile, AL	129. Round Lake Beach–McHenry–Grayslake, IL–WI
95. Modesto, CA	130. Sacramento, CA
96. Montgomery, AL	131. Salem, OR
97. Murrieta–Temecula–Menifee, CA	132. Salt Lake City–West Valley City, UT
98. Myrtle Beach–Socastee, SC–NC	133. San Antonio, TX
99. Nashville–Davidson, TN	134. San Francisco–Oakland, CA
100. New Haven, CT	135. San Jose, CA
101. New Orleans, LA	136. Santa Clarita, CA
102. New York–Newark, NY–NJ–CT	137. Sarasota–Bradenton, FL
103. Norwich–New London, CT–RI	138. Savannah, GA
104. Ogden–Layton, UT	139. Scranton, PA
105. Oklahoma City, OK	140. Seattle, WA
106. Omaha, NE–IA	141. Shreveport, LA
107. Orlando, FL	142. South Bend, IN–MI
108. Oxnard, CA	143. Spokane, WA
109. Palm Bay–Melbourne, FL	144. Springfield, MO
110. Palm Coast–Daytona Beach– Port Orange, FL	145. St. Louis, MO–IL
111. Pensacola, FL–AL	146. Stockton, CA
112. Peoria, IL	147. Syracuse, NY
113. Philadelphia, PA–NJ–DE–MD	148. Tallahassee, FL
114. Phoenix–Mesa, AZ	149. Tampa–St. Petersburg, FL
115. Pittsburgh, PA	150. Toledo, OH–MI
116. Port St. Lucie, FL	151. Trenton, NJ
117. Portland, ME	152. Tucson, AZ
118. Portland, OR–WA	153. Tulsa, OK
119. Poughkeepsie–Newburgh, NY–NJ	154. Victorville–Hesperia, CA
120. Provo–Orem, UT	155. Visalia, CA
121. Raleigh, NC	156. Washington, DC–VA–MD
122. Reading, PA	157. Wichita, KS
123. Reno, NV–CA	158. Wilmington, NC
124. Richmond, VA	159. Winston–Salem, NC
125. Riverside–San Bernardino, CA	160. Winter Haven, FL
126. Roanoke, VA	161. York, PA
127. Rochester, NY	162. Youngstown, OH–PA

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Deep Learning Visual Methods for Identifying Abandoned Houses

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Abstract

Housing abandonment contributes to neighborhood decline and disinvestment. Abandonment has plagued large metropolitan areas for decades, yet quantifying the scope and impact of abandonment has proven costly and elusive. This study introduces an innovative approach to detect and measure abandoned houses using technology innovations without requiring significant resource commitments. It presents a system of detecting abandoned houses leveraging deep learning models for image classification, building an ensemble model that considers both global and local contexts to identify abandoned structures. This study takes imagery and structure data from multiple sources and uses transfer learning in a three-stage ensemble approach to identify abandoned houses. Four deep learning models are constructed for this study: the ResNet-50 model, an incremental knowledge model, a hybrid approach, and a check model. Results from the different models are compared and analyzed to identify the visual characteristics of houses that improve or degrade each method's accuracy. The methodology presented herein is scalable and could be applied in other neighborhoods and communities. The data generated by this method will empower communities and cities to design more effective strategies to address housing abandonment.

Introduction

Housing abandonment contributes to neighborhood decline and disinvestment. Abandonment has plagued large metropolitan areas for decades (HUD PD&R, 2014). Quantifying the scope and the impact of abandonment has proven elusive in part because there is no agreed-upon way to identify and track abandonment (Bieretz and Schilling, 2019). This void has forced governments and scholars to rely on indirect measures, including vacancy data compiled by the U.S. Census Bureau or the United States Postal Service (USPS). These data do not provide an accurate measure of abandonment, failing to identify functionally abandoned houses unfit for human habitation (Schilling, 2002; U.S. Government Accountability Office [GAO], 2011). While some field-based methods have been applied (e.g., foot surveys), they require substantial resources and cannot keep up with abandoned properties' rapid pace of turnover (Morckel, 2012; Pagano and Bowman, 2000). The absence of accurate and cost-effective methods has contributed to the inability to address the abandonment crisis. The application of artificial intelligence (AI) and other emerging technologies presented in this study presents an innovative method for identifying the dynamic stock of abandoned houses. The data generated by this method will empower communities and cities to design more effective strategies to address housing abandonment.

Problem Statement

Housing Abandonment Issue in the United States

The interaction between blight, abandoned housing, and the adverse impacts on American cities have been recognized since the early 20th century. Robbins (1935) advocated that cities implement demolition programs to remove neglected and unfit housing to reverse the adverse impacts on residents and communities. The United States Housing Act of 1937 provided support for local demolition programs and mandated that cities demolish unsafe housing—both abandoned and occupied—making it a requirement for funding for new low-rent housing (Woodbury, 1937). Over the next two decades, the abandoned and substandard housing problem continued to plague cities, despite federal funding for demolition programs and local efforts to eradicate the problem, with a growing recognition that in many cases the problem was endemic and had sociological roots (Rosenthal, 1953; Schneider, 1941; Sjoberg, 1955).

During the early 1970s, renewed attention was paid to the housing abandonment problem, which had become a national phenomenon, rising to crisis proportions in some cities. At the same time, there was a shift from demolitions to the rehabilitation of abandoned housing. This shift received additional momentum through a change in the Community Development Grant Program that allowed cities to use neighborhood preservation and renewal funds outside of blighted areas (Cannon, Lachman, and Bernhard, 1977). In the 1980s, researchers looked at the efficacy of efforts to address the abandoned housing problem, including HUD's "Urban Homesteading Program" (Varady, 1984). Researchers also began advocating for additional programs to fund the rehabilitation of abandoned housing to supplant the prior emphasis on demolitions (Margulis and Sheets, 1985). Efforts were also made to develop a more proactive approach to the challenge of abandoned housing, including the application of discriminant analysis to determine which houses were more vulnerable to demolition, thus creating an early warning system that would reflect the

relative vulnerability of buildings that would render them "endangered" buildings that should be protected from demolition (Bell and Kelso, 1986).

The inability to resolve the abandonment challenge was attributed to the tangled web of causes and effects of urban decline, such as economic decline, job loss, quality of life decline, tax/mortgage delinquency, eviction/foreclosure, market distortions, and development barriers (Goldstein, Jensen, and Reiskin, 2001). The 2008 housing crisis exacerbated the abandoned housing problem with a tsunami of foreclosures leading to a surge in abandonment. The federally funded Neighborhood Stabilization Program generated significant data to support research into the efficacy of initiatives launched to resolve the foreclosure and abandonment problem stemming from the housing crisis (Bak and Hewings, 2017; Fraser and Oakley, 2015; Leonard, Jha, and Zhang, 2017; Schuetz, Spader, and Cortes, 2016).

State and local efforts were launched to help address the abandonment problem in distressed or blighted neighborhoods, but resource constraints and lack of access to timely data placed a damper on such initiatives and failed to address abandonment associated with systemic issues. To help address the abandonment problem, a growing number of states passed legislation enabling the creation of land banks and community land trusts (Decker, 2018; Fujii, 2016; Martin et al., 2020; Whitaker and Fitzpatrick, 2016). While land bank programs achieved some success in resolving the challenge of abandoned housing, these efforts struggled due to an adverse selection process whereby the properties transferred to land banks suffered from significant physical deterioration, due in part to the time lags between abandonment and transfer. Furthermore, land banks served as intermediaries and did not have the mission, budget, or staff to maintain or improve abandoned houses. In some markets, houses held by the land banks were exempt from property violations, leading to further deterioration; this circumstance made it challenging and expensive for private market efforts to remediate the problem and return abandoned housing to productive use, and it heightened interest in demolition programs, which merely shifted the problem to abandoned lots.

The abandoned housing problem has continued to plague many cities for over 80 years, especially following cyclical downturns. While some progress has been made, the efforts of researchers and advocates have been thwarted by the complexity and interactive nature of forces that have sustained the long-term abandonment problem (Foster and Hipp, 2011; Grinstein-Weiss et al., 2013; Keating, 2010; Mennis, Dayanim, and Grunwald, 2013). Since abandonment is a process rather than a discrete event, it is imperative that this study develop the ability to predict abandonment so that steps can be taken to reverse the forces or to develop rapid response models (Williams, Galster, and Verma, 2013). A prerequisite to such work, however, is the ability to detect properties that are clearly abandoned. While detection might appear to be relatively straightforward, the absence of an unambiguous definition of abandoned property complicates the process. That is, unlike foreclosed properties that go through a predetermined process that is documented along the way, the road to abandonment can take many twists and turns. For example, water shut-offs, postal records, tax delinquency, property violations, and 311 reports can be used, but such indicators might merely flag vacant properties rather than identify abandoned properties. Even if these trails can be mapped out along the journey, there are no consistent checkpoints along the route, and the destination (i.e., abandonment) is not even clear. Morckel (2014) tested the

premise that operational definitions of housing abandonment matter, which pointed to additional informational inefficiencies that had plagued researchers (e.g., tax delinquency as a proxy for abandonment, abandonment as identified by foot survey, and abandonment defined as "other vacant" by the Census Bureau). Depending on the definition, the application of spatial and other analytical models generates statistically significant outcomes and weightings that vary substantially from model to model. Immergluck and Smith (2006) recognized the lack of good data related to long-term vacancy problems after the housing crisis, utilizing data from the USPS to explore changes in vacancy and noting the difference in vacancy and abandonment across neighborhoods, with more persistence in poorer neighborhoods. Despite these efforts and those of other researchers, the inability to detect and predict abandonment frustrates the efforts to understand and thus develop valid and reliable intervention programs.

Challenges to Measure Housing Abandonment: Lack of Standardized Definition

One major challenge to measuring housing abandonment is the lack of a formal or standardized definition of abandoned houses. Wachsmuth (2008) states there are as many definitions of abandonment as municipal governments addressing abandonment and scholars writing about it. Among scholars, Mallach (2006) of the Brookings Institution considers a property abandoned if the owner has stopped carrying out at least one of the significant responsibilities of property ownership, causing a property to be vacant or likely to become vacant. Many scholars consider neglected property ownership duties—e.g., delinquent property taxes or noncompliance with relevant codes—as indicators of abandonment. Sternlieb et al. (1974) defined an abandoned building as a residential structure that the owner has removed from the housing stock by neglecting property ownership duties regarding functional, financial, and physical maintenance. Hillier et al. (2003) also identified three distinct aspects of abandonment: functional, financial, and physical. Functional abandonment concerns a vacant property that is not suitable for residency, such as one that lacks sealed doors and windows. Financial abandonment happens when an owner stops meeting his or her financial responsibilities, such as making property tax or mortgage payments. Physical abandonment occurs when a property is unfit for occupation because the owner neglected to maintain the inside or outside of the residence.

The definition of abandonment varies depending on state and municipal governments. The New Jersey Abandoned Properties Rehabilitation Act of 2004 defines abandoned property as any property that has not been legally occupied for 6 months and which also meets any one of the following criteria: (1) the property requires rehabilitation, and no rehabilitation has taken place during those 6 months; (2) construction began but was discontinued before the property was suitable for occupancy or use, and no construction has taken place for those 6 months; (3) at least one installment of property tax is delinquent; or (4) the property is determined to be a nuisance by the public officer.[1] The City of Kansas City, Missouri, classifies a vacant property as "vacant" or "dangerous." A property is defined as "vacant" if it lacks the habitual presence of human beings who have a legal right to be on the property or if any substantial lawful residential occupancy or business operation has ceased (City of Kansas City, Missouri, n.d.b). The following factors are

[1] Housing and Community Development Network of New Jersey. 2004. Abandoned Properties Rehabilitation Act, P.L. 2003, c.210. https://hcdnnj.memberclicks.net/assets/documents/npt_abandonedproprehabact.pdf

considered to determine whether a property is vacant: the proportion of vacant to occupied space, the condition and value of any items on the property, the presence of rental or for-sale signs on the property (implying the property is currently marketed by a licensed real estate professional), and water service not being shut off (City of Kansas City, Missouri, n.d.b). The City of Kansas City labels some vacant properties as dangerous buildings. Dangerous buildings exhibit the most severe type of residential code violations that pose the highest risk to surrounding areas (City of Kansas City, Missouri, n.d.a). Common conditions of dangerous buildings include exterior walls that are leaning; the building or any portion thereof is in danger of collapse; the building has been damaged by fire or earthquake; electrical, plumbing or other mechanical systems are dangerous or inoperable; the roof or walls have holes exposing the entry of weather; or a foundation that has settled or is damaged (City of Kansas City, Missouri, n.d.a).

Problems with Using Proxy Measures to Estimate Housing Abandonment

The lack of a universal definition, and thus the difficulty of obtaining an objective indicator of housing abandonment, makes it difficult to measure the scope of housing abandonment accurately. Municipal governments and scholars use indirect measures to estimate the scope of abandonment. The U.S. Census Bureau, for example, collects data on housing vacancy, classifying a housing unit as "Other vacant" if it is vacant year-round for reasons other than being vacant for sale or rent or occasional use. The "Other vacant" category also includes vacant and abandoned units, as well as units to be demolished or condemned. It also includes foreclosed housing units, units that are vacant because of legal issues, units that are currently being prepared to rent or sell, units that need repairs or are vacant for 6 months or longer, and units that are vacant for unknown reasons (U.S. Census Bureau, 2022). Thus, the U.S. Census data on housing vacancy fail to reflect the full depth of housing abandonment. The USPS provides data on addresses it identifies as "Vacant" or "No-Stat" (HUD PD&R, n.d.). Vacant addresses refer to those not collecting their mail for 90 days or longer. No-Stat addresses include those not collecting their mail for 90 days or longer and businesses or homes under construction and not yet occupied. USPS data categorizes these vacant addresses by the length of vacancy. Some scholars use the addresses that have been vacant for more than 24 months as a proxy for abandonment and blight. While USPS data provide information on occupancy status and the length of vacancy, USPS does not capture information on the nature of vacancy or the physical condition of the property. Therefore, it is difficult to use these data to identify abandoned houses because they overlook functionally abandoned houses that are unfit for human habitation or other authorized uses (Schilling, 2002; U.S. Government Accountability Office [GAO], 2011).

On a local level, municipal governments and scholars often use land bank data to understand the scope of abandonment. Land banks are governmental entities or nonprofit organizations that acquire vacant, abandoned, and tax-delinquent properties to return these properties to productive use (Heins and Abdelazim, 2014). However, land banks operate in different structures with varying abilities to acquire and redevelop their problem properties. One of the common challenges land banks face is the lack of precise data on these problem properties (Alexander, 2005). One reason for the lack of precise data on problem properties is fragmented functions among local government agencies and departments. For example, one department records housing and building code

violations while another agency records tax delinquency. Alexander (2005) argues that community development corporations or neighborhood agencies know their communities and can more accurately identify vacant, abandoned, and tax-delinquent properties.

Multiple warning signs often indicate the process of abandonment. For example, code violations and unpaid utility accounts are signs that a property is in the abandonment process (Hillier et al., 2003). Some scholars stress the importance of including property information, such as delinquent water and sewer bills and property-based nuisance complaints, as additional indicators of housing abandonment. A 311 call system can provide useful information on residential code violations. The data on 311 calls for service have been recently used in research to measure potential indicators of neighborhood physical disorder, capturing information such as neglected properties and public nuisance. However, some argue that 311 data can introduce biases, such as some neighborhoods or residents being unwilling or unable to call and log a 311 report (Theall et al., 2021).

Literature Review

Related Work on Detecting Abandoned Houses: Street Audits

Street audits are one of the traditional techniques for assessing neighborhood conditions and, by extension, the environmental factors that could lead to abandonment. Street audits and the use of streetscapes have received traction among researchers concerned with neighborhood conditions (Harvey and Aultman-Hall, 2016). The approach has been of particular interest to healthcare researchers interested in the health-related impacts of neighborhood conditions (Badland et al., 2015; Cain et al., 2014). In a novel approach, researchers have used "citizen scientists" to compile information about neighborhood conditions in disadvantaged communities as well as improve community engagement (Winter et al., 2016)

The Microscale Audit of Pedestrian Streetscapes (MAPS) was developed to assess details of streetscapes considered relevant for physical activity (Fox et al., 2021; Millstein et al., 2013; Vanwolleghem et al., 2016). Due to the time and resource commitments needed to support MAPS using observation, researchers have explored the validity of on-street versus online assessments and reported generally positive results (Cleland et al., 2021; Fox et al., 2021; Phillips et al., 2017; Queralt et al., 2021; Zhu et al., 2017). Virtual street audits have received significant attention as a means of assessing neighborhood conditions as compared to physical audits (Badland et al., 2010; Pliakas et al., 2017) Health-related researchers have also applied virtual street audits with an emphasis on neighborhood disorder (Mooney et al., 2017; Nesoff et al., 2020).

Related Work on Detecting Abandoned Houses: Deep Learning

Cities have increasingly sought to leverage the precipitous drop in the cost of sensors and cloud computing to better allocate finite municipal resources to the myriad of resident needs. Likewise, social scientists and engineers have leveraged artificial intelligence, generally, and visual analytics through deep learning, more specifically, to assist governments in better understanding the complex problems of their communities and to drive down costs. For example, Bloch (2020) assessed neighborhood characteristics by analyzing visual data from Google Street View and

municipal 311 calls. Recently, Zuo et al. (2020) evaluated mobility and sociability trends during COVID-19 using an interactive data visualization and analytics tool.

One promising technique has been the use of neural networks, and more specifically deep learning, as a means to classify aspects of images accurately. For example, Zou and Wang (2021) proposed a novel technique for detecting abandoned houses based on hierarchical deep learning. They designed two deep Convolutional Neural Network (ConvNet/CNN) models and extracted global visual features from the abandoned house using scene-based classification and local visual features from buildings, vegetation, and other objects using patch-based classification. This method allows researchers to accurately identify sub-elements of an image, such as doors or weeds; Zou and Wang successfully classified Google Street View images in five cities with an F1 score, which assesses both accuracy and precision of identification, at 0.84.

Stevenson and Bravo (2021) proposed to combine deep learning and K-means to cluster a series of convenient task-agnostic tile elevation embeddings with socioeconomic outcomes in predicting seven English deprivation indices for small geographies in the Greater London area. Briefly, task-agnostic tile elevation embedding is a deep learning model for learning structural node embeddings. It captures higher-level features of the urban environment numerically and can be imported into any analytics tool. The generated embeddings, either alone or combined with standard structured data, are used to assess their potential as auxiliary sources of data. Task-agnostic tile embeddings can also be derived from elevation data using unsupervised deep learning. After evaluating various model/embedding configurations, coherent tile segments enable the interpretation of latent embedding features, resulting in an increase in Root Mean Squared Error (RMSE) of up to 21 percent compared to standard demographic features alone.

Related Work on Detecting Abandoned Houses: Google Street View

Over the past decade, researchers have relied on Google Street View to observe and track neighborhood conditions (Anguelov et al., 2010; Clarke et al., 2010; Rundle et al., 2011). The validity and reliability of using Google Street View to supplant more traditional time- and resource-intensive observations of neighborhood conditions have been vetted in the research with generally positive results (Griew et al., 2013; Marco et al., 2017; Odgers et al., 2012; Wu et al. 2014).

Nesoff et al. (2018) used Google Street View to develop a measure of pedestrian safety as an alternative to maintaining a database of city infrastructure. Google Street View has been an integral component of several applications developed to assess streetscapes, including the Virtual Systematic Tool for Evaluating Pedestrian Streetscapes (Virtual-STEPS), a Google Street View-based auditing tool specifically designed to remotely assess microscale characteristics of the built environment (Steinmetz-Wood et al., 2019).

Related Work on Detecting Abandoned Houses: Images

The use of images to monitor street-level conditions has received attention from researchers applying a variety of techniques to compile images. Cannuscio et al. (2009) collaborated with residents to compile photographs from "outsiders" (i.e., staff photographers) along with "insiders" (or residents) and a combination of the two teams. This approach provided insights into health-

related conditions that benefited from a form of coproduction with residents. Wilson et al. (2012) collected health-related data on residents and built-environment conditions using a hybrid approach blending traditional field audits with omnidirectional imagery. The researchers concluded that the use of image-based audits could reliably supplant manual data collection processes. Researchers have also sought out low-cost alternatives for compiling images in conducting research in markets where Google Street View is not a viable option and have reported favorable results (de Souza-Daw et al., 2015).

Huang et al. (2014) provide an overview of image classification techniques that are relied on in computer vision and pattern recognition. The favorable results of image-based research into spatial conditions have fostered an increase in techniques for image classification and object detection (Liu et al., 2020; Sharma and Mir, 2020; Zhang et al., 2018). Researchers have combined the use of machine learning algorithms and Google Street View to measure walkability (Hu et al., 2020; Yin and Wang, 2016).

Empirical Studies on Predicting Abandoned Houses

Despite the challenges researchers have faced in their attempts to unambiguously identify and measure housing abandonment, some efforts to predict housing abandonment emerged in the early 1990s. For example, Anas and Arnott (1993) presented a stationary-state model which isolated land and improvements and treated both as investment assets in which improvements could be converted or rehabilitated, land could be improved, or improvements could be demolished. They also explored the relationships among construction costs, demolition costs, land costs, and maintenance costs, which all can affect investor decisions and help predict the outcomes of individual decisionmakers who rely on economics in approaching demolition and development decisions.

Hillier et al. (2003) used the Philadelphia Neighborhood Information System data to predict which residential properties are most likely to become abandoned. They found that vacancy, outstanding housing code violations, tax arrearages, and characteristics of nearby properties were significant predictors. That study stated that defining abandonment, integrating administrative data from multiple sources, and modeling temporal and spatial data are major challenges common to developing data to predict abandonment. Morckel (2012) predicted residential abandonment in two cities in Ohio, Columbus and Youngstown, using neighborhood-level factors including market conditions, physical neglect, socioeconomic conditions, and financial neglect. Morckel found that among these factors, market conditions, gentrification, and physical neglect significantly predicted the probability of a house being abandoned.

Method

Houses that have been abandoned or are about to be abandoned are a significant problem. This challenge has the potential to directly impact significant community issues, such as property violations and social-economic instability. Open data from a range of sources can be leveraged to robustly diagnose abandoned housing. Understanding the socioeconomic status of our neighbors and their concerns about property violations can aid in comprehending the critical issues

underlying house abandonment, raise awareness of this issue, and institute the necessary prevention and intervention strategies to address the impact of abandonment on communities.

This paper introduces an innovative framework for detecting abandoned houses. The framework presents a system of detecting abandoned houses, using deep learning by building an ensemble model that takes global and local contexts into account. Global contexts relate to all potential data that could be used in a model, whereas local contexts apply to a particular application; images of houses from any American city would speak to the global context, whereas images from a particular neighborhood in a single city would speak to the local context. The challenge of building models is to have the greatest potential scope of application (global) without significantly diminishing the applicability of the model to particular local contexts. To accomplish this goal, two image-based classification models for recognizing abandoned homes in both global and local contexts were developed using a variety of sources, including the house images from Web and Google Street View. A grid-search strategy was used to aggregate the models, therefore increasing the prediction accuracy for any input (either local or global context). While many deep-learning models can be highly accurate, they can be black-box analytical solutions where it is difficult to explain the result. A benefit of the model developed here is that it is highly explainable to stakeholders. It assesses the predictions of the ensemble approach model by explaining the best, worst, and conflicting cases with global and location variables. The training of the models consists of the following phases: (1) Data Collection and Preprocessing, (2) Deep Learning Modeling for Detecting Abandoned Houses, and (3) Model Validation and Explainability.

Data Collection and Preprocessing

Data Collection with Multiple Sources

Both image and structured data of houses in Kansas City, Missouri (KCMO) were gathered from various sources (exhibit 1).

Exhibit 1

Web and Kansas City Data Used for Abandoned House Detection (1 of 2)

Data	Size	Time	Modality	#Feature	Description
Neighborhood	246	Current	Geocode	246	KCMO's 246 Neighborhood in Geocode
311 call property violation (OpenData, 2021)	800K	2007-2021	Structured in a tabular format	23	Property Violation ID, Case ID, Status, Case Opened Date, Case Closed Date, Days Open, Violation Code, Violation Description, Ordinance Number, Ordinance Chapter, Violation Entry Date, Address, County, State, Zip Code, Latitude, Longitude, KIVA PIN, Council District, Police Patrol Area, Inspection Area, Neighborhood, Code Violation Location
Land Bank (2021)	6,256	2012-2020	Structured in a tabular format	16	Parcel Number, Property Class, Property Status, Address, City, State, Postal Code, County, Neighborhood, Council District, Sold Date, School District, Market Value Year, Market Value, Date Evaluated

Exhibit 1

Web and Kansas City Data Used for Abandoned House Detection (2 of 2)

Data	Size	Time	Modality	#Feature	Description
Google Street Views (Google, 2021)	398	2021	Image	2	Two categories (Abandoned houses vs. Occupied houses): A total of 398 house images were retrieved through Google Street View API based on (LandBank, 2021) and Property Violation Data from (OpenData KC, 2021)
Web Scraper (ours)	1,181	2022	Image	2	Two categories (Abandoned houses vs. Occupied houses): A total of 1181 house images were retrieved using Web Scraper.

API = application programming interface. KCMO = Kansas City, Missouri.

Source: Web Scraper images from https://images.google.com/

Neighborhoods in Kansas City

The neighborhoods used in this study were the officially recognized neighborhoods as published through the OpenData KC portal as a GeoJSON file. This type of data allows the most precise polygonal representation of the neighborhoods on a digital map. The dataset contained 246 neighborhoods with a corresponding id, name, and multi-polygonal annotations in terms of latitude and longitude coordinates. Five out of 246 neighborhoods had no name.

Web Scraping Image Data

Images of occupied homes and abandoned houses were scraped from Google Images, disregarding contextual information. These images were preprocessed manually and resized automatically. Exhibit 2 illustrates an example of abandoned and occupied houses collected by web scraping. These images were used to create a base model.

Google Street View Image Data

This dataset consists of abandoned and occupied house images in Kansas City, Missouri; 311 Call property violation data (City of Kansas City, MO, 2021b) and Land Bank data (City of Kansas City, MO, 2021a) from OpenData KC were used to identify addresses of abandoned and occupied houses. First, the Land Bank data contain data on abandoned homes in Kansas City, MO, including their current property status. A list of abandoned house addresses was compiled based upon this dataset. Second, the list of the occupied houses was compiled to establish a balance between abandoned and occupied properties in terms of socioeconomic situations and the degree of property violations. As a result, the majority of abandoned and occupied house images were acquired from comparable neighborhoods in Kansas City. Third, images of abandoned and occupied houses on these two lists were scraped from Google Street View. Diligent preprocessing is necessary for the accuracy of any subsequent analysis.

Exhibit 2

Google Images and Google Street View Images of Abandoned and Occupied Houses

Preprocessing

In a previous work, the authors designed an algorithm to merge the data from various sources such as 311 calls, property violations, and Land Bank data.[2] The essential factor in integrating data was to assign each data point to its own neighborhood using a geocode (coordinate pairs of latitude and longitude) given by the address of each data point (e.g., 311 request). Between 2007 and 2020, about 800,000 311 calls related to property violations were recorded in addition to data gathered from the Kansas City, Missouri Land Bank. Python was used to build the data retrieval system (version 3) using the Google Street View API. Exhibit 2 illustrates an example of abandoned and occupied houses. A total of 398 house images of 190 abandoned houses (more than one house could be associated with the 140 addresses from the Land Bank), and 208 occupied houses (from 311 property violation data) were retrieved from Google Street View.

Image-Based Abandoned House Detection

For abandoned house detection, transfer learning is applied in a three-stage ensemble approach used in a study by Anguelov et al. (2010) to identify abandonment. Transfer learning can construct domain-specific models with a comparatively small set of image data, which, when linked through the incremental learning and the ensemble approach, can optimize the prediction based upon multiple knowledge sources (Tan et al., 2018). The methodology overcomes the limitations of relying on non-geo-specific Google images and older geo-specific images from Google Street View (exhibit 2). A three-phase incremental learning algorithm was used, in which three models were created by transfer learning by adding iteratively different image datasets: **Model 1:** a global perspective based upon web images; **Model 2:** a local perspective based upon Google Street View of Kansas City, Missouri houses recorded in Land Bank records and 311 calls for suspected property infractions; and **Model 3:** an ensemble model of Model 1 and Model 2 with grid search.

The following three types of datasets were created to develop deep learning models. First, a total of 1,181 house images were acquired for this study (561 for abandoned houses and 620 for occupied houses) with Web scraping techniques using the keywords "abandoned houses," "empty houses," and "occupied." The images have been preserved in preparing for the deep learning network to be

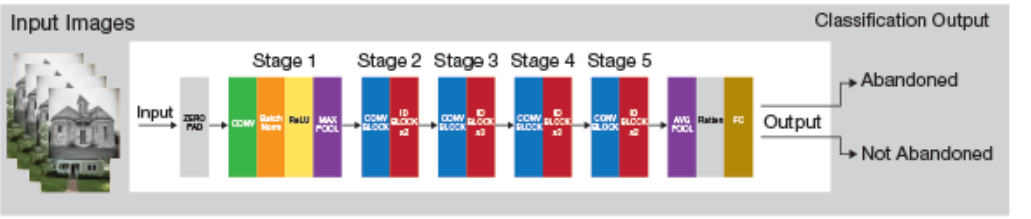
[2] Reference is withheld to protect blind review process.

used to generate the initial model (Model 1). Second, a total of 398 house images were collected from Kansas City neighborhoods. This dataset was used to build out a specific local context compared with the global context using Web data. As discussed previously, 190 abandoned house images and 208 occupied house images were retrieved via Google Street View's API. Similar to the first step, these images were also preprocessed for training the local context model (Model 2). Third, a total of 160 images from both global and local domains (80 images each) were utilized as the ensemble model's testing dataset.

Model 1: Instead of training an image model from scratch, Model 1 was created with the ResNet-50 model. The ResNet-50 model is a pre-trained powerful image model, and the Web images of houses were used to tune the ResNet-50 model for the classification task of abandoned and occupied houses. The ResNet-50 model consists of five stages of 50-layers applying Convolutional Neural Networks (ConvNet/CNN). Each convolution block has three convolution layers, and each identity block has three convolution layers, trained on more than one million images of ImageNet (as shown in exhibit 3). CNN can learn without having separate filtering or featuring engineering steps constructing deep neural networks layer-by-layer. To tune the ResNet-50 model, a classification layer was added that specifically detects image features of abandoned versus occupied houses.

Exhibit 3

Architecture of CNN Model for Abandoned House Detection



Source: Image generated by the authors based on the ResNet-50 architecture diagram from He et al., 2016

The web image dataset was passed to the training process. As more training data would improve the accuracy of the classification model, data augmentation techniques were employed in this work to improve training generalization and reduce overfitting. Each image was rotated, zoomed, and flipped to create more training data points. Specially, the rotation range was set to 20 degrees, and the zoom range to 50 percent. The image was flipped horizontally, and the height and width shift ranges were set to 30 degrees. As a result, data augmentation increased the number of image variations available during each of the training epochs. One image became 16 images, equal to the batch size passed to the model. Thus, Model 1 was a general model that could classify whether a Web image of a house was abandoned or not.

Model 2: Model 2 aimed at gaining additional knowledge based upon new data and the general knowledge of abandoned houses from Model 1. The incremental knowledge was obtained by fine-tuning Model 1 using the 398 house images from the local community via Google Street View. The second model distinguishes itself from the first in that it incorporates real-world data in order to account for contextual viewpoints. Through leveraging Model 1, subsequent models are able to train much more efficiently. According to the learning curve that is a plot of model learning

performance over experience or time, the effectiveness of training is defined by the number of epochs required to complete the training. While the images from Google Street View are of lower quality than the online data, this rapid learning performance with acceptable accuracy demonstrates the effectiveness of incorporating Model 1's analysis.

Model 3: This model is a combination of Models 1 and 2. Model 1 is a global perspective on abandoned and occupied houses, and Model 2 is based on local cases of abandoned and occupied properties in Kansas City, Missouri, using local data sources such as Kansas City Land Bank data and 311 calls associated with supposed property violation data from the OpenData KC. The ensemble model was created primarily by integrating two image-based classification models utilizing the grid search method developed in a study by Qiu et al. (2014) on a weighted average basis. Grid search is a simple yet exhaustive approach for obtaining the ensemble members' weights. Grid search enables models with varying degrees of confidence or predicted performance to contribute to a prediction. Depending upon the weight, models with better performance could contribute more to the overall effort, and models with lower performance could contribute less. As a result, the ensemble model often outperforms a single model. The contribution of each model is weighted by a coefficient indicating its predicted performance. Weight values are between 0 to 100 percent, with the total weights of the ensemble models equal to one. This ensemble approach is crucial because it enables the most accurate prediction of abandoned homes by taking both global and local perspectives on vacant properties into account.

Model 4: This model was constructed as a check when compared to the proposed model (Model 3). Model 4 is a unified network model that was built with data from the Web (global) and Google Street View domains (local). In contrast to Model 3, this model was developed using the combined data. Comparing model-based fusion with data-based fusion may be an interesting point of comparison for AI and deep learning researchers.

Model Validation and Explainability

To overcome the explainability challenges associated with backbox machine learning and deep learning, one must first understand why and how prediction models work effectively or badly. Without an explanation or justification for the prediction models' decisions, prediction is not compelling. It is critical to explicate misclassified or disputed conditions in particular. Local Interpretable Model-Agnostic Explanations (LIME) developed by Ribeiro, Singh, and Guestrin (2016), was used, a well-known technique of incorporating interpretable data representations into prediction models to address black-box machine learning. Image classification evidence can be represented as a collection of super-pixels and converted to a binary on/off vector indicating which super-pixels remain visible while others are obscured. However, adoption of LIME is limited due to its presentation as a one-size-fits-all explainability tool with limited customization options. Creating a customized surrogate explainer for a specific task can significantly improve the quality of explanations produced and allow users to make informed choices, justifying the use of the instance segmentation model in conjunction with the classification model.

Results

All the datasets were randomly divided into three types of data (Training/Validation/Testing) in the ratio of 80 percent, 10 percent, 10 percent, and 65 percent, 15 percent, 20 percent for Model 1 and Model 2, respectively. A more aggressive strategy was used, which means allocating more training data (10 percent) for the global model compared to testing data (20 percent) for the local model in terms of data split since the local context could be subjective compared to the global context. Exhibit 4 summarizes the dataset's properties.

Exhibit 4

Breakdown of Image and Structured Dataset

Task/Data	Training			Validation			Testing			Total
	AB	OC	Total	AB	OC	Total	AB	OC	Total	
Web Image Data	449	496	945	56	62	118	56	62	118	1181
GSV Image Data	121	133	254	31	33	64	38	42	80	398
Ensemble Inferencing	N/A			N/A			80	80	160	160

AB = abandoned houses. GSV = Google Street View. OC = occupied houses.

Sources: Web Image Data from https://images.google.com/; GSV Image Data from https://developers.google.com/maps/documentation/streetview/overview

As mentioned previously, Model 1 is the global model, Model 2 is the local model (KCMO), Model 3 is an ensemble model with Model 1 and Model 2 (where Model 1 contributes 0.55 and model 2 contributes 0.45), and Model 4 is the single model with mixed data of global and local house images). In this paper, the authors propose Model 3 based on Model 1 and Model 2 while comparing it with Model 4. The results of testing the four unique models (Model 1, Model 2, Model 3, Model 4) are shown in exhibit 5 and exhibit 6. The confusion matrix categorizes the output into four distinct groups based on a comparison of the actual output to the ground truth: the upper left corner is True Positives (TP); the upper right corner is False Negative (FN); the lower left is False Positive (FP); and the lower right is True Negative (TN).

Accuracy—Accuracy is the most intuitive performance metric, consisting of the ratio of properly predicted observations to total observations.

$$Accuracy = \frac{TP + TN}{TP + FP + FN + TN}$$

Precision—The precision of a prediction is defined as the ratio of accurately predicted positive observations to all anticipated positive observations.

$$Precision = \frac{TP}{TP + FP}$$

Recall (Sensitivity)—The recall ratio is the number of accurately predicted positive observations divided by the total number of observations in the actual class: abandoned house.

$$Recall = \frac{TP}{TP + FP}$$

F1 score—The F1 Score is calculated by averaging Precision and Recall. As a result, this score accounts for both false positives and negatives. While the F1 score is not as intuitive as accuracy, it is frequently more helpful than accuracy, especially when the class distribution is unequal.

$$F1\ score = \frac{2 \times Recall \times Precision}{Recall + Precision}$$

Exhibit 5

Abandoned House Prediction Performance

	Model 1 (%)	Model 2 (%)	Model 3 (%)	Model 4 (%)
Accuracy	68	88	**91**	86
Precision	91	91	**96**	85
Recall	80	84	**85**	88
F1 Score	85	87	**90**	86

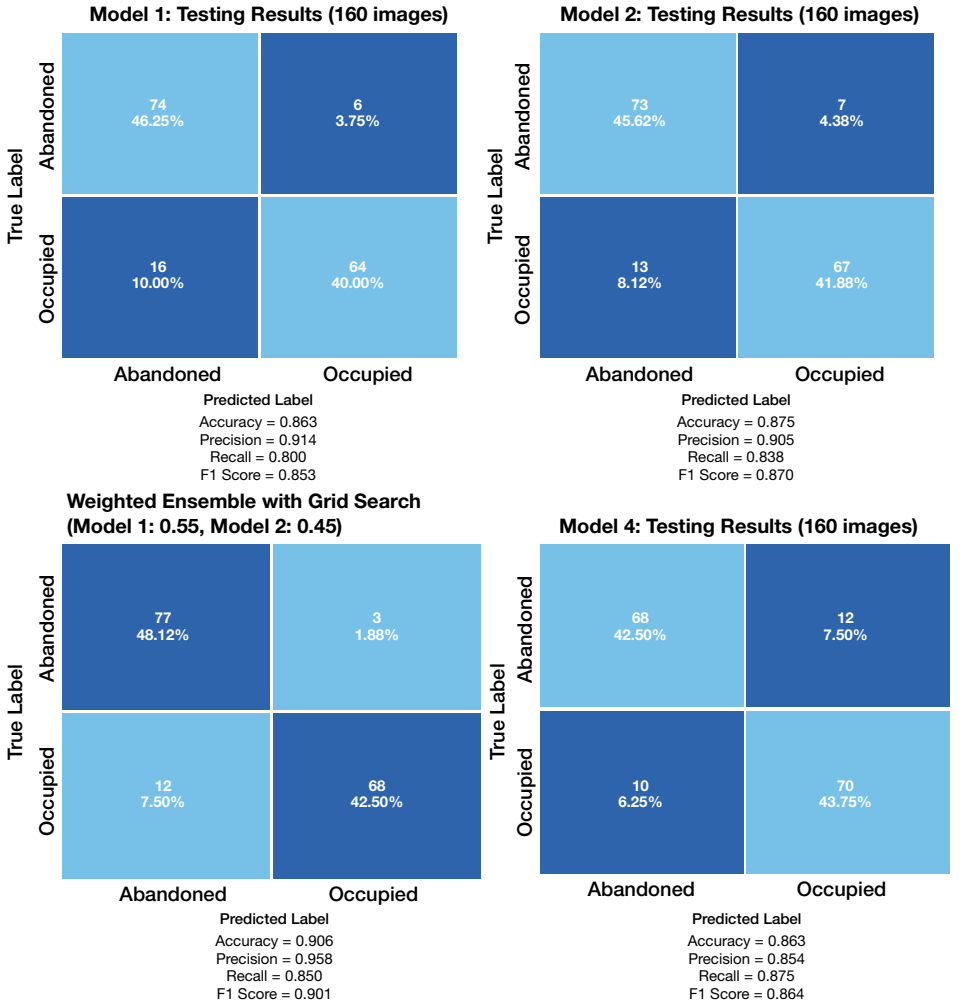
Source: Data from experiments and evaluation by the authors

As shown in exhibit 5, the proposed model, Model 3, is superior to the other three models. The performance of Model 1 is demonstrably inferior to that of Model 3 or Model 4. Model 2 was created using more realistic house images as opposed to the house images of Model 1 found online that were devoid of context. Understandably, Model 2 outperforms Model 1, with an accuracy of 88 percent and an F1-score of 87 percent, compared to 68 percent and an F1-score of 85 percent, respectively. Additionally, Model 2 is superior to Model 4, which was constructed using combined images from both global and local settings. The most intriguing discovery is the performance difference between Model 3 and Model 4: Model 3 achieved 91 percent accuracy and a 90 percent F-score, whereas Model 4 achieved 86 percent and 86 percent, respectively. This demonstrates an increase of more than 5 percent, suggesting an ensemble model that integrates knowledge from separate models trained on two distinct homogeneous datasets (global and local datasets) is more successful than a single model trained on the mixed data.

Exhibit 6

Confusion Matrix

Model 1: Global Abandoned House Classification; Model 2: Local Abandoned House Classification; Model 3: Ensemble Abandoned House Classification; Model 4: Fusion Abandoned House Classification

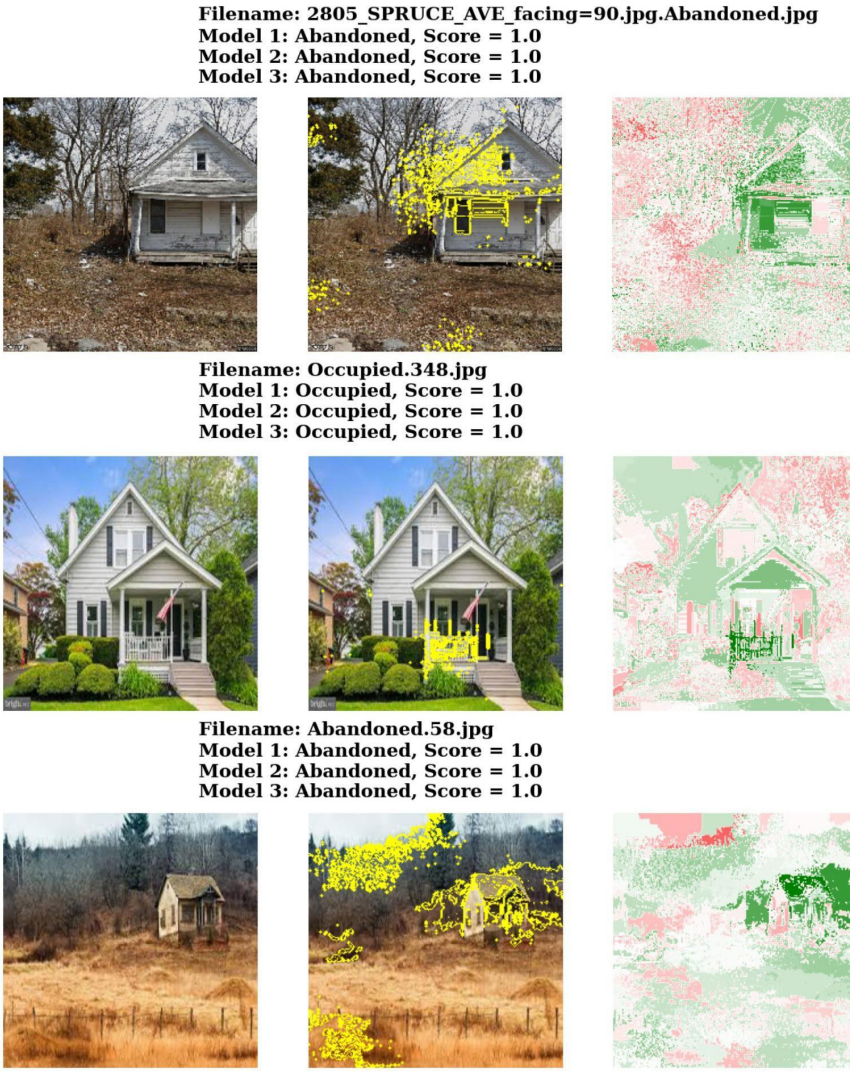


Source: Generated by the authors

The best cases in exhibit 7 feature three images in a series of an abandoned house, an occupied house, and an abandoned house with a 100 percent confidence score, which indicates that the images are accurate to the ground truth. These are the cases in which the three models (Models 1, 2, and 3) produce the correct prediction with the greatest confidence score (all are 100 [percent) since the house's look and location fit a logical pattern (cues such as boarded windows and peeling paint). The LIME visualization highlights several essential positive aspects of these properties (highlighted pixels) suggest they have been abandoned, including their entrances, roofs, pillars, front yards, and surrounding regions.

Exhibit 7

Best Cases: Model 1, 2, and 3 all Return the Correct Predictions



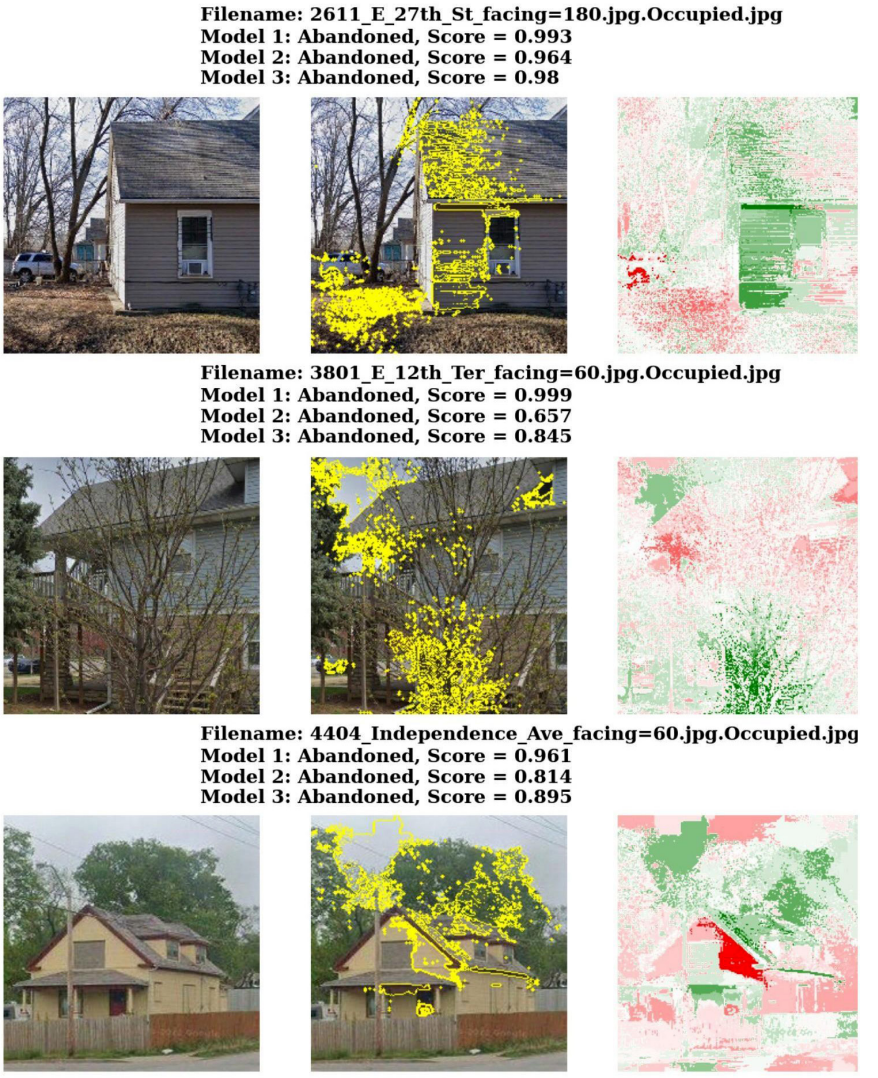
Sources: Input images from Google Street Views; explainability images generated by the authors

The worst situations depicted in exhibit 8 are forecasts that are inaccurate for all three models. Three occupied houses are used as ground truth. For all three houses, Model 1 (global context) has a very high confidence score range (0.96–0.99), but Model 2 (local context) has a broad confidence score range of 0.96, 0.65, and 0.81. The inaccurate predictions often have a lower confidence score range (0.65–0.96) since their appearances are harder than those of the other cases, which have a more recent and clean condition. Additionally, as with the top row, the image is incomplete, which means that models are unable to collect valuable visual signals, resulting in erroneous scores and predictions. Also, the house is partially obscured by trees (as shown in the second row of the same

image), creating confusion in the three models. Finally, the explainability demonstrated by LIME visualization revealed numerous critical positive characteristics of these properties (highlighted pixels) that indicate they have been occupied, such as their trees, bushes, and neighboring areas, resulting in a misleading categorization of these properties in comparison to occupied houses.

Exhibit 8

Worst cases: Model 1, 2, and 3 all Return the Incorrect Predictions



Sources: Input images from Google Street Views; explainability images generated by the authors

There are many cases in which Model 1 and Model 2 conflict with each other. Conflicting predictions cause the ensemble model to make incorrect predictions, as it is difficult to make a judgment based on disputed observations. The conflict situations depicted in exhibit 9 are

examples of Model 1 and Model 2 conflicting with each other. Model 2 (local context) correctly identified the ground truth for all three houses, while Model 1 (global context) incorrectly identified with relatively low confidence at around 0.7. Some of the images are incomplete, which means that models are unable to collect valuable visual signals, resulting in erroneous scores and predictions. With LIME, we can clearly tell that Model 2 has complete control over which portion of the image is crucial to its decision (highlighted pixels). If the owner of the house forgot to trim the lawn (as in the top row), the house is more likely to have been neglected for a while.

Exhibit 9

Conflicting Cases: Model 1 Returned an Incorrect Prediction, but Model 3 Corrected It

Sources: Input images from Google Street Views; explainability images generated by the authors

The conflicts can happen on the other side too, however, where Model 2 fails to classify correctly, as in exhibit 10. The top row indicates that the model was able to capture the trash in front of the house (highlighted pixels for abandoned in this case), but the positive area is dominant instead; it has given too much sensitivity to the roof and door instead of the surroundings—hence, a low confidence score (0.547) and a misclassification. In the remaining two cases, Model 2 tends to be confused by both the layout, scenery, and coloration of the images. These oddly lit scenes do not exist in a typical Google Street View image. Therefore, despite having a medium to high confidence score, Model 2 was not fully prepared for these.

Exhibit 10

Conflicting Cases: Model 2 Returned an Incorrect Prediction, but Model 3 Corrected It

Filename: 3807_E_68th_St_facing=180.jpg.Abandoned.jpg
Model 1: Abandoned, Score = 0.988
Model 2: Occupied, Score = 0.547
Model 3: Abandoned, Score = 0.747

Filename: Abandoned.544.jpg
Model 1: Abandoned, Score = 1.0
Model 2: Occupied, Score = 0.991
Model 3: Abandoned, Score = 0.554

Filename: Abandoned.13.jpg
Model 1: Abandoned, Score = 1.0
Model 2: Occupied, Score = 0.781
Model 3: Abandoned, Score = 0.648

Sources: Input images from Google Street Views; explainability images generated by the authors

Conclusion

The housing abandonment crisis that has contributed to neighborhood decline and created a financial drain on metropolitan areas must be addressed. One key obstacle has been the inability to identify individual abandoned houses and track them over the cycle of abandonment. While some progress has been made by using secondary data, fundamental challenges exist for the time- and cost-effective collection of primary data. Traditionally, housing surveys conducted by city officials physically walking the streets and cataloging housing conditions have faced high labor costs that render them unaffordable for many cities, particularly when considering the rapid change in housing conditions and the need to maintain such data over time. Municipal officials also face the challenge of convincing elected leaders and citizens to allocate resources toward data collection, something that does not yield immediate tangible results, as opposed to other tangible policies such as public safety or solid waste collection. This paper presents a methodology that uses technological innovations of image analysis to fill the void by substituting technological innovations to complement and extend manual efforts in a more cost-effective manner, especially when conducted at scale and on a continuous basis.

The image analysis method presented in this study has two paths forward for adoption by municipalities that can help reduce incremental costs. As noted previously, the ability to detect abandoned houses earlier in the process, enabled by the use of real-time images collected by low-cost cameras mounted on private vehicles and driven through the sample neighborhood, could be leveraged by blending the data with imagery from Google Street View. Furthermore, the recent drop in the price of cameras and image sensors opens the field for the widespread use of the technology. In a real-world application, the images could be collected at a relatively low cost by mounting cameras on municipal fleet vehicles. Trash vehicles, for example, that drive fixed routes every week, could provide images where subtle changes in housing conditions could lead to preventative maintenance even before the structure is abandoned. This level of image collection could help develop valid and reliable predictive models of abandonment, allowing cities to develop more effective intervention programs. Furthermore, the methodology presented herein is scalable and could be applied in other neighborhoods and communities.

In addition to collecting images through primary efforts, municipalities could also leverage a coproduction process wherein residents could be empowered to take images of houses that may need immediate attention. This could reduce costs and increase community engagement by encouraging resident participation to develop low-cost crowdsourcing of images that could complement municipal efforts. Having “eyes on the streets” would provide a real-time set of images that could be used to help train AI models to detect abandoned housing earlier in the process of abandonment. However, it should be recognized that overreliance on this method by municipalities has the potential for inequitable allocation of resources due to differences in the capacity and willingness of residents to engage in capturing images and submitting them for review, especially in blighted neighborhoods where the abandonment problem may be more ingrained. At the same time, the process could also serve to empower residents who have historically felt disengaged with their governments. Care needs to be placed in creating a process that empowers residents to collect data yet does not allow the process to be weaponized by disaffected neighbors or other actors.

In addition to data collection, the approach presented in this paper also takes into consideration the deployment of the models that can contribute to the success of city and land bank staff members in their missions to serve the public interest in an equitable, timely, and resource-efficient manner. Transfer learning could be used to mitigate the cost of development and implementation of the proposed method. That is, the approaches, methodology, and models presented in this study created a set of publicly available pretrained models. By building on these more general image models that detect abandonment in this case study, municipalities could build locally valid models using a smaller amount of locally collected data. This approach would reduce one of the biggest costs encountered in this study: the collection of up-to-date local data. To encourage the adoption of the methodology presented in this study, an open-source project of the proposed work will be published in the near future that will contain source-code, data, models, tools, and apps. Municipalities looking to leverage this method will be able to upload housing images and tune the model for their particular local contexts; this open-source tool will allow for continual updating and tuning of the deep learning model in order to generate more accurate predictions for future users. The goal is to guide potential users through the end-to-end process, which includes (1) gathering data relevant to their own context, (2) sharing their own data, (3) building deep learning models, and (4) distributing as a web application to a wider audience. This will reduce the cost and time associated with managing and scaling up the deployment of these models to the level of serving a whole community or city.

The proposed approach is not without limitations. This study focused on the front views of houses utilizing land bank data and 311 calls to develop methods for detecting abandoned houses based on house images. According to the literature review, markers of the pedestrian environment, such as the design of street crossings and the quality of sidewalks, can also help detect abandoned houses. In future research, the success of detection methods focused on street-front house images presented in this study can be enhanced by incorporating more images on the houses (e.g., backyards), as well as information on conditions in the surrounding environment that may be crowdsourced from local community members. It should also be noted that another limitation of this study was the reliance on housing images collected during the summer and fall. Seasonal differences will be explored in future research, incorporating thermal cameras and observing other variables (e.g., snow removal) that provide additional insights into abandonment. Since abandonment is a process that spans seasons, adapting the model to seasonal differences will help improve the reliability of the methodology. In making this extension, the methodology will correct for the influence of seasonal factors, such as vegetation or snow covering camera views, that impair the effectiveness of detection for the proposed models. In addition to seasonal recalibration, future research will explore the contributions and challenges imposed in the development of time-aware models (i.e., day and night), as well as weather-aware models (i.e., sunny versus rainy days). Leveraging the open-source tools available to municipal officials will allow the team to efficiently introduce images that contain seasonal differences.

Finally, it is important to recognize some caveats with respect to the use of multiple sources of data presented in this study. For example, efforts such as those used in this study must recognize the importance of privacy. Since 2020, the Census Bureau has used a technology known as differential privacy (DP) to protect individuals' privacy. A previous study by the authors of this study (Ho et

al., 2022) incorporated the DP technique for 311 call data and census data entirely in order to determine the optimal level of privacy for protecting neighbors' information. The intention is to include privacy-preserving abandoned home identification into future work while retaining a high detection rate for abandoned houses.

Additionally, public domain data, such as criminal or census bureau data, present a variety of challenges, including missing values, invalidated values, inconsistent values, and categories generated by a number of inconsistent or duplicate entries. Ho et al. (2022) addressed these data quality challenges when combining data from many sources for Kansas City neighborhood data. A future study will also address issues in image domains with inconsistencies or low image quality.

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Are Housing Vacancy Rates a Good Proxy for Physical Blight?

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Abstract

Housing vacancy and physical blight pose challenges in U.S. cities, particularly in shrinking cities of the Rust Belt. Although some cities have begun collecting fine-scale data on physical blight, most cities do not have detailed blight data. Researchers and policymakers may need to rely on coarser-scale data such as neighborhood vacancy rates as a proxy for physical blight. To explore whether housing vacancy rates are a reasonable proxy for physical blight, data from a comprehensive parcel condition survey in Toledo, Ohio, were used to characterize residential vacancy and physical blight at the property parcel scale. These data were then aggregated to the census tract scale, and rates of vacancy and physical blight from the local parcel survey were compared with broadly available tract-scale estimates of vacancy from the U.S. Postal Service (USPS) and the U.S. Census Bureau's American Community Survey (ACS). Results demonstrate that although USPS and ACS vacancy estimates were closely correlated with vacancy rates from the local survey, both sources overestimated vacancy in high-vacancy areas of Toledo relative to the local survey. For all three data sources, tract-scale vacancy rates were strongly and positively correlated with physical blight ($r \geq 0.73$), and there were no significant differences in the strength of correlation among the data sources. These results suggest that, despite modest overestimation of vacancy in high-vacancy areas, tract-scale housing vacancy data from USPS or ACS can be used as a proxy for physical blight in the absence of more detailed local data. By comparing patterns in three relevant data sources, this study helps work toward just and informed decisionmaking related to housing vacancy and physical blight.

Introduction

Urban vacant land is important from a number of perspectives, such as urban planning and policy (for example, Hollander et al., 2009; Kim, Newman, and Jiang, 2020; Németh and Langhorst, 2014; Prener, Braswell, and Monti, 2020), social-ecological systems (for example, Haase, Haase, and Rink, 2014; Kremer, Hamstead, and McPhearson, 2013; Nassauer and Raskin, 2014), and sustainability (for example, Anderson and Minor, 2017; Herrmann, Schwarz, et al., 2016; Herrmann, Shuster, et al., 2016). Vacant parcels are properties that are not currently occupied or

inhabited. This definition includes parcels with unoccupied housing units or other structures and vacant lots that do not contain structures. Vacant residential land is particularly prominent in U.S. cities, as vacant residences account for three-fourths of all vacant addresses (Newman et al., 2016).

Vacant land is particularly abundant in shrinking cities (also termed legacy cities) compared with growing cities (Newman et al., 2016). Shrinking cities are those that have experienced sustained declines in population and/or economic activity resulting from a series of related processes, including globalization, deindustrialization, suburbanization, targeted disinvestment, and racist housing practices (Hackworth, 2019; Martinez-Fernandez et al., 2012; Sadler and Lafreniere, 2017). In the United States, shrinking cities are concentrated in the Rust Belt that extends from the Northeast to the Midwest (Ganning and Tighe, 2021; Harrison and Immergluck, 2021; Schilling and Logan, 2008). Shrinking cities have high levels of residential vacancy citywide compared with growing cities (Newman et al., 2016), but vacancy patterns are heterogenous within cities as some neighborhoods experience more land abandonment than others (Berland et al., 2020; Hoalst-Pullen, Patterson, and Gatrell, 2011; Pearsall and Christman, 2012).

Although some degree of housing vacancy can be desirable to provide opportunities in the housing market (Mallach, 2018), widespread vacancy presents challenges for local governments. Vacant parcels burden local governments with costs for services such as code enforcement units, police, and fire departments (Immergluck et al., 2016). At the same time, vacant parcels generate less property tax revenue than occupied parcels due to tax delinquency and lower property values. They further reduce tax revenues by depressing the property values of nearby parcels (Immergluck et al., 2016; Mallach, 2018). Local governments and nonprofits dedicate substantial resources to neighborhood stabilization through efforts including revitalization, urban greening, land banking, and targeted demolitions.

Housing vacancy also presents challenges for urban residents (Sampson et al., 2017), in part because vacancy is associated with physical blight. The broader concept of blight has been difficult to define objectively, and the use of blight to justify redevelopment has a controversial history in U.S. urban policy (Gordon, 2004; Pritchett, 2003). Here, physical blight is defined more narrowly as observable elements of physical disorder such as broken windows or fire damage that negatively impact the appearance or integrity of a residential property. Whereas recognizable signs of care encourage a sense of safety (Nassauer and Raskin, 2014), the presence of physical blight increases fear and the perception of criminal activity (Branas et al., 2018; Perkins, Meeks, and Taylor, 1992). Vacancy has been linked to increased crime (Branas, Rubin, and Guo, 2012; Cui and Walsh, 2015) and negative physical and mental health outcomes (Garvin et al., 2013; Sivak, Pearson, and Hurlburt, 2021; Wang and Immergluck, 2018). Vacancy and physical blight can contribute to the erosion of social capital and a reduced sense of community pride (Curley, 2010; Teixeira, 2015). Landowners see their property values fall when surrounding parcels are vacant (Han, 2014; Whitaker and Fitzpatrick, 2013). This deterioration of neighborhood housing market conditions may disincentivize owners to maintain their properties, particularly when needed repairs cost more than the house is worth.

Concentrated vacancy is an equity issue, given that vacancy rates are positively correlated with higher proportions of Black or African-American residents, higher poverty, and lower educational

attainment (Harrison and Immergluck, 2021; Schwarz, Berland, and Herrmann, 2018). Racially discriminatory housing practices have been implicated as historical drivers of vacancy (Sadler and Lafreniere, 2017). Immergluck (2016) found that more persistent vacancy was associated with high-poverty areas during the 2011–2014 housing market recovery. In addition, the perception of neighborhood disorder is amplified in areas with more Black or African-American residents and higher poverty, reflecting implicit cultural biases (Sampson and Raudenbush, 2004). So although urban vacancy poses tremendous challenges for urban policymaking in general (Hackworth and Nowakowski, 2015), the disproportionate consequences of physical blight for traditionally marginalized groups further underscore the need to understand patterns in housing vacancy and physical blight and then design effective solutions.

One way that cities in the Rust Belt have worked to understand residential vacancy and the condition of their housing stocks is through parcel condition surveys. In general, parcel condition surveys involve field crews walking the city and making observations about each property. These observations may include land use, presence/absence of a structure, building occupancy status, condition of the structure, indicators of physical blight, and more. To date, parcel condition surveys have been conducted across a range of Rust Belt cities, including Toledo, Ohio; Cleveland, Ohio; Detroit, Michigan; Gary, Indiana; Muncie, Indiana; and Trenton, New Jersey. The data from these parcel condition surveys can be used to understand the scope and geographic distribution of vacancy and physical blight and then to design strategic policy responses (Kapszukiewicz and Mann, 2015). Parcel condition surveys require time and money to complete, however, and they may not be feasible in all cities. In lieu of parcel condition surveys, national datasets are broadly available that characterize residential vacancy at the neighborhood scale. It is unclear how well these national datasets agree with data from local parcel condition surveys. Moreover, although it is acknowledged that physical blight is associated with vacancy, it is not known how reliably neighborhood estimates of housing vacancy can be used as a proxy for physical blight.

This article contributes to our understanding of housing vacancy and physical blight in three ways. First, the article establishes a connection between housing vacancy and physical blight at the parcel scale. Second, vacancy rates from two national data sources are compared with vacancy data from a local parcel condition survey to analyze the overall level of agreement among data sources and geographic patterns where the data sources disagree. Third, all three vacancy data sources are correlated with rates of physical blight to understand whether vacancy data can serve as a reliable proxy for physical blight in the absence of blight data.

Methods

Study Area

The study area is Toledo, Ohio (41.65° N 83.54° W). Toledo is adjacent to Lake Erie in the U.S. Rust Belt. Formerly a glass manufacturing center (Floyd, 2014), the city experienced declines in manufacturing during the second half of the 20th century. Toledo's population decreased by approximately 100,000 people from its peak census population in 1970 to 282,275 people in 2015 (U.S. Census Bureau, 2021a). Today, Toledo is representative of many Rust Belt cities with areas of marked decline and relatively prosperous areas with functioning housing markets (Hackworth and

Nowakowski, 2015; Tighe and Ganning, 2015). The proliferation of vacant properties and physical blight costs the city millions of dollars per year through direct costs and lost tax revenues (Immergluck et al., 2016).

Data Sources and Preparation

Toledo Survey Data

In recognition of challenges presented by vacant properties and the need for data to guide management decisions, the Lucas County Land Bank launched the Toledo Survey (Kapszukiewicz and Mann, 2015). The Toledo Survey is a comprehensive parcel condition survey conducted in 2014–2015. For each property parcel in the city, field crews documented the presence or absence of a structure, the condition of the structure, whether the structure appeared to be occupied, and various indicators of physical blight (Kapszukiewicz and Mann, 2015).

The Toledo Survey data were prepared for analysis by characterizing housing vacancy and physical blight. For housing vacancy, non-residential parcels were removed from the dataset. Vacant lots—parcels without a residential structure—were also removed for consistency with the two national data sources used for comparison. Then the Toledo Survey indicator of occupied/vacant was used to characterize vacancy at the parcel level. To match the national data sources, the parcel data were aggregated to the scale of census tracts using 2015 tract boundaries (U.S. Census Bureau, 2021b). Census tract boundaries do not match the boundaries of Toledo. The final set of 95 census tracts included in the analysis consisted of 93 tracts with their geographic centers within Toledo and two tracts that extend northeast into Lake Erie but have all their residences in Toledo.

Physical blight was categorized into serious issues and aesthetic issues following Kapszukiewicz and Mann (2015). Serious issues included the following major maintenance issues: roof damage, foundation damage, and fire damage. Aesthetic issues included deteriorated porches, peeling paint or missing siding, broken windows, unkempt lawns, and boarded structures. For each parcel, two binary indicators were created to signal the presence of (1) one or more serious issues and/or (2) one or more aesthetic issues. As with the vacancy data, these data were aggregated to the tract scale, yielding the percent of residential parcels in each tract with serious issues and the percent of residential parcels in each tract with aesthetic issues.

U.S. Postal Service and U.S. Department of Housing and Urban Development Data

The U.S. Department of Housing and Urban Development (HUD) publishes vacancy data generated by the U.S. Postal Service (USPS). These data were acquired at the census tract scale from the HUD Office of Policy Development and Research (HUD, 2021). This dataset includes the total number of residential addresses in each tract, the number of residential addresses that have been vacant for at least 90 days, and the number of "no-stat" or undeliverable residential addresses that are unlikely to have mail delivered. The USPS/HUD residential vacancy rate for each tract was calculated by subtracting no-stat addresses from total addresses and dividing the number of vacant addresses by that difference. Data from the fourth quarter of 2015 were used to match the dates of the other two data sources. Negligible differences in tract vacancy rates were observed when rates were calculated

without first subtracting no-stat addresses or when data from different quarters in 2015 were used. This result indicates that patterns in the data were not sensitive to these data preparation choices.

American Community Survey Data

American Community Survey (ACS) data were acquired from the U.S. Census Bureau (2021a). The ACS reports data annually based on surveys sent to a sample of the population. Here, 2011–2015 5-year estimates were used to characterize residential vacancy at the census tract scale. Tract vacancy rates were calculated by dividing the count of vacant housing units by the total housing units.

Data Analysis

Vacancy and Physical Blight Relationships at the Parcel Scale

The relationship between housing vacancy and physical blight was first analyzed at the parcel scale. This analysis relied on Toledo Survey observations of parcel occupancy status and binary indicators of physical blight (serious issues and aesthetic issues). First, chi-squared tests were used to determine if rates of physical blight varied according to occupancy status for all residential parcels citywide. Second, in recognition that citywide results could be biased by the disproportionate amount of both vacancy and physical blight in high-vacancy areas, the chi-squared tests were repeated for high-vacancy areas only. High-vacancy areas were defined as census tracts with housing vacancy rates above the upper quartile (that is, 75th percentile and above), based on tract vacancy rates derived from the Toledo Survey data.

Comparison of Vacancy Rates by Data Source

Census tract vacancy rates were compared among the three data sources to assess the magnitude of differences and to analyze geographic patterns in where those differences were more pronounced. The parcel-scale Toledo Survey vacancy data were aggregated to census tracts to assess differences among data sources. Pearson correlations were computed to characterize the level of agreement among vacancy estimates from the Toledo Survey, USPS/HUD, and ACS. Scatterplot graphs with linear regression lines were generated to visualize these relationships.

Hot spot analysis was conducted to indicate where discrepancies in vacancy estimates among data sources were more pronounced. Specifically, the Getis-Ord G_i^* statistic was applied to identify geographic hot spots and cold spots in the differences between data sources in tract vacancy estimates across Toledo. For example, when subtracting Toledo Survey vacancy minus USPS/HUD vacancy, hot spots would indicate geographic clusters of relatively strong positive differences wherein the Toledo Survey estimated higher vacancy rates in that part of the city than USPS/HUD. On the other hand, cold spots would indicate areas where relatively strong negative differences were clustered, highlighting areas where USPS/HUD vacancy estimates were substantially higher than Toledo Survey estimates. Hot spot analysis was performed for each paired combination of Toledo Survey, USPS/HUD, and ACS data sources. The Getis-Ord G_i^* statistic was implemented using a first-order queen contiguity neighborhood definition in the R *spdep* package (Bivand and Wong, 2018).

Census Tract Housing Vacancy Rates as a Proxy for Blight

Correlation analysis was used to assess the relationship between housing vacancy and physical blight at the census tract scale. Pearson correlation coefficients (r) were computed to characterize the relationships between each of the three vacancy data sources (Toledo Survey, USPS/HUD, and ACS) and the proportion of residential parcels with each type of physical blight (aesthetic issues, serious issues). This analysis yielded six total correlation coefficients. The strength of correlation between vacancy and physical blight was compared across data sources using the Fisher z-transformation, which converts correlation coefficients to z-scores. The z-scores were then used to test for significant differences between correlation coefficients. A significant difference between datasets would indicate that one data source was more closely correlated with physical blight than another data source. Unless otherwise noted, all analyses were conducted in the R *stats* and *base* packages (R Core Team, 2021).

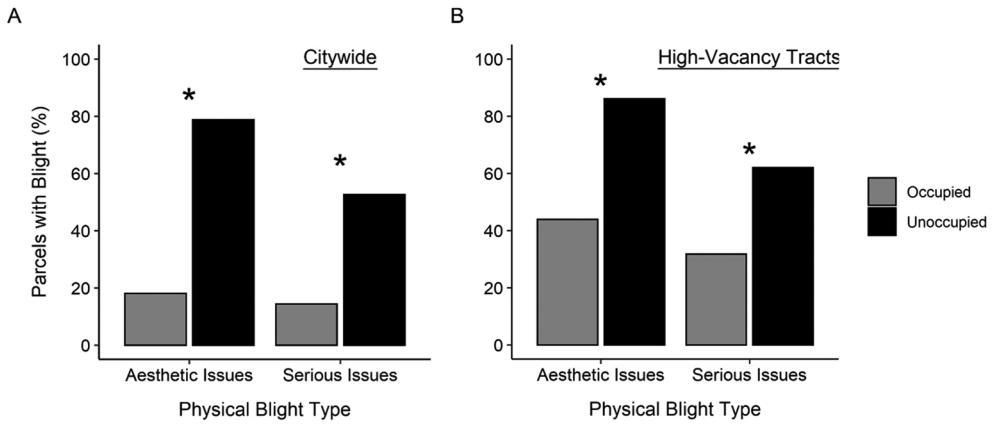
Results

Vacancy and Physical Blight Relationships at the Parcel Scale

Chi-squared tests indicated significant differences in the prevalence of physical blight between occupied and unoccupied parcels (see exhibit 1). In the citywide analysis, aesthetic issues were observed on 78.7 percent of unoccupied parcels compared with 18.1 percent of occupied parcels. Similarly, serious issues were observed on more than one-half (52.7 percent) of unoccupied parcels and only 14.4 percent of occupied parcels (see exhibit 1a). The observed rates of physical blight were greater in high-vacancy tracts. For unoccupied parcels, aesthetic issues (86.0 percent) and serious issues (62.1 percent) were both more prevalent as compared with occupied parcels (43.9 percent and 31.8 percent, respectively) (see exhibit 1b).

Exhibit 1a and 1b

Comparison of Physical Blight on Occupied Versus Unoccupied Parcels



**Significant differences at p < 0.001.*

Note: High-vacancy tracts are those with vacancy rates at or above the 75th percentile.

Source: Toledo Survey

Comparison of Housing Vacancy Rates by Data Source

Estimates of census tract housing vacancy rates varied by the data source. The Toledo Survey recorded lower vacancy rates overall than either USPS/HUD or ACS (see exhibit 2). Pearson correlations ranging from 0.73 to 0.85 showed reasonably strong agreement between the data sources (see exhibit 3). Tract vacancy rates from USPS/HUD were usually greater than Toledo Survey estimates, and ACS vacancy rates were generally greater than both the Toledo Survey and USPS/HUD (see exhibit 3).

Exhibit 2

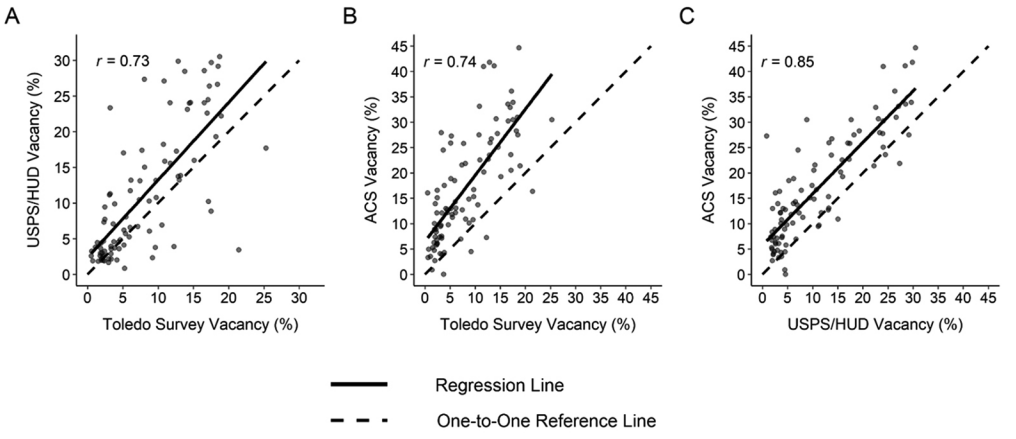
Summary Statistics for Housing Vacancy Rates by Data Source for Toledo Census Tracts

	Toledo Survey (%)	USPS/HUD (%)	ACS (%)
Mean	8.1	11.1	17.0
Median	6.0	7.7	14.3
Standard Deviation	6.0	9.0	10.7
Minimum	0.5	0.8	0.0
Maximum	25.3	30.5	44.6

ACS = American Community Survey. USPS = U.S. Postal Service.
Note: n = 95.
Sources: Toledo Survey; U.S. Census Bureau; U.S. Department of Housing and Urban Development

Exhibit 3

Scatterplots Comparing Census Tract Vacancy by Data Source



ACS = American Community Survey. USPS = U.S. Postal Service.
Sources: Toledo Survey; U.S. Census Bureau; U.S. Department of Housing and Urban Development

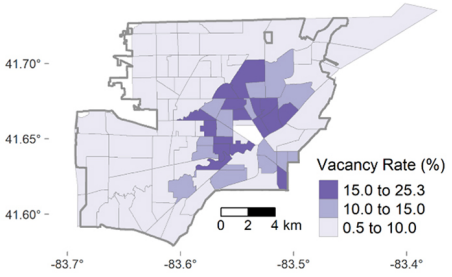
Hot spot analysis with the Getis-Ord G_i^* statistic demonstrated spatial non-stationarity in the differences in vacancy estimates between data sources. Although USPS/HUD vacancy rates tended to be higher overall than Toledo Survey rates (see exhibit 3a), these differences were more pronounced in the higher vacancy areas of Toledo (see cold spots with solid outlines in exhibit 4b). Similarly, ACS vacancy rates were typically higher than Toledo Survey vacancy rates (see exhibit

3b), but these differences were more pronounced in high-vacancy tracts near downtown Toledo (see cold spots with solid outlines in exhibit 4c) and less pronounced in lower-vacancy tracts in south and northwest Toledo (see hot spots with dashed outlines in exhibit 4c). Finally, there was comparatively less spatial structure to the differences between USPS/HUD vacancy rates and ACS vacancy rates (see exhibit 4d), with only two cold spots centered on lower vacancy tracts that bordered higher vacancy tracts.

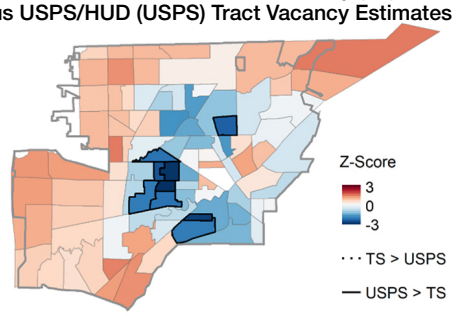
Exhibit 4

Geographic Patterns in Vacancy Estimates Across Data Sources

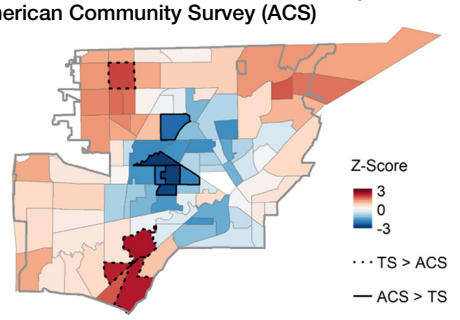
A: Toledo Survey Estimates for Percent Vacant Residential Structures by Census Tract



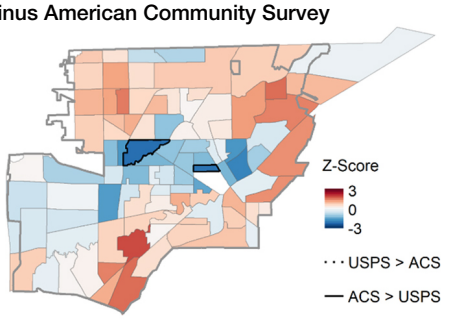
B: Hot Spot Maps Showing Geographic Clusters in the Difference Between Toledo Survey (TS) Minus USPS/HUD (USPS) Tract Vacancy Estimates



C: Hot Spot Maps Showing Geographic Clusters in the Difference Between Toledo Survey Minus American Community Survey (ACS)



D: Hot Spot Maps Showing Geographic Clusters in the Difference Between USPS/HUD Minus American Community Survey



ACS = American Community Survey. TS = Toledo Survey. USPS = U.S. Postal Service.

Note: Bold tract outlines indicate statistically significant clusters of large positive differences (dotted lines) and large negative differences (solid lines).

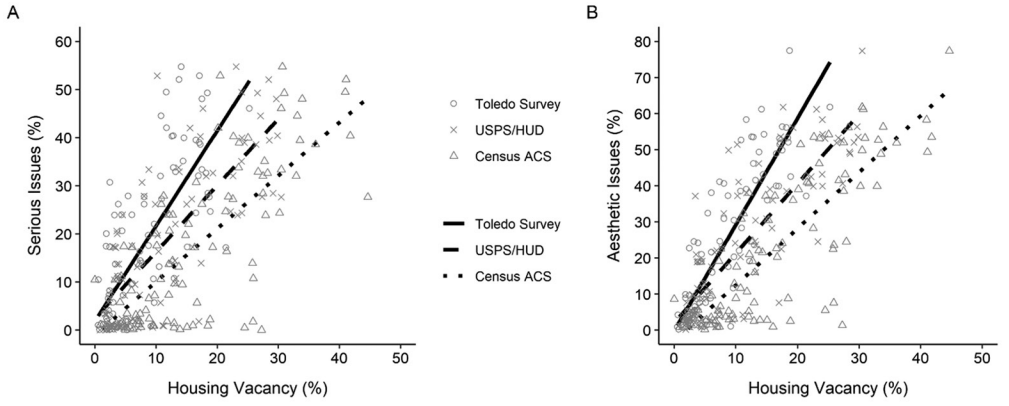
Sources: Toledo Survey; U.S. Census Bureau; U.S. Department of Housing and Urban Development

Census Tract Housing Vacancy as a Proxy for Blight

Physical blight increased with housing vacancy. All correlations between housing vacancy and physical blight were positive and strong ($r \geq 0.73$; $p < 0.001$) (see exhibits 5 and 6). Observed r values ranged from 0.73–0.77 for serious issues and 0.81–0.87 for aesthetic issues. No significant differences were observed between correlation coefficients ($p > 0.10$ for all comparisons) (see exhibit 6).

Exhibit 5

Scatterplots with Linear Regression Lines Showing the Relationships Between Housing Vacancy and Physical Blight

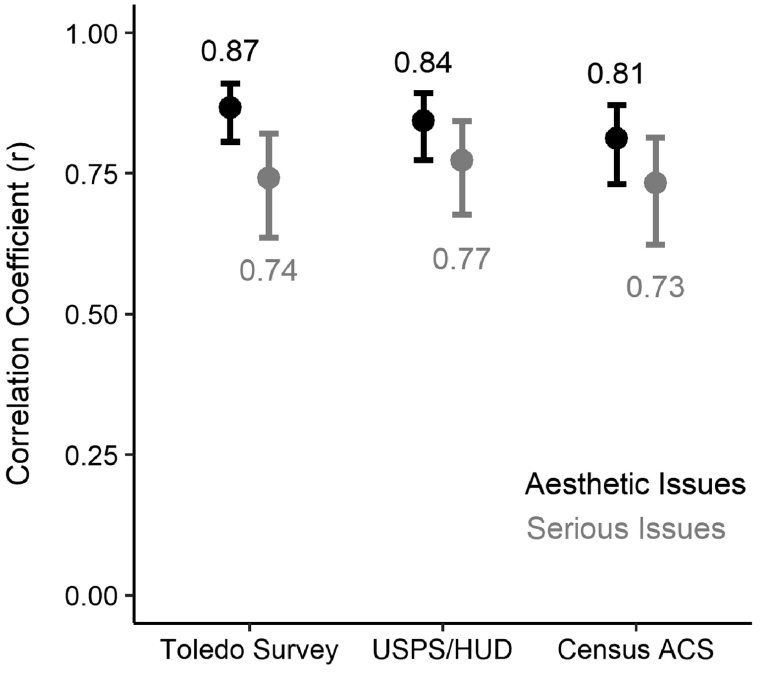


ACS = American Community Survey. USPS = U.S. Postal Service.

Sources: Toledo Survey; U.S. Census Bureau; U.S. Department of Housing and Urban Development

Exhibit 6

Pearson Correlation Coefficients and 95 Percent Confidence Intervals for the Relationships Between Housing Vacancy and Physical Blight, by Data Source



ACS = American Community Survey. USPS = U.S. Postal Service.

Sources: Toledo Survey; U.S. Census Bureau; U.S. Department of Housing and Urban Development

Discussion

Vacant housing and physical blight are pressing issues in U.S. cities. The rise of parcel condition surveys, especially in Rust Belt cities, reflects the importance of vacancy and physical blight observations for guiding data-driven land management and policy decisions. In the absence of parcel-scale datasets, however, decisionmakers and researchers have relied on broadly available datasets at the neighborhood scale from USPS/HUD and the Census ACS to understand patterns in housing vacancy and physical blight (for example, Hackworth, 2014; Harrison and Immergluck, 2021; Schwarz, Berland, and Herrmann, 2018). This article provides context for using these datasets by comparing housing vacancy rates across data sources and explores implications for using vacancy rates to approximate the prevalence of physical blight. In general, strong agreement in tract vacancy estimates among all three data sources (see exhibit 3) suggests that robust analyses could be generated using any of the data sources. Furthermore, strong correlations between housing vacancy and physical blight did not differ significantly across data sources (see exhibit 6), indicating that each data source could reliably capture the relationship between housing vacancy and physical blight.

There are some nuanced differences among data sources that deserve mention, however. First, tract-scale vacancy estimates were lower overall in the Toledo Survey compared with both national data sources (see exhibits 2 and 3). The sources of error in these estimates are not fully known but could result from factors like data collection error in the Toledo Survey (for example, misjudged vacancy or data entry errors) or sampling error inherent in the Census ACS. Second, the relatively higher estimates of vacancy observed in the USPS/HUD and ACS estimates were more pronounced in higher-vacancy areas, as indicated by cold spots in exhibit 4b and 4c, respectively. Again, the reasons for these discrepancies are not apparent, but they suggest that the choice of the vacancy data source is potentially important in studies focused on high-vacancy areas. Third, although the strength of correlation between vacancy rates and physical blight did not vary by data source (see exhibit 6), the slopes of regression lines characterizing those relationships did vary (see exhibit 5). This variation is apparently caused by relatively higher vacancy estimates in the Census ACS data—and to a lesser degree the USPS/HUD data—as compared with the Toledo Survey data. The reasons for these observed differences could be explored further in future studies to better understand the implications for research and policy related to high-vacancy areas.

This article demonstrates a connection at the parcel scale between housing vacancy and physical blight for both aesthetic issues and serious issues. Previous work in Toledo by Berland et al. (2020) showed that vacant residential parcels were more likely to have overgrown vegetation than comparable occupied parcels. The results here extend this finding to other forms of physical blight, including dilapidated building conditions. As expected, physical blight was more common on parcels with vacant structures (see exhibit 1), although it is not clear if reduced parcel care following abandonment led to physical blight or if perhaps the preexistence of physical blight played a role in prompting abandonment. In some cases, it may have been a combination of both, wherein deteriorating housing market conditions in the neighborhood reduced incentives to maintain the property, allowing physical blight issues to emerge. Then the property was eventually abandoned, and subsequently, more blight issues developed as the house sat unoccupied.

Observing relatively higher rates of physical blight in high-vacancy areas (see exhibits 1 and 5) is not surprising given that high-vacancy neighborhoods have experienced a confluence of challenging factors. These factors include policies that featured racial discrimination or systematically disinvested in high-poverty neighborhoods (Hackworth, 2019; Tighe and Ganning, 2015). In addition, weakening housing market conditions and land abandonment can reduce financial incentives for owners to maintain properties (Fujii, 2016; Han, 2014; Harrison and Immergluck, 2021; Hollander, 2010). Finally, reduced social cohesion can undermine the sense of community and neighborhood social norms that can encourage property maintenance (Locke et al., 2021; Rigolon et al., 2021; Sampson et al., 2017; Teixeira, 2015). The high prevalence of physical blight on vacant residential parcels likely has neighborhood effects, whereby occupied parcels in close proximity experience negative impacts of vacancy, including reduced property values (Han, 2014; Whitaker and Fitzpatrick, 2013), increased crime or the perception of reduced safety (Branas, Rubin, and Guo, 2012; Cui and Walsh, 2015; Nassauer and Raskin, 2014), and a loss of social cohesion or community pride (Nassauer and Raskin, 2014; Rigolon et al., 2021). Furthermore, although this article only considered the vacancy of housing units, high-vacancy areas are also likely to have many vacant lots without residential structures. Vacant lots add to the challenges presented by vacant residences, but they may also present opportunities for locally desirable social-ecological outcomes (Anderson and Minor, 2017; Garvin et al., 2013; Herrmann, Schwarz, et al., 2016; Rigolon et al., 2021; Stern and Lester, 2021).

The negative impacts of vacancy and physical blight have been well documented, policy recommendations and responses have been varied (Harrison and Immergluck, 2021). Direct discussion of urban shrinkage has often been avoided by policymakers altogether (Mallach, 2017). Demolition has commonly been used to reduce the prevalence of abandoned houses and physical blight (Mallach, 2018). Paredes and Skidmore (2017) observed increased property values for parcels near demolition sites in Detroit. In addition, Alvayay Torrejón, Paredes, and Skidmore (2021) demonstrated a reduction in property tax delinquency for properties near demolition sites, possibly signaling that demolishing dilapidated houses can improve perceived neighborhood quality. Strategic demolitions may be beneficial in certain situations (Harrison and Immergluck, 2021), but widespread demolition as a policy has been criticized (Hackworth, 2019). Although not always successful in practice, revitalization efforts may encourage reinvestment in high-vacancy neighborhoods, particularly when safeguards such as community land trusts are put in place to avoid gentrification that displaces residents (Prener, Braswell, and Monti, 2020). Governance innovations like land banks have become increasingly common to facilitate the transfer of vacant houses to new owners who are likely to maintain the properties. Fujii (2016) described how land banks can work together with community development corporations to generate positive outcomes that are not seen when financial institutions or speculative investors own vacant houses.

Policy interventions should be tailored to the local situation because the impacts of vacancy on quality of life within neighborhoods are context-dependent, such that vacancy rates alone cannot precisely predict socioeconomic outcomes (Hollander, 2010). Still, addressing residential vacancy and physical blight remains a key challenge, particularly for shrinking cities (Accordino and Johnson, 2000; Harrison and Immergluck, 2021). This issue is made even more important by the imperative to address structural inequities in our cities (Tighe and Ganning, 2015) related to the fact that high-vacancy neighborhoods have disproportionately high populations of traditionally

marginalized groups (Rigolon et al., 2021; Schwarz, Berland, and Herrmann, 2018). The emergence of parcel condition surveys alongside broadly available USPS/HUD and ACS data gives policymakers and researchers new perspectives on housing vacancy and physical blight. As presented in this article, a better understanding of these data sources—and the patterns they reveal—is an important step in working toward just and informed decisionmaking.

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Does the Inclusion of Residential No-Stat Addresses Along Rural Postal Carrier Routes Improve Vacancy Rate Estimates?

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Abstract

Blighted housing is a problem in communities throughout the United States. Many definitions of blight and data sources attempt to quantify and measure blight. One common measure of housing blight is housing vacancy, and one common data source for housing vacancy is the U.S. Department of Housing and Urban Development (HUD) Aggregated U.S. Postal Service (USPS) Administrative Data on Address Vacancies (USPS address data). This dataset provides granular and timely data into active and vacant housing. However, the USPS address data is not without its flaws. The label "not-a-statistic" ("no-stat") to describe housing that is vacant, under construction, or otherwise not receiving mail is an ambiguous designation and has puzzled researchers. It is not possible to discern between no-stat for blight versus no-stat for development in the data. This error may lead researchers to false conclusions about housing vacancy or neighborhood characteristics of high housing vacancy areas if the housing vacancy rate is not accurately calculated. The label no-stat has even attracted Congressional attention to decipher no-stat for blight versus no-stat for development.[1]

[1] See 116th Congress. 2019. "H. Rept. 116-106 – Departments of Transportation, and Housing and Urban Development, and Related Agencies Appropriations Bill, 2020." https://www.congress.gov/congressional-report/116th-congress/house-report/106/1

Abstract, continued

One clue regarding no-stat addresses has not been investigated until this study. Letter carriers that work in rural postal carrier routes are instructed to label vacant addresses as no-stat (HUD, 2010; USPS, 2019, 2013). No-stat addresses along rural routes (rural no-stats) are likely vacant addresses. This study tests if the inclusion of residential rural no-stat addresses better approximates the vacancy rate from the American Community Survey (ACS) by benchmarking two measures of housing vacancy from the USPS address data: long-term (6 months or greater) residential address vacancy and long-term residential vacancy plus residential rural no-stats. Because this research involves rural postal carrier routes, it compares the two USPS-derived vacancy rates against the ACS vacancy rate and uses Rural-Urban Commuting Area (RUCA) code geographies as a measure of rurality. The USPS vacancy rate that includes residential rural no-stats more closely approximates the ACS vacancy rate overall. The improvement is particularly better in non-core census tracts mostly served by rural postal carrier routes rather than city postal carrier routes.

Introduction

Housing vacancy is a problem in many communities throughout the United States (Accordino and Johnson, 2000; GAO, 2011). Structures that have been vacant for longer periods of time are a good proxy for blight (Duke, 2012). Housing vacancy and blight have been linked to a number of negative phenomena such as reduced property values (Han, 2014), unpaid revenue collection (Accordino and Johnson, 2000), poor health outcomes (Katz, Barrie, and Carey, 2014; South, Holh, and Kondo, 2018; Wang and Immergluck, 2018), and crime (Branas et al., 2011; Branas et al., 2018; Garvin, Cannuscio, and Branas, 2013; Jay et al., 2019; Larson et al., 2019).

Policymakers have sought help from analysts and researchers to identify housing vacancies and blight in their communities to remediate problems caused by housing vacancies. Hindering their efforts is that housing vacancy and blight data can be difficult to measure and collect. Defining blight itself is a challenging concept to establish (Gordon, 2004). Gathering data on housing vacancy and blight is also challenging, particularly at granular levels of detail. Other data sources such as 311 calls for service or housing vacancy often serve as a proxy to identify blight.

There are several sources of housing vacancy and blight data. Some local jurisdictions use 311 calls as a proxy for blight (Athens et al., 2020), whereas a small number of other jurisdictions may conduct surveys (Berland et al., 2020). The Housing Vacancy Survey (HVS) by the U.S. Census Bureau provides some useful information about vacant housing, but the survey is not granular; the most detailed estimates are at the metropolitan statistical area-level. The Census Bureau, through the decennial Census and American Community Survey (ACS), also collects information on housing vacancies down to the neighborhood-level (census tract), which may be considered the most accurate housing vacancy data source (Molloy, 2016). However, census data is not without issues to analysts and policymakers. To achieve granularity, the Census Bureau uses statistical

sampling from 5-year rolling surveys to generate neighborhood-level data. There is also a data availability delay, as detailed data on neighborhood characteristics are released at the end of the year following the last year of data collection (Census Bureau, 2022).[2]

An alternative source of housing vacancy data at the census tract level is the HUD Aggregated U.S. Postal Service (USPS) Administrative Address Data on Vacancies (USPS address data). In addition to delivering the mail, letter carriers also collect delivery status information about the addresses providing near real-time data about housing vacancies. The advantage of this dataset is that the information is collected daily by a workforce that serves every address in the United States and is released shortly after the end of each quarter.[3]

USPS address data provides unique, neighborhood-level insight into housing vacancy throughout the United States. However, housing vacancy estimates from USPS address data are frequently lower than from the ACS produced by the Census Bureau for a given area. Because the ACS and USPS use different data collection sources and methods, it should not be expected that these datasets exactly match up. The source of the discrepancy may be related to the fact that the USPS uses two separate indicators for unoccupied housing. The first is the label "vacancy," used when a structure is habitable, but the mail has not been collected for 90 days or longer. The second label is "not a statistic" (no-stat) which can indicate housing vacancy but may also indicate other conditions such as a home under construction, two addresses merged, served by a post office box, demolished, or some other condition. There are no other variables in the data provided by the USPS that describe *why* an address is listed as no-stat.

Investigation into no-stat addresses could assist in estimating vacancy rates with USPS address data. Addresses along rural postal carrier routes are listed as no-stat if they are vacant for 90 days or longer (HUD, 2010; USPS, 2019, 2013). Postal routes are described as city or rural; the designation is not necessarily a description of geography but is instead a description of pay structure. Letter carriers that work on city routes are paid an hourly wage whereas their rural route counterparts are paid by a formula based on mileage and the number of stops. Because letter carriers are instructed to mark vacant addresses as no-stat when the address is served by a rural carrier route, the inclusion of rural no-stats into the vacancy rate estimation will improve the USPS vacancy rate estimate. In this analysis, the USPS vacancy rate estimate is compared to the vacancy rate estimate from the American Community Survey.

This study contributes to the literature in two ways. This is likely the first article investigating residential addresses coded as no-stats by the USPS along the rural postal carrier routes (rural no-stats). First, the study examines residential addresses on rural postal carrier routes and whether they match with the addresses on rural areas by Rural-Urban Commuting Area (RUCA) codes. RUCA codes are neighborhood-level extensions of the Office of Management and Budget's (OMB) definition of metropolitan, micropolitan, and non-metropolitan statistical areas. This is to establish if areas served by rural postal routes are considered rural by other metrics and because data on rural housing vacancy and blight is sparse (Eisenberg, 2018). Second, the study investigates the

[2] The 2015–2019 5-Year American Community Survey dataset was released in December 2020.

[3] For example, data collected between October 1 and December 31 is delivered to HUD from the USPS in early January, and HUD typically posts fourth quarter data by the end of January.

differences and correlations between neighborhood-level estimates of housing vacancy from the Census Bureau and no-stat addresses along rural routes by RUCA code are investigated. The analysis used data from the Census Bureau as a point of comparison against USPS address data because of the data's availability at small geographic scales and the frequent use of census data in social science research, including housing vacancy.

The structure of this article is divided as follows: The next section reviews the literature regarding USPS address data. The subsequent section describes the datasets used in the analysis. The analytical strategy and results are reported after that. The last section discusses analysis implications and future work plans.

Background

Studies over the last several decades debated what to do about vacant, abandoned, and blighted structures and property. Primarily, research into vacant and abandoned structures and the property has been associated with poor financial impacts and economic stagnation or decline (GAO, 2011; Han 2014; Mallach, 2012; Wang and Immergluck, 2019; Whitaker and Fitzpatrick IV, 2013) and declining populations (Lee and Newman, 2017), whereas some researchers also note the potential benefits of leaving vacant properties as they are (Kelleher et al., 2020), research on vacant lots and structures generally focuses how to transform the abandoned site into something more useful.

The need for data has grown as more communities seek to address vacant housing problems; several studies utilize USPS address data to monitor and evaluate address vacancy as a proxy for blight. Silverman, Yin, and Patterson (2013) explored long-term (6 months or longer) residential vacancy patterns in Buffalo, New York. Long-term vacancy increased as poverty rates, the share of renters receiving rental assistance, and the share of the Black population increased. Immergluck (2015) analyzed neighborhood characteristics associated with long-term vacancy to explore the housing market recovery between 2011–2014. Although the United States generally experienced a housing market recovery during this period, Immergluck observed that the recovery in long-term vacancy rates lagged in poor neighborhoods. Recently, Harrison and Immergluck (2021) used the USPS address data to analyze neighborhood vacancy trends in the largest 200 metros in the United States with "hyper-vacancy" which represents census tracts with 8.0 percent or greater residential vacancy and found a decline in these neighborhoods from 9.4 percent of all census tracts in the study area in 2012 to 7.5 percent in 2019. These studies use residential addresses that are listed as vacant, not no-stat, for 6 months or longer.

Molloy (2016) investigated long-term vacancy in metropolitan areas to measure excess housing supply noting the mismatch between the housing supply and demand could rise if the community includes a significant number of seasonal vacant homes and other homes intentionally left vacant with no negative neighborhood consequences. Then Molloy employs a unique filter to USPS address data to align with the data from the Census Bureau. Molloy included no-stat addresses but did not differentiate the data by postal route type—city or rural. Until now, Molloy's methodology of aggregating vacant addresses and no-stat addresses to determine the vacancy rate has not been corroborated or duplicated, especially for rural areas.

Although a few studies concerning vacant and abandoned properties have been conducted to include rural regions as part of a broader study, most research on long-term vacancy and blight has been conducted on a single city, region, or large metropolitan area (Harrison and Immergluck, 2020; Hollander, 2011; Newman et al., 2016; Silverman, Yin, and Patterson, 2013). Rural areas in the United States have distinct socioeconomic characteristics and unique challenges concerning housing issues. Rural areas differ in housing needs and the resources they possess to address them. Rural areas have had declining population growth and out-migration for decades (Dobis et al., 2021). Johnson and Lichter (2019) observed that rural blight faces unique challenges such as drastic population and resource decline, as 17 percent of non-metropolitan counties had lost over half their peak populations compared to about 1 percent of metropolitan counties losing the same population in 2010. During the last century, rapid suburbanization of the United States also led to a population decrease across many rural areas, including people leaving agrarian communities and exiting urbanized communities in largely rural areas. Analysis found no studies using USPS address data to analyze vacant and/or blighted housing specifically in rural areas, although a few may have included some rural areas as part of broader metropolitan regions. This article closes the knowledge gap by examining the vacant and abandoned residential addresses along the rural postal carrier routes using the merged USPS address data and 2015–2019 5-Year ACS data.

Data

HUD Aggregated USPS Administrative Data on Address Vacancies (USPS Address Data)

The primary dataset used in this analysis is the HUD Aggregated United States Postal Service (USPS) Administrative Data on Address Vacancies (USPS address data). This dataset contains administrative information collected by the Postal Service's letter carriers. In addition to delivering mail, letter carriers also collect information about the addresses to which they are delivering the mail to improve delivery. These data points primarily concern if mail can be delivered to an address. Letter carriers collect this information which is imputed into the USPS's Address Management System (AMS). This data is aggregated to the ZIP+4 geographic level, which is then provided to HUD. A single ZIP+4 centroid can be thought of as a block of rowhomes, a cul-de-sac, or a single floor of an apartment building. One ZIP+4 centroid typically has between one and 24 residential addresses.[4] Only ZIP+4 records which are associated with a residential, business, or other address type are provided to HUD. Postal box-only ZIP+4 records are not included in the dataset and the subsequent data products released by HUD. In the fourth quarter of 2019, there were more than 37 million records in the ZIP+4 extract containing over 154 million residential addresses.

HUD uses a sublicense to share USPS address data to government entities and other non-profit researchers. The data is aggregated to census tracts per the interagency agreement with the USPS. The USPS address data include counts of addresses where mail cannot be delivered. Letter carriers label these addresses either as no-stat or vacant; both indicate mail delivery is not possible at the address. There are also data points that describe how average length of vacancy or no-stat statuses

[4] These are the 1st and 99th percentiles for residential addresses for ZIP+4 records with at least one residential address. The median is three residential addresses per ZIP+4. The maximum value was 1,038 residential addresses.

and other new descriptive fields such as the USPS preferred state and city names, count of new addresses during that quarter, and addresses served by a drop stop (Din, 2021).

Addresses labeled as no-stat can be listed for multiple reasons, including potential vacancy, the demolition of a building (the address is kept in AMS), or new construction housing that has not yet begun to receive mail. The USPS states the following potential reasons why an address may be labeled no-stat (USPS, 2013)—

- New housing developments
- Vacant delivery points on rural routes
- Addresses for delivery points in gated communities (identified with a drop count on the address where all mail is delivered)

Vacant addresses are addresses that have not collected mail for 90 days or longer. The description vacant may be a proxy for blight but is not necessarily blight itself. For both descriptors, no-stat and vacant, the USPS tracks how long an address has been in that status. Multiple variables describe the length of vacancy in the data. In the literature, researchers generally divide the data into short-term vacancies, (fewer than 6 months) and long-term vacancies, (greater than 6 months) because some level of short-term vacancy might be indicative of a healthy housing market (Mallach, 2018). The analysis focuses on long-term vacancies; short-term vacancies may also be more difficult to pick up by a survey like the ACS.

This study used the Carrier Route ID (CR) variable to identify ZIP+4 records along rural routes. The CR variable is a four-character variable that describes the route that a ZIP+4 falls along. Carrier routes indicate a pay structure. Letter carriers working rural routes are paid based on a formula (USPS, 2022), unlike city letter carriers who receive an hourly wage. Therefore, rural defined by the USPS is a description of the pay structure, not geography. The first character in the variable describes the type of route. The possible values for the first character of the CR are—

- B – P.O. Box
- C – City Delivery
- G – General Delivery
- H – Contract Rural Route
- R – Rural Route

The study identified residential addresses along rural routes by analyzing ZIP+4 records with a CR value that began with either "H" or "R." For the fourth quarter of 2019, there were slightly more than 151 million residential addresses in the USPS address data, of which approximately 36.7 percent were either along a rural route or contracted rural route. Addresses were aggregated to the census tract level for linkage with RUCA code and ACS datasets. Unlike the census tract aggregation file normally made available to governments and nonprofit researchers, the data are

sorted by postal carrier routes. Calculating the share of residential addresses that are along a rural (including rural contract) route allowed identification of USPS address data by route type.

Rural-Urban Commuting Area Codes

The most recent RUCA codes are based on the 2010 Decennial Census; the 2006–2010 5-Year ACS, and codes categorize U.S. census tracts into 10 primary codes using measures of population density, urbanization, and daily commuting. Although similar in concept with the Office of Management and Budget's (OMB) classification of county-level metropolitan (metro) and non-metropolitan (nonmetro) areas, RUCA codes identify urban cores and adjacent territories by using census tracts as geographical building blocks to differentiate urban and rural areas. Census tracts equivalent to urban areas are defined as metropolitan areas and classified as code 1, but Census tracts equivalent to urban clusters area defined as micropolitan and small town cores, so they are classified as codes 4 and 7, respectively. RUCA codes were chosen to analyze rural geography because they describe every census tract in the United States. This allows researchers to identify rural areas in metropolitan counties and urban areas in micropolitan counties and small-town areas (Hart, Larson, and Lishner, 2005). For a full description of each RUCA code, refer to exhibit 1.

Exhibit 1

Primary Rural-Urban Commuting Area Codes, 2010

Rural-Urban Commuting Area (RUCA) Code		Classification Description
1	Metropolitan	Metropolitan area core: primary flow within an urbanized area (UA)
2	Metropolitan	Metropolitan area high commuting: primary flow 30% or more to a UA
3	Metropolitan	Metropolitan area low commuting: primary flow 10% to 30% to a UA
4	Micropolitan	Micropolitan area core: primary flow within an urban cluster of 10,000 to 49,999 (large UC)
5	Micropolitan	Micropolitan high commuting: primary flow 30% or more to a large UC
6	Micropolitan	Micropolitan low commuting: primary flow 10% to 30% to a large UC
7	Small Town	Small town core: primary flow within an urban cluster of 2,500 to 9,999 (small UC)
8	Small Town	Small town high commuting: primary flow 30% or more to a small UC
9	Small Town	Small town low commuting: primary flow 10% to 30% to a small UC
10	Rural Areas	Rural areas: primary flow to a tract outside a UA or UC
99	n/a	Not coded: Census tract has zero population and no rural-urban identifier information

Source: U.S. Department of Agriculture (USDA) Economic Research Service (ERS)

American Community Survey Vacancy Estimates

ACS started in 2004 to replace decennial census sample data as the primary source for detailed population and housing data and provide data more frequently. The survey's sample size of over 2 million households is sufficient to provide annual estimates for nonmetro areas by state. However, for smaller geographic units such as census tracts, the Census Bureau aggregates and estimates the

average of 5 years of annual surveys (Census Bureau, 2021). This article uses the most recent 5-year aggregate data at the time this article was written, covering 2015–2019.

This analysis uses the ACS code Occupancy Status (B25002) to derive a vacancy rate. The code B25002 provides three variables (1) a count of total housing units, (2) the count of occupied housing units, and (3) the count of vacant housing units (ACS, 2021). This study calculated the rate of vacant housing at the census tract level for all 50 states and the District of Columbia. Next, the study merged ACS vacancy estimates with the USPS address data and RUCA codes at the census tract level. It was not expected that either the estimated ACS vacancy rate or the estimated USPS vacancy rate would represent the true vacancy rates of any geographical unit in a time period. Large differences between the two data sources were treated as problematic; the neighborhood-level ACS data was used as a point of comparison because of the wide availability and usage of census data.

Analysis

Alignment Between USPS Carrier Route Types and RUCA Codes

This study evaluated whether Census tracts with a greater share of residential addresses along rural postal carrier routes represent the rural areas in the United States. Even though rural carrier routes are designated as a formula-based pay structure rather than a geographical representation, rural carrier routes could also account for non-urban areas as well. Whereas some rural studies use metro-nonmetro county classification by the OMB to analyze rural America, this analysis used Rural-Urban Commuting Area (RUCA) codes because it is a more delineated classification system incorporating population density, urbanization, and daily commuting at the census tract level. The study assessed alignment between the rural postal carrier routes and RUCA codes in terms of residential and no-stat addresses in each category.

This study calculated the share of residential and no-stat addresses along rural postal carrier routes by RUCA code shown in exhibit 2. Codes 1, 4, and 7 provide the total address counts for metropolitan, micropolitan, and small town cores, respectively. Census tracts are included in these cores if more than 30 percent of their population is in the urbanized area or urban cluster. These three columns comprise most residential addresses in their respective groupings of metropolitan, micropolitan, and small town communities. In metropolitan areas (codes 1, 2, and 3, commonly referred to as metro by OMB definition), 87.5 percent of all residential addresses are in the core (see column 1 in exhibit 2), whereas even in small towns approximately 70.3 percent reside in the core. In these metropolitan, micropolitan, and small town cores, residential addresses along rural postal carrier routes make up a smaller share of residential addresses compared with the surrounding commuting areas, ranging from 23.9 percent in metropolitan cores to 35.1 percent in micropolitan cores, and 44.4 percent in small town cores.

Exhibit 2

Count of USPS Address Data by Rural-Urban Commuting Area Code, 2019

USPS Address Data	1	2	3	4	5	6	7	8	9	10	Total
	Metropolitan			Micropolitan			Small Town			Rural Areas	
	Core: primary flow within an urbanized area (UA)	High-commuting: primary flow 30% or more to a UA	Low-commuting: primary flow 10% to 30% to a UA	Core: primary flow within an urban cluster of 10,000 to 49,999 (large UC)	High-commuting: primary flow 30% or more to a large UC	Low-commuting: primary flow 10% to 30% to a large UC	Core: primary flow within an urban cluster of 2,500 to 9,999 (small UC)	High-commuting: primary flow 30% or more to a small UC	Low-commuting: primary flow 10% to 30% to a small UC	Primary flow to a tract outside a UA or UC	
Total Residential Addresses	110,068,835	14,434,490	1,258,426	9,710,507	3,744,410	769,865	4,660,446	1,354,968	612,982	4,716,662	151,331,591
Total Residential Addresses Along Rural Carrier Routes	26,260,646	12,333,676	1,150,220	3,410,981	3,522,099	732,036	2,068,261	1,275,226	594,746	4,162,631	55,510,522
Share	23.9%	85.4%	91.4%	35.1%	94.1%	95.1%	44.4%	94.1%	97.0%	88.3%	36.7%
Total No-Stat Residential Addresses	11,539,661	2,441,801	248,503	1,734,402	730,457	155,565	799,403	290,314	129,740	1,274,178	19,344,024
Total No-Stat Residential Addresses Along Rural Carrier Routes	2,186,996	1,889,956	212,384	512,523	666,047	144,654	394,403	265,223	122,436	1,133,144	7,527,766
Share	19.0%	77.4%	85.5%	29.6%	91.2%	93.0%	49.3%	91.4%	94.4%	88.9%	38.9%

Sources: 2019 fourth quarter USPS address data merged with USDA ERS defined RUCA codes; calculations performed by the authors

The number of addresses on rural postal carrier routes and the total number of addresses in each RUCA category is more similar in the commuting areas surrounding the metropolitan, micropolitan, and small town cores. In codes 2, 5, and 8—areas of high-commuting in metropolitan, micropolitan, and small towns, respectively—the share of residential addresses along rural postal carrier routes represents most residential addresses in each category. In high-commuting census tracts in metro areas, residential addresses along rural postal carrier routes comprise 85.5 percent. In comparison, nearly all residential addresses in high-commuting micropolitan and small town census tracts are along rural routes at 94.1 percent each. In low-commuting census tracts (codes 3, 6, and 9), the share of residential addresses along rural routes again rises to 91.4, 95.1, and 97.0 percent in metropolitan, micropolitan, and small town census tracts, respectively. In completely rural areas (code 10), where the only commuter flow is to an area outside of an urbanized area or urbanized cluster, 88.3 of residential addresses are along rural routes.

Overall, about one-third, 36.7 percent, of all residential addresses are along the rural postal carrier routes. In comparison, nonmetro areas by OMB definition contain only 16.9 percent of all residential addresses. This analysis aligned rural postal carrier routes by utilizing RUCA codes, which identified non-urban core or cluster areas more precisely. The residential addresses along city routes tend to be concentrated in urbanized areas or urban clusters, particularly in metropolitan and micropolitan areas. The smaller the overall community is, such as micropolitan or small town communities, the greater the share of addresses is along the rural routes. At the same time, as commuting into urbanized areas or urban clusters falls, the share of addresses along rural postal carrier routes rises. The residential no-stat addresses total and along the rural postal carrier routes have a similar trend as well. This study checked the persistence of these results over time by calculating the proportion of residential addresses along rural postal carrier routes by RUCA code from 2012 to 2021, as shown in exhibit 3. This study uses years 2012 through 2021 because this was the full range of data available and after some adjustment of the use of no-stat addresses by the USPS in their Move to Competitive Street Addressing program.

Exhibit 3

Share of Residential Addresses Along Rural Carrier Routes by RUCA Code, 2012–2021

Rural-Urban Commuting Area (RUCA) Code			Year									
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Metropolitan	Core: primary flow within an urbanized area (UA)	22.3%	22.5%	22.5%	22.8%	23.0%	23.3%	23.6%	23.9%	24.2%	24.3%
2		High-commuting: primary flow 30% or more to a UA	85.7%	85.8%	84.5%	84.7%	84.8%	85.0%	85.2%	85.4%	85.6%	85.6%
3		Low-commuting: primary flow 10% to 30% to a UA	91.8%	91.9%	90.6%	90.7%	90.9%	91.0%	91.1%	91.4%	91.4%	91.5%
4	Micropolitan	Core: primary flow within an urban cluster of 10,000 to 49,999 (large UC)	34.4%	34.6%	33.7%	34.0%	34.2%	34.4%	34.7%	35.1%	35.4%	35.5%
5		High-commuting: primary flow 30% or more to a large UC	94.5%	94.5%	93.6%	93.7%	93.7%	93.8%	93.9%	94.1%	94.1%	94.1%
6		Low-commuting: primary flow 10% to 30% to a large UC	95.7%	95.7%	94.8%	94.9%	94.9%	95.0%	95.0%	95.1%	95.2%	95.2%
7	Small Town	Core: primary flow within an urban cluster of 2,500 to 9,999 (small UC)	43.7%	44.0%	42.8%	43.0%	43.2%	43.5%	43.8%	44.3%	44.7%	44.9%
8		High-commuting: primary flow 30% or more to a small UC	94.4%	94.4%	94.5%	93.6%	93.6%	93.7%	93.8%	94.1%	94.0%	94.1%
9		Low-commuting: primary flow 10% to 30% to a small UC	97.5%	97.6%	96.6%	96.7%	96.7%	96.7%	96.8%	97.0%	97.0%	97.0%
10	Rural Areas	Primary flow to a tract outside a UA or UC	88.1%	88.3%	86.8%	87.0%	87.2%	87.3%	87.7%	88.2%	88.3%	88.3%

Sources: 2019 fourth quarter USPS address data merged with USDA ERS defined RUCA codes; calculations performed by the authors

No-Stat Addresses and the American Community Survey Vacancy Rate

The American Community Survey (ACS) is the primary supplier of detailed neighborhood characteristics in the United States, including estimates for housing occupancy and vacancy. The 5-year pooled estimates of the ACS increase the statistical reliability of the estimates at the census tract level. However, analysis indicates that the 5-year ACS estimates of housing vacancy differ from the estimates of housing vacancy provided by the USPS address data. One reason could be that for statistical reliability at the census tract level, data from the ACS is aggregated and estimated over a 5-year period, whereas the USPS provides quarterly data. Another source of discrepancy between the ACS and USPS vacancy rates is that along rural carrier routes the USPS instructs letter carriers to mark any address that has been vacant for 90 days or longer as no-stat rather than long-term vacant (HUD, 2010; USPS, 2019, 2013). Vacant residential addresses labeled no-stat may explain some differences between USPS address data estimates and ACS vacancy rate estimates.

Researchers investigated the role of no-stat addresses in estimating vacancy rates by examining the shares of USPS residential addresses that are short-term vacant, long-term vacant, and no-stat by RUCA code. The results are shown in exhibit 4. Overall, the long-term vacancy rate is approximately one-quarter of the ACS estimated vacancy rate. This result is driven by the long-term vacancy in core areas (RUCA codes 1, 4, and 7). As the size of the communities decreases and the commuting distance to the urban areas and clusters increases (RUCA codes 2, 3, 5, 6, 8, and 9), the long-term vacancy rate falls to only about one-tenth of the ACS estimated vacancy rate in the non-core communities. Long-term vacancy performs poorly in metropolitan core areas where the residential addresses tend to be located along city routes. In non-core areas with high commuting (RUCA codes 2, 5, and 8), the rate of long-term vacant housing performs worse than the ACS estimates in the core communities, decreasing by over one-half in all three cases. In non-core areas of low-commuting (RUCA codes 3, 6, and 9), the long-term vacancy rate continues to perform even worse, less than one-tenth of the ACS estimates. This trend reflects that the share of residential addresses along rural routes rises in non-core communities; letter carriers may be instructed to label vacant housing as no-stat rather than long-term vacant.

Exhibit 4

Comparison of American Community Survey Vacancy Rate to USPS Address Inactivity Statuses

Rural-Urban Commuting Area (RUCA) Codes			Observations (N)	ACS Vacancy Rate	No-Stat (Rate)	Long-Term Vacant (Rate)	Short-Term Vacant (Rate)	No-Stat Rural Route (Rate)	Long-Term Vacant and No-Stat Rural Route (Rate)
1	Metropolitan	Core: primary flow within an urbanized area (UA)	51,694	0.096	0.080	0.025	0.003	0.015	0.040
2		High-commuting: primary flow 30% or more to a UA	6,805	0.133	0.160	0.016	0.002	0.135	0.151
3		Low-commuting: primary flow 10% to 30% to a UA	653	0.193	0.191	0.019	0.002	0.173	0.192
4	Micropolitan	Core: primary flow within an urban cluster of 10,000 to 49,999 (large UC)	4,211	0.148	0.139	0.043	0.005	0.051	0.094
5		High-commuting: primary flow 30% or more to a large UC	1,968	0.186	0.198	0.023	0.002	0.186	0.208
6		Low-commuting: primary flow 10% to 30% to a large UC	406	0.207	0.196	0.020	0.001	0.186	0.206
7	Small Town	Core: primary flow within an urban cluster of 2,500 to 9,999 (small UC)	2,145	0.169	0.147	0.049	0.006	0.087	0.136
8		High-commuting: primary flow 30% or more to a small UC	824	0.239	0.216	0.027	0.002	0.205	0.233
9		Low-commuting: primary flow 10% to 30% to a small UC	342	0.228	0.207	0.022	0.001	0.199	0.221
10	Rural Areas	Primary flow to a tract outside a UA or UC	3,133	0.279	0.286	0.031	0.003	0.268	0.299
All			72,181	0.119	0.109	0.026	0.003	0.051	0.077

Sources: 2015–2019 5-Year American Community Survey; 2019 fourth quarter USPS address data; USDA ERS defined RUCA codes; calculations performed by the authors

This research incorporated no-stat addresses along rural routes with the long-term vacancy rate in estimating USPS vacancy rate. Although there are also no-stat addresses along city routes, the USPS defines these differently than along rural routes and may not reflect vacant housing at all. As a result, although the proportion of all no-stat addresses along any route type (city or rural) more closely approximates the estimated ACS vacancy rate quite closely at the census tract level, this research did not utilize all no-stat residential addresses along any route type due to uncertainty. Instead, this analysis combined no-stat addresses along rural routes with long-term vacant addresses to investigate the USPS vacancy alignment with the ACS estimates. In metropolitan core areas (RUCA code 1), where rural routes make up the smallest share of carrier routes for addresses, the combined estimates of long-term vacant and no-stat addresses along the rural routes (4.0 percent) nearly double from the long-term vacancy alone, but they are still far short of the ACS estimated vacancy rate (9.6 percent). In micropolitan and small town cores (RUCA codes 4 and 7, respectively), the combined estimates have much greater improvements in terms of alignment with the ACS estimated vacancy rate than long-term vacancy rate by itself.

The difference between ACS vacancy rate and the combined estimates of long-term vacant and no-stat addresses along rural routes is smaller in non-core and rural communities. In high-commuting metropolitan areas (RUCA code 2), the addition of no-stat residences along rural routes increases the rate of inactive housing to 15.1 percent, slightly over the ACS estimated vacancy rate (13.3 percent). The same effect persists for high-commuting micropolitan areas (RUCA code 5), but the difference is smaller. Long-term vacancy and no-stat residences along rural routes are estimated to be 20.8 percent, 2.2 percentage points higher than the ACS estimated vacancy rate of 18.6 percent. On the other hand, high-commuting small town areas (RUCA code 8) have nearly similar USPS combined estimates (23.3 percent) compared to the ACS estimated vacancy rate (23.6 percent). The gap between the ACS and USPS combined estimates narrows down more as one compares the estimates in non-core low commuting and all rural areas. In low-commuting metropolitan and micropolitan areas (RUCA codes 3 and 6, respectively), the ACS vacancy rate is only 0.1 percent higher than the combined estimates of long-term vacant and no-stat addresses along rural routes. In low-commuting small town areas (RUCA code 9), the difference was only 0.6 percent. In rural areas (RUCA code 10), the long-term vacancy rate was 3.1 percent, whereas the ACS vacancy rate was 27.9 percent. The inclusion of no-stat addresses along rural routes increases the vacancy rate to 29.9 percent, just 2 percent higher than the ACS estimate. As more residential addresses are along rural routes in non-core communities, the addition of no-stat addresses to the long-term vacant addresses helps close the gap between the ACS vacancy rate and USPS vacancy rate.

Exhibit 5 illustrates the correlation between the estimated ACS vacancy rate and various USPS inactive residential address rates at the census tract level.[5] The USPS estimated vacancy rate of long-term and no-stat addresses along rural routes has the most consistently high correlation with the ACS vacancy rate in each RUCA category. Although the overall correlation between the ACS vacancy rate and USPS long-term vacancy rate was 0.37, the correlation improves to 0.54 between the ACS vacancy rate and the proportion of USPS combined long-term vacant and no-stat residential addresses along rural routes. By RUCA codes, the correlation between the ACS and

[5] All correlations have $P<0.0001$.

USPS long-term vacancy rate is the strongest in the metropolitan core communities (RUCA code 1) at 0.55; for all other areas, the correlation sharply drops, especially in areas with a higher proportion of rural routes. Nonmetro core communities (RUCA codes 4 and 7) have higher correlation factors (0.18 and 0.14, respectively) than non-core communities. However, when including residential no-stat addresses along rural routes in estimating the vacancy rate, the correlation factors in each RUCA category are consistently stronger than 0.35, except for high-commuting small town communities and completely rural areas (RUCA codes 8 and 10, respectively); this demonstrates that the inclusion of no-stat addresses along rural routes would assist with aligning USPS and ACS estimates better than only employing long-term vacant addresses at the census tract level.

Exhibit 5

Correlation Between USPS Address Data and 2015–2019 5-Year ACS Housing Vacancy Rate Estimate

Rural-Urban Commuting Area (RUCA) Codes			No-Stat (Rate)	Long-Term Vacant (Rate)	Short-Term Vacant (Rate)	No-Stat Rural Route (Rate)	Long-Term Vacant and No-Stat Rural Route (Rate)
1	Metropolitan	Core: primary flow within an urbanized area (UA)	0.080	0.025	0.003	0.015	0.040
2	Metropolitan	High-commuting: primary flow 30% or more to a UA	0.160	0.016	0.002	0.135	0.151
3	Metropolitan	Low-commuting: primary flow 10% to 30% to a UA	0.191	0.019	0.002	0.173	0.192
4	Micropolitan	Core: primary flow within an urban cluster of 10,000 to 49,999 (large UC)	0.139	0.043	0.005	0.051	0.094
5	Micropolitan	High-commuting: primary flow 30% or more to a large UC	0.198	0.023	0.002	0.186	0.208
6	Micropolitan	Low-commuting: primary flow 10% to 30% to a large UC	0.196	0.020	0.001	0.186	0.206
7	Small Town	Core: primary flow within an urban cluster of 2,500 to 9,999 (small UC)	0.147	0.049	0.006	0.087	0.136
8	Small Town	High-commuting: primary flow 30% or more to a small UC	0.216	0.027	0.002	0.205	0.233
9	Small Town	Low-commuting: primary flow 10% to 30% to a small UC	0.207	0.022	0.001	0.199	0.221
10	Rural Areas	Primary flow to a tract outside a UA or UC	0.286	0.031	0.003	0.268	0.299
All			0.109	0.026	0.003	0.051	0.077

Sources: 2015–2019 5-Year American Community Survey (ACS); 2019 fourth quarter USPS address data; USDA ERS defined RUCA codes; calculations performed by the authors

Discussion

Rural-Urban Commuting Area (RUCA) codes were a good proxy for the number of addresses served by rural postal routes. Core census tracts (RUCA codes 1, 4, and 7), regardless of being in a metropolitan or micropolitan county, were primarily not served by rural postal routes. The non-core census tracts, either high-commuting (RUCA codes 2, 5, and 8) or low-commuting (RUCA codes 3, 6, or 9), are overwhelmingly served by rural postal routes. Using only addresses listed as vacant as opposed to no-stat is likely to underestimate the housing vacancy rate in communities with non-core census tracts. It may benefit researchers to compare trends between the United States Postal Service (USPS) long-term vacancy rates and American Community Survey (ACS) estimated vacancy rates to determine if the inclusion of no-stat addresses may produce a more comparable rate for any metro areas of interest. In nonmetro areas, the critical problem of underestimating vacancy would certainly arise without accounting for no-stat addresses along rural routes. Non-core communities as defined by RUCA codes include a proportionally large share of rural routes, core communities with urban areas and clusters have a relatively smaller portion of rural routes, aligning with RUCA categories of core and non-core communities. Researchers analyzing residential vacancy may consider using combined estimates of no-stat addresses along rural routes with long-term vacant addresses in non-core communities surrounding urban areas and clusters.

This analysis investigated the association between the ACS vacancy rate and the USPS rate of short-term vacancy, long-term vacancy, no-stats, and no-stats along rural routes. The overall long-term vacancy rate was consistently far off from the ACS estimated vacancy rate, even in metropolitan census tracts where the fewest residences are along rural carrier routes and thus more likely to have vacant addresses to be marked as vacant rather than no-stat. The inclusion of rural no-stat addresses in the vacancy rate produced a USPS-derived vacancy rate more like the ACS estimated vacancy rate across all RUCA codes. This trend varied across areas of different urbanized sizes and commuting patterns; the greatest change in areas of low-commuting and the least change in core areas of any urbanization type (metropolitan, micropolitan, or small town). Furthermore, the correlation between the ACS vacancy rate and USPS vacancy rate became stronger more consistently with the inclusion of no-stat addresses along rural routes. These suggest that in the neighboring communities of urban areas and clusters, the addition of no-stat addresses to the long-term vacant addresses helps close the gap between the ACS vacancy rate and USPS vacancy rate, even in non-core metropolitan areas. It is anticipated that the inclusion of no-stat addresses along rural routes could also assist with urban vacancy research by providing a closer proximate to ACS estimated vacancy rates.

Conclusion

This analysis has aimed to assist researchers using USPS address data to create better estimates of vacancy in their study areas. USPS address data is unique because the data is collected daily by a workforce that already reaches every American's door. The data is timely because it is released only a few weeks after it has been collected. This is likely the first analysis utilizing residential no-stat addresses along rural postal carrier routes in vacancy estimates. This study establishes that although rural postal carrier routes do not represent nonmetro areas by the Office of Management

and Budget (OMB) definition, they align with non-core areas defined by RUCA codes. As the population size of communities get smaller and commuting to nearby urban centers and clusters takes longer, there is an increasingly higher share of residential addresses along rural routes in those communities. This is important because these are the areas where housing vacancy will not be detected by the common measure of long-term housing vacancy using USPS data. In non-core areas defined by RUCA codes, the inclusion of no-stat residential addresses along rural routes into estimating vacancy rate produces a vacancy rate that is closer to the ACS estimated vacancy rate. By more closely approximating the ACS vacancy rate using USPS address data, researchers can leverage data that will both yield similar results to the ACS data and is released much earlier. Although this study has contributed to narrowing the gap between the ACS and USPS vacancy rates, the USPS could help more with how it labels vacant properties. One of the main issues researchers deal with is how to interpret no-stat addresses, especially along city routes. If USPS letter carriers could mark why an address is labeled as no-stat, whether for issues of blight, demolition, address merge with another address, or construction, that would prove the most important contribution to the data.

There is more work to be done. There is limited research identifying the spatial locations and patterns where residential no-stat addresses along rural routes improve the vacancy rate. Some work has been done comparing either USPS address data or the ACS estimated vacancy rate to local measures of blight and vacancy; there have not been any studies conducted utilizing residential no-stat addresses along rural routes.

Additionally, USPS address data could provide new insight into the degrees of rurality in the United States. Residential addresses on rural postal carrier routes are highly aligned with non-core RUCA codes. Analyzing the degrees of rurality based on USPS postal carrier routes could narrow the gap on how rural is defined among diverse government agencies.

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Brainstorming: Learning Agenda

This issue of Cityscape includes a colloquy of several papers addressing the question of whether and how equity should play a larger role in research, evaluation, and other evidence building conducted by the U.S. Department of Housing and Urban Development (HUD).

Equity in HUD's Learning Agenda

Framing Paper for a Cityscape Point of Contention

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The views expressed in this article are those of the authors and do not represent the official positions or policies of the Office of Policy Development and Research (PD&R), the U.S. Department of Housing and Urban Development (HUD), or the U.S. Government.

Abstract

Evaluation planning across the federal government is beginning to transform to implement the vision and requirements of the Foundations for Evidence-Based Policymaking Act of 2018 (Evidence Act).[1] *Evaluation and evidence building, along with core program activities, also are subject to a recent Executive Order from President Biden that calls for affirmatively advancing equity, civil rights, racial justice, and equal opportunity across the federal government.*

This paper provides context for the colloquy by summarizing the implementation of evidence building and equity initiatives at HUD. The authors are HUD staff who have been substantively engaged in implementing the Evidence Act, including developing HUD's Learning Agenda: Fiscal Years 2022–2026 *(HUD PD&R, 2022a), which aligns with HUD's* Fiscal Year 2022–2026 Strategic Plan *to place evidence building on a strategic footing, and in supporting the development of HUD's Equity Action Plan under the Executive Order.*

Evidence Building and Learning Agendas

The Evidence-Based Policy Movement

Federal evaluation policy and approaches toward evidence have evolved over decades. Change in the past 5 years has increasingly emphasized the role of evaluation in building evidence in a way that could be transformative. Several pieces of legislation punctuated the evolution and motivated

[1] Foundations for Evidence-Based Policymaking Act of 2018. P.L.:115-435 (01/14/2019). https://www.congress.gov/bill/115th-congress/house-bill/4174

the transformation. The Office of Management and Budget (OMB) also plays a major role in interpreting relevant legislation and guiding agencies in implementation.

Nearly three decades ago, the Government Performance and Results Act of 1993 (GPRA)[2] established requirements for federal strategic planning and performance planning, management, and reporting. GPRA's emphasis on performance measurement represented an early example of evidence-based policymaking. The GPRA Modernization Act of 2010[3] added requirements for quarterly data-driven performance reviews.

Parallel to the growing role for performance measurement was a growing emphasis on formal program evaluations. In 2002, the Institute of Education Sciences within the U.S. Department of Education established the What Works Clearinghouse, representing an early effort to make policy-relevant evidence more systematically accessible.[4]

Enactment of the Evidence-Based Policymaking Commission Act in 2016[5] created the bipartisan Commission on Evidence-Based Policymaking. Congress charged the Commission with making recommendations to strengthen data infrastructure, rigorous evaluation, and integration of administrative and survey data for evaluation purposes with privacy safeguards. The Commission's recommendations (CEP, 2017) had a strong emphasis on data access, security, and privacy,[6] along with the need for strengthening federal evidence-building capacity and improving planning around evidence-based policymaking needs.

Foundations for Evidence-Based Policymaking Act

The Foundations for Evidence-Based Policymaking Act (Evidence Act) adopted about one-half[7] of the Commission's recommendations and maintained a similarly strong emphasis on data. Key recommendations relating to evidence-building capacity that Congress adopted included the appointment of Evaluation Officers, developing "evidence-building plans" (Learning Agendas), developing annual evaluation plans, and conducting capacity assessments (HUD PD&R, 2022b).

Evaluation, as defined by the Evidence Act, means "an assessment using systematic data collection and analysis of one or more programs, policies, and organizations intended to assess their effectiveness and efficiency."

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[2] Government Performance and Results Act of 1993, P.L.: 103-62. https://www.congress.gov/bill/103rd-congress/senate-bill/20

[3] GPRA Modernization Act of 2010, P.L." 111-352 (01/04/2011). https://www.congress.gov/bill/111th-congress/house-bill/2142

[4] See https://ies.ed.gov/ncee/wwc/WhoWeAre.

[5] Evidence-Based Policymaking Commission Act of 2016. P.L.: 114-140 (03/30/2016). https://www.congress.gov/bill/114th-congress/house-bill/1831

[6] The Commission notably limited their use of "evidence" to mean "information produced by statistical activities with a statistical purpose" that is potentially useful when evaluating government programs and policies (CEP 2017, p.8). This narrow definition derives from the Confidential Information Protection and Statistical Efficiency Act (CIPSEA, 44 U.S.C. 3561(6)), which perhaps regrettably is the same definition used by the Evidence Act. Nevertheless, OMB's Circular A-11 guidance states that evidence in the context of the Federal Performance Framework has a considerably broader definition (OMB 2021, Section 200, p.18) and that many of the Evidence Act's provisions support the Federal Performance Framework (OMB 2021, Section 290.3).

[7] OMB 2021, Section 290.3.

The Evidence Act and OMB's annual guidance for budget preparation, strategic planning, and performance management (OMB, 2021; see Part 6) have several key requirements for a federal learning agenda. The law requires the Learning Agenda to be a multi-year, systematic plan for identifying and addressing policy questions relevant to the programs, policies, and regulations of the agency. The Learning Agenda must identify policy-relevant priority questions, identify data needs and analytical methods, identify legal barriers or other challenges to filling the evidence gap, and explain how the agency will go about filling the evidence gap. It should appear as an appendix or separate chapter of, or document referenced and posted along with, the Strategic Plan.

Research Roadmap as an Early Learning Agenda

Before the Evidence Act mandated the development of Learning Agendas, HUD's Office of Policy Development and Research (PD&R) had been developing "Research Roadmaps," a type of Learning Agenda that was developed through a similar process of stakeholder engagement and included brief proposals for research projects. The process focused on identifying emerging research questions, prioritizing questions that were timely, policy-relevant, and utilized HUD's comparative advantage, and then developing project proposals for a 5-year research agenda. HUD's Research Roadmaps were published in 2013, 2017, and 2020. The 2020 Roadmap included necessary enhancements to serve as HUD's initial Learning Agenda under the Evidence Act.

Stakeholder Engagement in Learning Agenda development

Process

Under the guidance of HUD's Evidence Officer, a PD&R team of Learning Agenda coordinators and a PD&R working group conducted stakeholder outreach and developed the FY 2022–26 Learning Agenda. Engaging stakeholders in identifying research questions that are timely and relevant to support learning for HUD's mission, programs, and policy role is essential to developing a useful Learning Agenda. The Learning Agenda development process, like the process for Research Roadmaps, comprised five steps:

1. Conduct stakeholder outreach to collect suggestions for research questions and data enhancements.
2. Compile and organize research questions and projects.
3. Prioritize research questions and projects.
4. Develop brief project proposals.
5. Develop the Learning Agenda from prioritized research and complementary information required for Learning Agendas.

The outreach to internal and external stakeholders was intended to capture a wide range of views and suggestions. Methods included an email outreach to federal evaluators and policy experts soliciting suggestions in program and policy domains that overlap with HUD's mission; an electronic mailbox devoted to the Learning Agenda[8] that remains open for ongoing suggestions

[8] Suggestions for research questions and data enhancements may be sent to HUDLearningAgenda@huduser.gov.

about important research questions on any HUD-related topic; and listening sessions that were held with HUD program offices, PD&R staff, external federal stakeholders, and people with lived experience involving HUD programs. Listening sessions have repeatedly proven to be the most productive means of generating thoughtful research suggestions, probably because they provide an opportunity for dialogue.[9]

These sources generated hundreds of suggestions from internal and external stakeholders that the Learning Agenda team compiled in a database. The team also recorded the session or medium in which each comment was received but preserved anonymity of the commenters. Research questions were assessed for duplication before being prioritized by PD&R subject matter experts and managers in consultation with internal stakeholders. Brief research project proposals then were developed by PD&R subject matter experts to help provide context for the learning questions and offer concrete ideas for how they could be answered.[10]

Stakeholders with lived experience

In the social sciences, lived experience refers to the formation of a representation of the experiences and choices of a given person and the knowledge and meaning that person gains from these experiences and choices. Lived experience "can produce better quality research by enhancing methodological sensitivity, data accuracy, validity of results, and overall relevance to service users" (Honey et al., 2020). For purposes of supporting a learning organization offering public services to marginalized or underserved communities, capturing a relevant range of lived experience from program participants and eligible non-participants is essential for building evidence to improve program outcomes and, ultimately, cost effectiveness. For such reasons, lived experience can be crucial for evidence building that supports equity objectives.

The listening sessions involving groups with lived experience in HUD programs helped the Learning Agenda team validate the content of certain questions and identified opportunities to supplement other ideas. These changes helped ensure that major themes were properly framed and that complex ideas had appropriate depth. For example, feedback from a group of people with lived experience in HUD's homeless assistance programs underscored the importance of qualitative data collection in a proposed project on understanding barriers to shelter access among people experiencing unsheltered homelessness.

[9] HUD is considering opportunities to facilitate such sessions more efficiently in the future through the use of technology.

[10] Although project proposals are not a required part of Learning Agendas, HUD's experience with Research Roadmaps has shown that the preliminary thinking about research approaches captured in brief proposals can be beneficial for research planning and funding on an annual basis even if a different approach is ultimately used. The Evidence Act formalized this planning process through the requirement for Annual Evaluation Plans.

Importance of Centering Equity

Requirements of the Executive Order

In January 2021, President Biden issued Executive Order 13985, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government.[11] The order stated, "It is therefore the policy of my Administration that the Federal Government should pursue a comprehensive approach to advancing equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Affirmatively advancing equity, civil rights, racial justice, and equal opportunity is the responsibility of the whole of our Government. Because advancing equity requires a systematic approach to embedding fairness in decisionmaking processes, executive departments and agencies (agencies) must recognize and work to redress inequities in their policies and programs that serve as barriers to equal opportunity."

The Executive Order included these key definitions:

1. The term "equity" means the consistent and systematic, fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as women and girls, Black, Latino, Indigenous and Native American persons, Asian Americans and Pacific Islanders, and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality.

2. The term "underserved communities" refers to populations sharing a particular characteristic, as well as to geographic communities, that have been systematically denied the full opportunity to participate in aspects of economic, social, and civic life, as exemplified by the list in the preceding definition of "equity."

3. OMB's Circular A-11 reinforces the application of the Executive Order to the Learning Agenda and related documents. Section 220.23 of the Circular (OMB, 2021) states that agencies should use a whole of Government approach in advancing equity, apply an equity lens of justice across all policies and programs, and in developing documents including Learning Agendas, should "consult and involve underserved communities, consider how their organizational and decisionmaking processes may not account for certain perspectives, and incorporate leading practices for ongoing equity assessment and affirming efforts."

HUD's Evaluation Policy Statement

HUD's Evaluation Policy Statement (HUD PD&R, 2021) guides the conduct of all HUD-sponsored evaluations and regulatory impact analyses and the selection of projects, contractors, and staff

[11] Executive Order 13985 of January 20, 2021, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government. Code of Federal Regulations, 86 FR 7009: 7009-7013. https://www.federalregister.gov/documents/2021/01/25/2021-01753/advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government.

involved in evaluations. The Policy identifies six core principles and practices as fundamental to ensuring high-quality and consistent evaluation results: (1) rigor, (2) relevance, (3) transparency, (4) independence, (5) ethics, and (6) technical innovation.

The Evaluation Policy highlights equity considerations in connection with several of its core principles:

- Rigor: understanding and correcting for implicit bias in the formulation of research questions and methods.
- Relevance: including stakeholders with lived experience in research prioritization and planning; designing evaluations to better understand structural racism and reveal unequal benefits and harms; collecting and reporting data on underrepresented and underserved communities; engaging studied populations by including their thoughts and perspectives; and disseminating findings in ways that are accessible and useful to stakeholders.
- Ethics: conducting evaluations in an ethical manner and safeguarding the dignity, rights, safety, and privacy of participants.

Structure and Equity Content of HUD's Learning Agenda

In considering the equity implications of HUD's Learning Agenda, it is helpful to consider the Learning Agenda's basic structure and how it seeks to center equity in evidence building.

Modeled after the Research Roadmap, the Learning Agenda (HUD PD&R, 2022a) highlights a set of priority research questions and HUD's approach to answering those questions. These priority questions are organized into 11 policy topics that broadly categorize HUD's portfolio of work. Each topic has a "foundational learning question" meant to capture overarching themes and provide a bridge between policy and research. The policy topics and the foundational learning question identified for each topic are as follows:

1. **Community Development and Place-Based Initiatives:** How can federal policy most effectively support equitable place-building, community development, and quality of life improvements in American communities?
2. **Core Housing Programs:** How can HUD most effectively meet needs for high-quality, rent-assisted housing that supports housing security and economic advancement?
3. **Disaster Recovery, Energy, and Climate Change:** How can federal policy and funding best support disaster recovery, climate resilience, and sustainability and strengthen environmental justice?
4. **Fair Housing:** How can housing discrimination associated with online advertising, social media, and finance be measured, investigated, and prevented?
5. **Homeownership:** How can federal policy make first-time homeownership more accessible to all Americans and more likely to result in housing stability and wealth-building for underserved populations?

6. **Housing Finance and Affordable Housing Supply:** How can federal policy mitigate market constraints in affordable housing production and finance?

7. **Housing and Health:** How can HUD best address the health needs of people in its assisted housing programs and also bring housing assistance to those for whom lack of housing is a major barrier to health?

8. **Indian and Tribal Issues:** How can HUD better respond to housing and development challenges unique to Native American communities and tribal lands?

9. **Self-Sufficiency and Economic Opportunity:** How can housing assistance, including temporary assistance, best support moves to opportunity neighborhoods, human capital development, and increased economic opportunity?

10. **Vulnerable and Special Populations:** How can housing assistance respond more effectively to varied individual needs of people who have barriers to housing stability, and what combination of supports and policies are most effective at preventing evictions, homelessness, and housing insecurity for lower income persons?

11. **Enhanced Data and Methods:** How should HUD improve data, methods, and processes to build capacity for evidence-based policymaking?

The Learning Agenda seeks to support the foundational learning questions with priority research questions, which number more than 100 and are listed in the appendix (exhibit A.1). HUD's Learning Agenda takes the additional, unmandated step of following each priority research question with a brief project proposal that presents a possible approach HUD could take to address the issue, drawing from myriad rigorous research and evidence-building approaches. In addition to forward-looking research questions, the Learning Agenda also identifies key data gaps that HUD could address to further its evidence-building capacity.

HUD developed the Learning Agenda concurrently with its first Equity Assessment under Executive Order 13985.[12] It was through this parallel process that HUD engaged key stakeholders in issue-specific action teams and applied an equity lens to the Learning Agenda, the Program Evaluation Policy, and planned research and evaluation, including Regulatory Impact Analyses and the research priorities highlighted in PD&R's Unsolicited Proposals for Research Partnerships.[13] The Learning Agenda includes research questions and project descriptions, as well as data enhancement priorities, that build on the work of those teams and incorporate a focus on equitable outcomes, implementation, and impacts of HUD programs and policies. This focus is observable, for example, in the foundational learning questions listed previously, where the language of most questions can be read as framing various aspects of equity, equal opportunity, or serving underserved populations. The Learning Agenda team collaborated with HUD's Equity Leadership Committee and Equity Working Group to ensure that the Learning Agenda fully supports the HUD's learning

[12] Under OMB guidance to federal agencies, Equity Assessments remain internal, pre-deliberative documents at present.

[13] The FY 2021 notice of Authority to Accept Unsolicited Proposals for Research Partnerships is found at https://www.hud.gov/program_offices/spm/gmomgmt/grantsinfo/fundingopps/fy21_aauprpn.

needs with respect to reversing inequities in federal housing policy and practice and prioritizing equity in all HUD programs.

Building On the Learning Agenda

The proposals, questions, and broader focus areas presented in HUD's Learning Agenda represent a set of possible options for HUD to pursue going forward. HUD's research and evidence-building approach are inherently collaborative, often involving work across offices within HUD, with other Federal Agencies, and with the support of Congress through the appropriations process. As a result, the research questions and data gaps identified in the Learning Agenda may be better understood as stepping stones to a better-informed future rather than a clearly defined prescriptive path for evidence building.

Further emphasizing the contingent role of the Learning Agenda, OMB guidance requires agencies to revisit their Learning Agendas at least annually and update them "as needed to reflect progress toward answering the agency's priority questions, shifting agency priorities, changing contexts within which the agency operates, and emergent needs" (OMB, 2021, Sec. 290.8).

The encompassing nature of the federal equity lens poses challenges for successfully integrating equity into the Learning Agenda. Priority research questions and projects must balance equity evidence building and learning with other evidence-building priorities. For example, if HUD does not definitively know whether a given program has beneficial impacts, either on average or for specific population groups, then there is little basis for confidence that expanding the program's reach or better targeting of underserved populations is a desirable policy goal. In some cases, it may be appropriate to answer the general impact question before addressing whether a program should be administered more equitably, although evaluations frequently can address both issues simultaneously.

Framing research questions with an equity-building lens represents an important first step in integrating the federal equity initiative with the evidence-building initiative. To support the next steps, it would be beneficial for PD&R to receive expert counsel about where equity-oriented research methodologies should become a default approach or consideration in research planning and where key methods may have been overlooked. Good program evaluation is a costly endeavor, so ensuring that appropriate research methods are incorporated from the outset is important for using taxpayer resources effectively. For this reason, the authors hope that the following reports in this journal will provide insights and clarity about methodologies that HUD should be considering as a matter of course to help research better advance equity.

For such reasons, the frequent revisiting of the Learning Agenda and incremental enhancements of evidence building and organizational learning appear to set a wise course. Robust engagement of stakeholders in this process of reassessment will almost certainly be beneficial for long-term success.

Appendix

HUD's *Learning Agenda: Fiscal Year 2022–2026* (HUD PD&R, 2022a) provides the following summary list of the foundational learning questions and priority research questions that support each of the 11 policy topics (exhibit A.1.).

Exhibit A.1

List of Foundational Learning Questions and Priority Research Questions (1 of 6)

Policy Topic Areas, Foundational Learning Questions, and Priority Research Questions
Community Development and Place-based Initiatives
Foundational Learning Question: *How can federal policy most effectively support equitable place-building, community development, and quality of life improvements in American communities?*
Priority Research Questions:
• What were the outcomes of the Choice Neighborhoods program for both residents and the communities in which it was implemented?
• How effective are CDBG economic development activities across different community types and program approaches?
• To what extent does CDBG investment benefit low- and moderate-income persons and individuals who are members of protected class groups or underserved communities?
• How are CDBG grantees using the Section 108 loan guarantee program to expand access to alternative forms of affordable housing?
• How can HUD support and increase access to healthy environments in communities through the siting of recreation, health clinics, healthy food, and other assets connected to place-based investments?
• Can technical assistance build capacity and improve financial management of distressed local governments?
• How effective are homeowner rehabilitation programs at improving individual quality of life and what effect do they have on neighborhood quality?
• How much affordable housing is created within Opportunity Zones, and what is the broader change in housing affordability in those areas?
• What has been the impact of the HOPE VI Urban Revitalization program over 20 years?
• What are the personal reasons, outcomes, and destinations of households who leave gentrifying neighborhoods? What motivations and perceptions of neighborhood change influence the choices of leavers and stayers?
• What are the housing needs of agricultural workers?
Core Housing Programs
Foundational Learning Question: *How can HUD most effectively meet needs for high-quality, rent-assisted housing that supports housing security and economic advancement?*
Priority Research Questions:
• What are the best most effective ways of engaging with and attracting landlords to the voucher program?
• What would change if tenant-based rental assistance programs made payments directly to tenants?
• What would it take to modernize and improve accessibility in the assisted housing stock, including public housing and privately-owned multifamily housing?
• How does housing quality affect assisted housing tenure, employment, and quality of life outcomes of public housing and HCV tenants?
• What are the tenant, neighborhood, and PHA outcomes associated with the implementation of Small Area FMRs?
• What are the most effective strategies to reduce barriers to applying for federal housing assistance, especially for individuals who are members of protected class groups or underserved communities?

Exhibit A.1

List of Foundational Learning Questions and Priority Research Questions (2 of 6)

Policy Topic Areas, Foundational Learning Questions, and Priority Research Questions

Core Housing Programs, continued

- What is the pattern and distribution of voucher portability in the Housing Choice Voucher Program?
- How can HUD better support students in post-secondary education who are at risk of housing insecurity and homelessness?
- What are the pros and cons of updating utility allowances through energy consumption modeling rather than relying on actual utility data in multifamily properties?
- How do energy standards affect the long-term viability of RAD conversions?
- How are PHAs implementing the Project-Based Voucher program?
- Is the Project-Based Voucher program benefiting HUD's target populations and do underserved communities have equitable access to the program?
- What are the long-term social and economic outcomes of persons who have exited public and assisted housing?

Disaster Recovery, Energy, and Climate Change

Foundational Learning Question: *How can federal policy and funding best support disaster recovery, climate resilience, and sustainability and strengthen environmental justice?*

Priority Research Questions:

- Does HUD need to modify the CDBG-DR allocation process to account for new needs related to climate change?
- How do the impacts, costs, and resulting needs of slow-onset disasters compare with those of declared disasters, and what are implications for slow-onset disaster declarations, recovery aid programs, and HUD allocation formulas?
- What HUD-assisted properties are repeatedly harmed by or at increasing risk of disasters and what is the cost to HUD? What are risks to HUD-assisted and other vulnerable populations?
- What enhancements to disaster-related data collection and data sharing between agencies are needed to improve coordination and accelerated recovery?
- How does the impact of CDBG-DR funding vary across communities, and how do impacts vary with local capacity?
- What are the outcomes of CDBG-DR buyout programs and are these programs administered equitably?
- Where do people go after a disaster?
- What is the optimal level of flood insurance coverage for the FHA single-family mortgage portfolio and how can flood insurance policies maximize coverage?
- Are current building efficiency, safety, and resiliency codes for various types of housing adequate?
- How are climate change risk and disasters affecting mortgage performance, and what are implications of including climate risk in underwriting procedures?

Fair Housing

Foundational Learning Question: *How can housing discrimination associated with online advertising, social media, and finance be measured, investigated, and prevented?*

Priority Research Questions:

- To what extent do people of color with disabilities seek redress related to their disability?
- How can research support HUD and community efforts to Affirmatively Further Fair Housing (AFFH)?
- To what extent is there bias in home appraisals and automated valuations, and what are the fair housing implications?
- Why do comparatively few fair housing complaints relate to the home sales process, and are there ways to identify discriminatory practices such as steering?

Exhibit A.1

List of Foundational Learning Questions and Priority Research Questions (3 of 6)

Policy Topic Areas, Foundational Learning Questions, and Priority Research Questions
Fair Housing, continued
• What do early findings show about the experiences of voucher holders in jurisdictions with local source of income discrimination ordinances?
• Can innovative housing discrimination study methodologies better detect and measure evidence of discrimination in advertised units than in-person paired testing methods?
• Do home seekers with communication-related disabilities experience substantial barriers to information in seeking rental units?
• How are HUD's definitions of 'areas of minority concentration' and Site and Neighborhood Standards shaping the development of new affordable housing?
• What portion of HUD assisted rental housing continues to be non-compliant with applicable federal accessibility requirements, including in entrances and common areas of a building?
• How effective are Fair Housing Initiatives Program agencies in providing fair housing education, outreach, and investigations?
Homeownership
Foundational Learning Question: *How can federal policy make first-time homeownership more accessible to all Americans and more likely to result in housing stability and wealth-building for underserved populations?*
Priority Research Questions:
• How can equity in mortgage lending best be advanced, especially as algorithmic decisionmaking is becoming more prevalent?
• What have HUD programs done to close the homeownership gap, and what role does homeowner equity play?
• What are FHA's policy options and tradeoffs for advancing shared equity as a federal homeownership strategy?
• Who has benefitted from pandemic forbearance programs?
• What are the implications for the housing finance system of differences in the composition of mortgage-backed securities of GNMA versus those of the housing GSEs and their changes over time?
• To what extent is the GNMA portfolio vulnerable to climate risk?
• How much does student loan debt influence mortgage default risk?
• How effectively does a post-purchase, light-touch homeownership counseling program prepare FHA borrowers for sustainable homeownership?
• What risks and benefits are associated with providing down-payment assistance and other assistance to first-time homebuyers?
• Who is served by PHA-administered homeownership programs and to what extent have assisted households been able to maintain homeownership and build assets?
Housing Finance and Affordable Housing Supply
Foundational Learning Question: *How can federal policy mitigate market constraints in affordable housing production and finance?*
Priority Research Questions:
• What are the gaps in financing for multifamily housing in America, and under what conditions would an expanded FHA role be likely to support both increasing the supply of multifamily housing, and at preserving and enhancing the supply of naturally occurring affordable housing?
• How is the Housing Trust Fund being used to increase the production of affordable housing?
• What happens to the LIHTC portfolio as communities start to reach the end of the extended use affordability period?
• How would changes to basis boost policies impact patterns of LIHTC development?

Exhibit A.1

List of Foundational Learning Questions and Priority Research Questions (4 of 6)

Policy Topic Areas, Foundational Learning Questions, and Priority Research Questions
Housing Finance and Affordable Housing Supply, continued
• What do housing subsidies buy?
• How do zoning, subdivision regulations, procedural processes, and local land use conditions affect housing supply, and what regulatory reforms are most effective at matching housing supply to demand in a way that promotes inclusive communities?
• To what extent do land use policies and other regulatory factors drive differences in rents and production of affordable rental units?
• How successful have laws aimed at increasing duplexes, Accessory Dwelling Units, and other low-density, infill housing typologies been at creating new housing supply?
• What is the potential for alternative models for housing affordability?
• Can affordable housing and manufactured homes promote wealth building?
• What is the impact of Davis-Bacon wage requirements on the cost of housing development, project quality, and worker wages?
• To what extent can modular or other off-site construction methods produce affordable, accessible rental units, and how does the affordability of off-site methods compare with that of site-built housing?
Housing and Health
Foundational Learning Question: *How can HUD best address the health needs of people in its assisted housing programs and also bring housing assistance to those for whom lack of housing is a major barrier to health?*
Priority Research Questions:
• What are the most significant problems with indoor air quality in HUD-assisted housing? What are cost-effective ways to influence positive changes in indoor air quality?
• Which program designs for deploying Integrated Pest Management in public and assisted housing are most cost-effective and manageable?
• How can HUD reduce the incidence of elevated blood lead levels among children of families in the Housing Choice Voucher program?
• How well do HUD's homeless assistance programs meet the health needs of young children and their parents?
• What home visiting model would most successfully promote health or other beneficial outcomes for families with children in public housing, assisted multifamily properties, or emergency shelters?
• What are the most significant health disparities affecting HUD-assisted households? To what extent do health challenges represent opportunities for cost-effective coordination of healthcare services with housing assistance?
• How prevalent is receipt of Medicaid Home and Community Based Services (HCBS) among HUD-assisted households?
• What accessibility features and design standards are recommended when building or rehabilitating housing for the elderly to support residents' ability to age in place?
Indian and Tribal Issues
Foundational Learning Question: *How can HUD better respond to housing and development challenges unique to Native American communities and tribal lands?*
Priority Research Questions:
• What is the impact of the Indian Housing Block Grant competitive grant program for housing in tribal areas?
• What are the distinct impacts and challenges of climate change in tribal communities, and what are implications for housing and community development?
• What are the most effective disaster preparedness recovery, mitigation, and adaptation strategies undertaken by tribal communities, including pandemic response?

Exhibit A.1

List of Foundational Learning Questions and Priority Research Questions (5 of 6)

Policy Topic Areas, Foundational Learning Questions, and Priority Research Questions

Indian and Tribal Issues, continued

- How are crisis response approaches to prevent and end homelessness different in tribal areas?
- What is the feasibility of developing local sources of building components and materials in tribal areas to reduce housing construction costs?

Self-sufficiency and Economic Opportunity

Foundational Learning Question: *How can housing assistance, including temporary assistance, best support moves to opportunity neighborhoods, human capital development, and increased economic opportunity?*

Priority Research Questions:

- What additional approaches can encourage asset building among HUD assisted households?
- What is the unmet need for childcare among HUD-assisted households with children?
- What effect does improved access to affordable childcare have on the employment outcomes of parents/guardians and on the developmental outcomes of children?
- What proportion of public housing residents employed under Section 3 requirements receive training or certifications to improve their long-term employment prospects?
- How many HUD-assisted tenants receive services from other federal programs focused on labor market outcomes?
- Are there service delivery models evaluated in the research literature that could improve self-sufficiency outcomes for HUD-assisted households?
- What are the costs and benefits of making broadband internet services a reimbursable expense for providers of HUD-assisted housing?
- What is the policy value of implementing rent payment reporting to credit bureaus, and what are the equity tradeoffs for households in HUD-assisted housing?

Vulnerable and Special Populations

Foundational Learning Question: *How can housing assistance respond more effectively to varied individual needs of people who have barriers to housing stability, and what combination of supports and policies are most effective at preventing evictions, homelessness, and housing insecurity for lower income persons?*

Priority Research Questions:

- How did PHAs and Continuum of Care groups (CoCs) partner to administer their allocation of Emergency Housing Vouchers (EHV) and what were the outcomes of tenants who leased up with an EHV?
- To what extent did the Emergency Rental Assistance Program prevent evictions and homelessness in the short-term, did it have lasting effects on housing stability, and could it serve as a model for future HUD programs?
- How were eviction and foreclosure moratoria implemented during the pandemic, and what lessons does that experience have for the future?
- How are HUD grantees implementing the Eviction Prevention Services program?
- What have been the challenges and outcomes associated with implementing pandemic-related programs to prevent and end homelessness?
- What are the barriers people experiencing unsheltered homelessness face when trying to access the shelter system, and what can shelter providers do to address these barriers?
- What kinds of homelessness prevention and diversion strategies are communities employing, and which strategies are most effective at resolving homelessness and preventing returns to homelessness?
- For what portion of people experiencing homelessness is Rapid Rehousing the right resource, and what will the optimal program structure and duration be in different housing markets?
- What strategies best support formerly homeless tenants who wish to "Move-On" from Permanent Supportive Housing?

Exhibit A.1

List of Foundational Learning Questions and Priority Research Questions (6 of 6)

Policy Topic Areas, Foundational Learning Questions, and Priority Research Questions
Vulnerable and Special Populations, continued
• What are the long-term outcomes of the Section 811 Housing for Persons with Disabilities program?
• Are Mainstream, Non-Elderly Disabled (NED) vouchers an effective intervention for individuals with disabilities experiencing homelessness?
• What are the costs and preparation necessary for older adults to age in place successfully in public and assisted housing?
• How well are housing protections provided under the Violence Against Women Act (VAWA) assisting victims of domestic violence, dating violence, sexual assault, and stalking achieve housing stability?
Enhanced Data and Methods
Foundational Learning Question: *How should HUD improve data, methods, and processes to build capacity for evidence-based policymaking?*
Priority Research Questions:
• How can HUD capture 'positive' and 'negative' outcomes and motivations for exit by assisted tenants?
• What data linkages should HUD invest in as permanent, regular linkages and what data linkages can remain as ad-hoc efforts?
• Could HUD link IRS, HUD, and Census records to add to the evidence base on the effects of housing assistance on tenants' employment, income, and earnings?
• What can HUD learn about mortality outcomes through data linkages with the Census Bureau?
• Are there components of HUD's administrative data collection that do not yield sufficiently complete and/or high quality data for effective policymaking? How can these deficiencies be addressed?
• Which data currently collected on paper forms would support useful policy analysis and performance assessment if digitized in accessible and searchable form?
• Are there data sources that HUD maintains internally that could be made public while protecting privacy?
• How do REAC physical inspection results for the HUD stock compare with occupant-reported data from the American Housing Survey and the American Healthy Homes Survey?
• What would be the policy value of creating a national evictions database, including how the database could inform policy to advance housing stability?
• What can we learn from the American Housing Survey about how renter and homeowner decisions are changing in response to climate change?
• As HUD works to test and validate the American Housing Survey Housing Insecurity module, are there examples or test cases worthy of research for how a housing insecurity index might be applied?
• What do the next generation surveys on lead hazards and healthy homes tell us?
• How could HUD cost-effectively capture data on energy expenditures and energy consumption of public and assisted housing developments?
• Which drivers of customer experience most frequently hinder satisfaction and trust for specific program services?

CDBG = Community Development Block Grant program. Census = U.S. Census Bureau. DR = disaster recovery. FHA = Federal Housing Administration. FMR = fair market rent. GNMA = Ginnie Mae, or the Government National Mortgage Association. GSE = government-sponsored enterprise. HCV = housing choice voucher. HOPE VI = Program for Revitalization of Severely Distressed Public Housing (Office of Public and Indian Housing program). IRS = Internal Revenue Service. LIHTC = Low-Income Housing Tax Credit. PHA = public housing agency. RAD = Rental Assistance Demonstration. REAC = Real Estate Assessment Center.

Source: HUD Learning Agenda: Fiscal Years 2022–2026 *https://www.huduser.gov/portal/about/pdr_learningagenda.html*

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Applying an Access Framework to Studying Equity at the Intersection of Housing and Health

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Abstract

Safe and affordable housing in well-resourced neighborhoods is a cornerstone of health and well-being. Too often, however, such housing is in short supply, resulting in worse health and increased healthcare spending. HUD's Learning Agenda seeks to answer key questions on the role of housing and health, asking the fundamental question: How can HUD best address the health needs of people in its assisted housing programs and bring housing assistance to those for whom lack of housing is a major barrier to health? Underlying this question, the Learning Agenda seeks to apply an equity lens, recognizing that housing and health are not evenly distributed in our society. This report describes a framework of access, which has been developed to understand medical care utilization, to help examine questions of equity at the intersection of housing and health.

Equity in Housing Can Lead to More Equitable Health

President Biden's Executive Order on Advancing Racial Equity[1] calls for a renewed assessment of equity in all policies. Applying an equity lens to the learning agenda is critical because it will help build an evidence-based design that may provide insight into the ways housing programs are

[1] Executive Order 13985 of January 20, 2021, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government. *Code of Federal Regulations, 86 FR 7009: 7009-7013*. https://www.federalregister.gov/documents/2021/01/25/2021-01753/advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government.

designed to support healthy low-income households and surrounding communities. Critically, the emphasis on equity can further demonstrate how HUD can responsibly aid underserved communities and better understand how future policies may need to be implemented differently across different populations. Focusing on equity within the research-oriented learning agenda creates a platform through which housing-related programs may be best used to support individual and community-level health.

Six Dimensions of Access

The access framework provides one approach to systematically evaluate the impact of HUD programs and policies on health and housing equity. The leading definition of access, developed by Aday and Andersen, defines access as "those dimensions which describe the potential and actual entry of a given population group to the health care delivery system" (Aday and Andersen, 1974). The definition can be applied to understanding "entry" into high quality and affordable housing, its neighborhood context, and its connection with health and health care.

The Aday and Andersen definition has been further delineated into six dimensions according to the framework of access created by Penchansky and Thomas and augmented by Saurman (Penchansky and Thomas, 1981; Saurman, 2016). The framework is contextualized in identifying the effect of health policies on specific populations. A major strength is its ability to measure the fit between client and healthcare system, which was "used to support the assertion that client satisfaction with access influences utilization of health care services" (Kottke et al., 2018). Expanding beyond health services, fit can be conceptualized to apply to client satisfaction with housing assistance and both housing and health-related services.

1. **Availability** represents the adequacy and availability of existing healthcare services relative to clients' needs. For housing, this dimension considers the supply of housing units at different price points across different neighborhoods relative to the increasing demand for affordable housing based on changing demographic and economic conditions.

2. **Accessibility** in the healthcare setting refers to the location and supply of healthcare services relative to client transportation, travel time, distance, and cost. When applying this to housing, accessibility suggests that the presence of affordable housing allows access to key community resources such as employment opportunities, family and friendship networks, and access to reliable modes of transportation.

3. **Accommodation** recognizes that healthcare is not always organized to accept clients in an understandable and convenient way. In the housing sphere, clients need to navigate the process of obtaining housing assistance and renting homes, recognizing that this is impacted by a range of factors, including prior experiences, mental health, limited housing market literacy, and other issues.

4. **Affordability** reflects the relationship between the price of healthcare services and the cost-sharing capabilities of clients. In the housing domain, the balance of housing prices and client income is a key focus of housing programs that are designed to lower the cost of rentals and subsidize the cost of construction and rehabilitation.

5. **Acceptability** is defined as"the relationship of clients' attitudes about personal and practice characteristics of providers to the actual characteristics of existing providers, as well as to provider attitudes about acceptable personal characteristics of clients" (Penchansky and Thomas, 1981). The definition entails a dual process in which both the clients' and the providers' perceptions, biases, and discrimination shape access to quality health care; similarly, in housing, the client's and landlord's perceptions of each other impact client housing stability and perceived reliability and trustworthiness between both parties.

6. **Awareness** of services through effective communication and information strategies with relevant users, including consideration of context and health literacy, is the final dimension of access. In housing, this may include general messaging strategies designed to inform the public and public housing agency (PHA) employees of opportunities and targeted resources to assist individual clients.

Each of the six dimensions is shaped by the interaction between multiple levels of system- and interpersonal-level factors such as federal, state, and local policies, approval processes between housing authorities and clients, interactions between landlords and clients, clients' familial needs, and other contextual circumstances. This model can be adapted to address equitable access to affordable and safe housing while simultaneously monitoring the fit between HUD service recipients (clients) and access to healthcare services.

Importantly, the framework suggests that equity be evaluated within each dimension to ensure proper access and that it be understood as a relationship or fit between the individual client and the broader context. Understanding access from six dimensions with an equity lens allows the entrance of novel pathways to answer proposed research questions and helps researchers and policymakers understand how inequities can result from discordance within and across each dimension of access. Ultimately, research grounded in equity, with an emphasis on the six dimensions of access, can be used to leverage housing and health care policy solutions aimed at addressing and eradicating inequities existent in the current system.

Further, an equity lens acknowledges the pressing need for research questions to be informed by the communities that are directly or indirectly impacted in the quest to solve complicated social problems. As an example, The Greensboro Health Disparities Collaborative has successfully incorporated the viewpoints of community leaders, advocates, public health researchers, university faculty, clergy, and healthcare professionals in their mission to "establish structures and processes that respond to, empower, and facilitate communities in defining and resolving issues related to health disparities" (GHDC, 2022). Such community action-based partnerships may inform and enrich research that seeks to prioritize equity and understand the different dimensions of access to housing and health. When possible, researchers should empower community leaders to actively participate in solving complex research questions related to housing and health.

Learning Agenda Objectives: Access as an Indicator of Equity

The Learning Agenda raises critical questions about the connection between housing and health and healthcare. The access framework offers a practical approach to addressing access with an

equity lens. A few of the research questions outlined in the Learning Agenda are highlighted below and identify how dimensions of access may help frame questions around equity (exhibit 1).

To what extent do health challenges represent opportunities for cost-effective coordination of healthcare services with housing assistance?

An equity lens recognizes the glaring inequities in both housing and health which may be delineated, in part, by differential or unfair access within each access dimension. Research should investigate the extent to which recipients of federal housing assistance live near primary and specialty providers accepting Medicaid and Medicare insurance, and furthermore, how often they use nearby as opposed to more distant services (availability). Understanding how clients travel to the healthcare sites could identify and eliminate barriers to health care by incorporating mode of transportation, need for specialty transportation services, and overall convenience into care coordination services (accessibility). Affordability of both housing and health care expenses remains a pressing concern, recognizing that households will often make trade-offs between the two categories of spending. Understanding the extent to which housing costs contribute to delays in care-seeking and an inability to afford health-promoting resources (healthy foods) and activities (exercise) is crucial. Conversely, high healthcare needs and expenses may contribute to fluctuations in income and contribute to housing instability. A focused investigation into whether housing and healthcare services are perceived as fair, considering the role of stigma in the receipt of services and willingness to engage, could prove beneficial to better understand root causes of low assistance uptake or medical nonadherence (acceptability).

Which program designs for deploying Integrated Pest Management in public and assisted housing are most cost-effective and manageable?

Another Learning Agenda question focuses on deploying cost-effective and manageable Integrated Pest Management (IPM) in public and assisted housing. While the benefits of IPM have been established, the Learning Agenda aims to determine the best way to implement IPM approaches. Applying an access framework would underscore questions about the adequacy of supply and its timeliness relative to need (availability), recognizing that the need may be, at least in part, determined by an ongoing history of residential segregation, which may contribute to a higher concentration of assisted housing in blighted areas. The access framework further suggests the need for an investigation into the ability of clients to request services in a timely fashion with a contextual understanding of how this varies by client diversity (accommodation), concerns that clients may have in requesting services (acceptability), and the need for awareness about service offerings (awareness).

How can HUD reduce the incidence of elevated blood lead levels among children of families in the Housing Choice Voucher program?

No level of lead in the blood is safe. The Center for Disease Control and Prevention (CDC) states that even low levels of lead have been linked to harmful changes in intelligence, behavior, and health (CDC, 2022). While the hazards of blood lead levels are well documented, efforts to eradicate lead exposure in children are lagging (Cherney et al., 2021). In considering access through an equity

lens, it is important to acknowledge that non-Hispanic Black children are twice as likely as non-Hispanic White children, and more than three times as likely as Mexican-American children, to have elevated blood lead levels when prioritizing PHA funds (CDC, 2016). The current approach employed by HUD is to provide PHAs with funding to voluntarily conduct a lead hazard screening. To address equity, this approach should prioritize communities with a high-risk of lead exposure, typically communities with homes built before 1978 and a large population of Black families (availability). Clients should be educated about the dangers of lead poisoning, be comfortable expressing their concerns, and have the option to demand a lead hazard screen before a lease agreement is reached (awareness and accommodation). In addition, HUD should visibly advertise the availability of funding to high-priority PHAs and housing assistance recipients (awareness).

Exhibit 1

Application of Access Framework to Learning Agenda Questions

Learning Agenda Question	Access Dimension	Access-related Questions
To what extent do health challenges represent opportunities for cost-effective coordination of healthcare services with housing assistance?	Availability	Is there a sufficient supply of health care providers within an area to meet clients' needs? Are clients able to request timely appointments? How does this vary across communities?
	Accessibility	How do clients travel to health care services, and what travel-related barriers do they face?
	Affordability	What trade-offs do individuals make in affording their health care, and how does this vary across different types of insurance coverage?
Which program designs for deploying Integrated Pest Management (IPM) in public and assisted housing are most cost-effective and manageable?	Availability	Are pest management programs available to all clients who experience related issues?
	Accommodation	Are households able to request and receive services in a timely fashion?
	Acceptability	What stigmas or barriers are associated with requesting IPM assistance?
How can HUD reduce the incidence of elevated blood lead levels among children of families in the Housing Choice Voucher program?	Availability	Are neighborhoods with high-lead susceptibility prioritized in funds allocation?
	Awareness	Are Public Housing Authorities (PHAs) and clients aware of how to obtain a lead hazard screen in their community?
	Accommodation	Can families receive lead hazard screenings before committing to a lease agreement to abate harm?
How prevalent is receipt of Medicaid Home and Community-Based Services (HCBS) among HUD-assisted households?	Availability	What disadvantages do HUD clients face in states and areas without an HCBS waiver?
	Accessibility	What additional support can HUD offer to those who do not qualify for HCBS based on jurisdiction regulations?
	Awareness	How do demographic characteristics exacerbate disparities in service(s) receipt?

An Example of Access employed in Urban Development and Studying Park Access

Adapting the Penchansky access framework to health and neighborhoods has proved successful in prior research to better understand how neighborhood factors influence health and equitable distribution of health indicators. For example, the framework was applied to study equity in the usage of greenspace in the City of Baltimore (Hindman et al., 2020). Through a resident survey and geographic mapping of access in two low-income communities adjacent to a historic urban park, the researchers attempted to disentangle how inequitable park use may be related to dimensions of access (exhibit 2). The results suggest that perceptions around park access, park programming awareness, safety, and neighborhood affordability were each associated with park use. In contrast, geographic measures of distance within the two neighborhoods were not associated with park use. This study reiterates the importance of a multidimensional framework for understanding access as it relates to activities designed to improve health and well-being and provides a glimpse into the effectiveness of considering the dimensions of access with an equity lens in conducting research.

Exhibit 2

Dimensions of Access and Measures Used in Study of Access to Urban Greenspace

Dimension	Measure
Availability	Calculated travel time to a park
Accessibility	Perceived safety and ease of walking to a park
Accommodation	Satisfaction with park equipment, programming, and events
Affordability	Perceptions of costs of living near a park and participating in park events
Acceptability	Safety in the neighborhood, park upkeep, and feelings of acceptance

Source: Hindman, Chien, and Pollack, 2020

Conclusion

The Learning Agenda represents an important tool to better understand the ways housing and health are intricately intertwined. The Executive Order on Advancing Racial Equity reaffirms the need for research questions to be presented with explicit attention to housing and health in equity. Applying an access framework is one way to help generate a range of new access-oriented questions that consider the needs of the most vulnerable clients. Answering these questions often requires rich, multimodal data and employing quantitative and qualitative methods designed to understand broad trends, associations, and causal impacts in the context of the lived experience and meaning-making across clients' life course perspectives. The access framework further underscores that, across the broad range of research questions, the amount of quality and affordable housing assistance relative to need is inadequate. A call for renewed funding to make affordable housing more widely available will have important implications for health, health care, and overall well-being.

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Seeing More, Learning More: Equity in Housing and Community Development

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The opinions expressed in this article are those of the authors and do not necessarily reflect the views and policies of HUD or the U.S. government.

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Introduction

What does a renewed and reimagined commitment to equity require of the federal government's Learning Agenda on housing and community development? In addition, what does that commitment make possible in the way of opportunities to employ new methods and approaches to learning, with new reach and impact on social progress, including progress on racism and racial injustice? In this essay, we call for changes in three things to help understand and promote equity through the programs of the U.S. Department of Housing and Urban Development (HUD): (1) the types and sources of knowledge the agency seeks to generate and use; (2) the methods required; and (3) the scope of the Learning Agenda, to be far more intentional and creative about (actually) producing learning, as distinct from simply producing better and more available evidence in the form of evaluations. We address both the how and the what of learning, showing how those three changes could be applied in four core areas: (1) access to housing and opportunity; (2) identity-based discrimination and exclusion; (3) the built environment and environmental risk; and (4) the practice of active learning, regardless of program domain.

On that final point, we emphasize why and how HUD might shift from a *quality-evaluation* frame to a more outcome-oriented, participatory, and dynamic *policy learning* frame (knowledge in use, in dialectic), building on past efforts to engage with stakeholders and communities more inclusively.

This shift in focus would promote both the generation and wider use and testing of ideas through communities of practice, user-centered policy and program design, social audits, citizen science, and other mechanisms. This crosscutting opportunity—to see quality evaluation, and HUD's related work in policy analysis and performance measurement, as key *inputs* for learning, but also focus more intensively on the mechanisms that learning requires—has major implications for how we understand and advance equity. This approach acknowledges that evidence is often necessary, but almost never sufficient, for policy learning, not when it comes to some of the most divisive issues the nation has faced and will face.

Three meanings of learning are crucial here, if we are to apply an equity lens: (1) surfacing new knowledge about what is at stake and for whom (agenda-setting learning), including legacies of historical exclusion and other inequities; (2) expanding the sense of what is possible in the way of planned change or intervention (option-centered learning); and (3) improving understanding of the full effects of policy (feedback-loop learning), especially where those effects are disparate or differential by race, place, gender, or other identifiers. We illustrate these approaches to learning in a range of program domains and reference key housing market practices as well, such as the devaluation of Black-owned properties in home appraisal.

Before examining the premises and substance of HUD's proposed Learning Agenda, we briefly consider the historical context that underscores just how important a transformative, equity-centered learning agenda is, especially for an agency with HUD's mission.

Confident Expertise? Federal Agency Learning in Historical Context

The bipartisan Foundations of Evidence-Based Policy Act and President Biden's Executive Order on Advancing Racial Equity and Support for Underserved Communities offer some answers to the questions posed previously, particularly about what it means, operationally, for federal agencies to adopt systematic learning agendas and update them, together with agency programs and other operating practices, over time. To understand these recent mandates, it helps to reflect on the longer arc of history that informed them.

The lessons of this history, including the context in which HUD and its early ideas about evidence were forged, matter for the goals we set and the wisdom we bring, or fail to bring, to pursue those goals. In the context of the most extreme economic inequality the nation has seen in a century, the growing awareness of the stakes of the climate crisis and the many unknowns about how best to face it, and the call for a historic racial reckoning in America led by the movement for Black lives, now is not a moment to be without memory. On the contrary, we need more than ever to understand how our past shapes the assumptions and institutions we are working to improve now.

HUD was born at an extraordinary inflection in the nation's history, and the agency's commitment to systematic evaluation and learning, along with its mixed performance on that aspiration, reflects that genesis. HUD was created by an act of Congress in 1965, consolidating forerunner agencies with narrower missions and adding important new policy goals that reflected the era. The major ambitions

and gains of the Civil Rights Movement and President Johnson's Great Society agenda, which generated many new programs in addition to new agencies—combined with the growing confidence of the so-called policy sciences—produced an uncommonly robust policy development and research capacity at HUD, at least when compared with other domestic agencies (Pritchett, 2008; Briggs, 2015). The large-scale civil unrest in the Watts neighborhood in Los Angeles, also in 1965, and more than 100 other U.S. cities by the summer of 1967, only added to the sense of urgency and political possibility (although that window of attention and opportunity was short-lived).[1]

HUD was formed, in other words, where the determination to vigorously expand federal functions and investment through a "Second New Deal" met the conviction that the behavioral sciences, engineering, and other disciplines could be applied systematically to improve ambitious federal programs and the quality of policymaking and public debate about them. A *knowledge-producing* organization is not necessarily a *learning* organization, of course, let alone one supported by a society committed to learning. The fact that HUD was founded with a significant research mandate did not mean that its leaders, Congressional overseers, or other stakeholders were consistently interested in, let alone enthusiastic about, the agency's research findings or their implications, or even that the agency's program leadership heeded those findings. The larger point is that the dual circumstance of policy ambition meeting research ambition occurred in the 1960s at what was, in hindsight, the high-water mark of high modernism, as anthropologist James Scott (1998) has labeled it.

High modernism, Scott argues, is a viewpoint and set of institutional arrangements that combines a muscular and ambitious state with far-reaching claims to expert knowledge. At its worst, in a variety of political contexts and historical periods worldwide, that expert-dominated approach to governing has counted on a compliant civil society, either willing or obliged to accept the conclusions of the authorities who steer the ship of state. That state may be efficient and sometimes even socially just by the outcomes it produces, but it cannot be called democratic or accountable in its approach to governance.

That the 1960s modernist moment was also a high-water mark of social movement activism, with its call for a deep and inclusive democracy and economy, may be counterintuitive. Yet similar contradictions appear throughout our history and quite often in the creation of new functions or agencies of government. HUD's story is not an outlier: Social and political contradictions, it turns out, are generative. In a real sense, HUD was born of protest as well as program. Its learning aims and performance are marked by both.

We do not recount this history to argue that HUD was founded to keep society quiet and let the credentialed experts tinker. The agency's policies and programs, and sometimes its evaluation investments, have been the subject of intense media scrutiny and important public debates—the Moving to Opportunity[2] (MTO) social experiment is a prime example—and many of its aims have been furthered by the community reinvestment movement, fair housing movement, environmental

[1] Public and scholarly attention to the "urban crisis" of that moment was short lived, as this Google Ngram illustrates: https://books.google.com/ngrams/graph?content=urban+crisis&year_start=1960&year_end=2019&corpus=26&smoothing=3&direct_url=t1%3B%2Curban%20crisis%3B%2Cc0.

[2] https://www.chicagotribune.com/news/ct-xpm-1994-07-23-9407230027-story.html.

justice movement, and other mobilizations for reform that allied grassroots activists with scholars, public-interest lawyers, policy professionals, elected allies, and others. We are merely underscoring how vital it is that, with the lessons and limits of HUD's first half-century as a guide, and in the context of new agenda-setting to advance equity, we *should* ask fundamental questions about what counts as expert knowledge, which policy and research questions should be asked at all and why, how and by whom to produce meaningful and legitimate answers to those questions by improving and innovating in our methods, and how to embrace and support learning—which is a social and sometimes political process, not just a cognitive one—beyond merely supporting more evaluation.

Even the most thoughtful and intensive evaluation, as early observers warned back in the modernist heyday, can be a narrowly technical endeavor, oblivious to social and political context (Lindblom, 1963; Lindblom and Cohen, 1979). Learning cannot afford to be so limited, however. Crucially, the U.S. Office of Management and Budget's (OMB's) implementation guidance on evidence-based policymaking calls on agencies not only to produce better evidence but to clarify "the methods and analytical approaches to facilitate the *use* of evidence in policymaking" (emphasis added, Circular A-11[3]).

These distinctions are not new, we realize, nor is the call to appreciate the limits of formal evaluation. But it is crucial that we place these concerns in the foreground as we examine HUD's Learning Agenda and the use of that Agenda to expand our understanding of equity and make tangible progress toward it in every part of the country, for every group.

In calling attention to implicit and other forms of bias in research and evaluation, to the importance of lived experience as a source of insight and judgment on research teams, and to the range and importance of specific methods for directly engaging "studied populations," HUD's new evaluation policy statement makes a commendable leap forward. The agency has gone on the record with a recognition that research is not a value-free exercise; researchers are human and prone to bias, not to mention imperfect framers of questions and creatures of their experiences in a deeply unequal world; and what is considered rigorous, let alone relevant and useful, must be judged in that context. The agency is now accountable for making, and explaining, its judgments about those issues and for applying an equity lens, in today's parlance, to the full range of its evidence-building standards: rigor, relevance, transparency, independence, ethics, and technical innovation. That is our starting point for this study.

President Biden's Executive Order begins by asserting that "equal opportunity is the bedrock of American democracy." We begin our assessment of HUD's proposed Learning Agenda, likewise, with what is arguably the most fundamental mission of the agency, from which many of the other goals in HUD's Learning Agenda derive: to promote access to decent, safe, affordable housing, and opportunity-rich communities for all.

Learning about Equitable Access, Agency, and Opportunity

Affordable and safe housing is increasingly out of reach for most households in the United States, but particularly for those with the lowest incomes. Access to affordable housing is one of the

[3] https://www.whitehouse.gov/wp-content/uploads/2018/06/a11.pdf.

primary problems that HUD aims to address through its programs, but a legacy of actions and inactions by HUD and other government actors have segregated housing and perpetuated unequal access (Abrams, 1955; Briggs, 2005; Rothstein, 2017; Reina et al., 2021). The agency has, since its inception, funded research to understand how its policies and programs work and how they might work better (National Research Council, 2008). In many ways, this work has embodied a reliable ethos: how can we efficiently use and leverage limited resources, and to that end, what are the cost-effective adjustments and additions we can make to existing programs? Although it may not stir the body politic, this reflective adjustment approach—not unlike Charles Lindblom's seminal description of policy analysis as the making of "successive limited comparisons"—is essential for good policymaking and implementation (Lindblom, 1959). A more expansive view of the goal of policy learning, which includes revisioning what solutions can and should be, is likewise essential for progress. This is particularly true as HUD aims to directly address racial and economic inequality, because any effort to do so requires significant structural change.

A more expansive view of housing access, agency, and opportunity requires learning about things we still do not know, addressing unjust or wrong-headed ideas from the past, and creating new knowledge and solutions. This strategy can include, but is by no means limited to, such questions as:

1. *What are new models to increase housing access, supply, and affordability?* Much of HUD's learning has been around the limited toolkit it has at its disposal. There is a need to understand more clearly what this toolkit can be. The opportunity to do so has been clear during the COVID-19 pandemic, for example. The complex web of pandemic rent-relief programs rolled out across the country provided a unique opportunity to understand the potential impact of a more permanent emergency rental assistance funding stream, something that was barely considered prior to the pandemic (Aiken et al., 2022). There is also a clear chance to learn whether or how models like those in Philadelphia, which paired regulations (in this case, mandatory use of the diversion program) with resources (funding to address back rent identified through the diversion program), worked. The need for new models is something HUD has acknowledged (HUD, 2019). The mechanism for learning what those models can be, testing them, evaluating what is learned, and then disseminating such knowledge is less clear, however.

2. *What is a resident/household-centered definition of access, agency, and opportunity, and how can this understanding evolve over time?* We know surprisingly little—directly, at least—about what opportunity means to the people HUD programs aim to serve. Housing mobility research often highlights the many ways that policy, and even the learning around it, has imposed, on low-income and other disadvantaged households, normative, value-laden views about what access and opportunity mean. Some researchers have explored what a tenant-focused approach to defining opportunity looks like (e.g., Lung-Amam et al., 2018), but such efforts have never been centered in HUD's Learning Agenda. Ethnographic fieldwork and qualitative interviews to examine the experiences of participants in the randomized Moving to Opportunity program, in those participants' own words and reasoning, are examples of this type of learning (Goering and Feins, 2003; Briggs et al., 2010; Edin et al., 2016), although more work is needed to meaningfully scale such work and incorporate findings into program design and future evaluation. In sum, an equity-centered learning agenda needs to go beyond

views of access and opportunity as defined by researchers to views much more informed by those with lived experience.

3. *What are the barriers households face when attempting to access support, and how can we take a more intersectional approach to understand these barriers and the differential impact?* HUD has done some work to understand barriers to accessing programs, most notably devoting resources to analyzing ways to engage landlords in the rental voucher program in a more productive manner (Cunningham et al., 2018; Garboden et al., 2018). Nevertheless, we still rely on evidence from the early 2000s or studies on adjacent programs to understand how many households are able to even lease a unit when offered a voucher (Finkel and Buron, 2001; Reina and Winter, 2019). Considering that we know so little about HUD-assisted households, it is unsurprising that we know even less about the barriers faced by those households who either did not make it through a HUD application process or did not even apply (Reina and Aiken, 2021). More systematic analysis of need, who applies, and who makes it through the process of accessing housing assistance is critical. Moreover, a clear focus on the intersectionality and compounding nature of the barriers is essential to any equity-focused learning agenda.

4. *What strategies are effective for engaging and empowering communities, and how can they be better incorporated into HUD policies and programs?* HUD should invest in research to learn about the most effective strategies for engaging communities in meaningful ways. Meaningful engagement happened in some places during the Affirmatively Furthering Fair Housing (AFFH) planning processes because there was a mandate to do that engagement (Steil and Kelly, 2019). Some jurisdictions had to rely on local, private funders to support this more robust AFFH planning process; this program is something for which HUD should provide funding given its importance to learning about equity. As PolicyLink, Race Forward, The Urban Institute, Harvard University's Ash Institute on Democratic Governance and Innovation, New America, and other organizations have argued, HUD and other agencies, at all levels of government, should also go beyond narrow and limiting conceptions of engagement as consultative "participation" to experiment with approaches that directly build community voice and agency in shaping learning as well as programs—a critical shift to which we return, and illustrate specific practices in the final part of this essay (see Turner et al., 2021). Here, too, history is instructive, if we are willing to learn: The structuring, by decisionmakers, of opportunities for mostly low-grade, "ritual participation," especially by historically marginalized groups with a disproportionate stake in equitable and effective public policy, has been called out as a problem since the Great Society era—i.e., since the birth of public participation requirements (Arnstein, 1969). Over time, so have the failures of the rigid public-hearing model of input, which is rarely a mechanism for improving programs or other problem solving (Innes and Booher, 2004). HUD's interest in learning about more effective approaches to engagement, and the effects of those approaches, would directly support equity in the Learning Agenda and send a powerful signal to the field of housing and community development. The final part of our essay offers specific, actionable suggestions.

5. *Who are property owners?* HUD can play a critical role in helping the field better understand property owners. We know surprisingly little, systematically, about them, and efforts to mandate reporting requirements for owners are often met with skepticism and discussions of administrative burden. We cannot understand equitable access to America's housing and neighborhoods if we do not even know what kinds of landlords own the properties that we want people to access. Beyond that, additional research on how owners perceive programs and administrative burdens is essential if solutions are going to be designed around their participation. MTO researchers—in an effort to shed light on the shortcomings of the program and its implicit theory of change—called out the urgency of this attention to landlords, and of the "chain of cooperation" that ambitious voucher programs require, more than a decade ago (Briggs and Turner, 2008; Briggs et al., 2010).

There are several ways HUD can achieve these goals. First, HUD can spur learning and innovation that promotes access to stable housing at the local level with smaller pools of funds, specifically aimed at supporting programs that are not just incremental changes to what the agency already does (the Obama-era Social Innovation Fund is another model). Often, such local programs lack the resources for meaningful evaluation. That is why an innovation-driven federal funding source is essential. Fortunately, HUD recently reinitiated its research partnership funding and made the process of applying for that funding more transparent. From a learning perspective, that is another step in the right direction.

HUD could more actively partner with other federal agencies to understand the impact of accessing housing. Housing is increasingly viewed as a social determinant of many nonhousing outcomes, or co-benefits, of local, state, and national interest (Arcaya and Briggs, 2011; Taylor, 2018). For example, as of this writing, the National Institutes of Health has a funding call for research on the ways that COVID-related housing policies have affected health outcomes. The National Science Foundation (NSF) recently funded a series of projects where researchers partnered with government agencies to address the spatial mismatch between jobs and housing locations, with each project required to have a well-specified community engagement component. The NSF call addresses the need to catalyze the development of new models that draw connections between federal and local programs around housing, transportation, economic development, and schooling. This example is particularly instructive because the concept of spatial mismatch is a half-century old, and yet federal support for innovative responses, along with meaningful testing, has been limited to a few HUD demonstrations operated a generation ago and, in most cases, has had limited take-up by policymakers.

Such collaborative efforts should center structural racism in housing markets and policy as a focus of learning and action. HUD's ambitious MTO for Fair Housing, Bridges to Work, and Jobs-Plus demonstrations were launched in the 1990s, in a period of expanded policy and research ambition. As former HUD officials who organized those efforts have observed, however, all three were more focused on geographically concentrated poverty and economic isolation than the ongoing role of racism or the racialized experience of housing assistance, workforce development, transportation, and other systems.

Beyond greater support for rigorous qualitative and mixed-method research, HUD can expand the data it offers. For example, it can include documentation of both the nature and extent of community engagement in its publicly available data, alongside more detailed data on learning across the aforementioned topics.

Learning About Discrimination, Exclusion, and Affirmatively Furthering Fair Housing

The movement for Black lives has brought increased attention to the role that continuing racial discrimination and exclusion in housing and neighborhoods play in hoarding public resources and perpetuating racial injustice. The intersection of the movement for Black lives with the renewed energy in recent years in movements for stronger tenants' rights and affordable housing have dramatically expanded public conversations about how to advance housing justice.

As we have argued, shared learning, not just program evaluation, is essential to uncovering changing dynamics of discrimination and exclusion. Learning from the lived experiences of low-income households—in particular, their experiences at the intersection of access, agency, and opportunity—is an essential foundation for this learning. Participatory action research methodologies, working with tenant associations and community-based organizations for example, would be a powerful and effective, albeit time-intensive and resource-intensive, approach. One model for this kind of work is the Healthy Neighborhoods Study in Boston (Arcaya et al., 2018; Binet et al., 2019). Within this focus on the lived experiences of low-income households, it is essential to examine the intersections of the dimensions of identity that have been protected under the Fair Housing Act because they have so often been axes of discrimination. Looking at the intersections of race or ethnicity, disability, and family status, among other intersections, as HUD has proposed in its Learning Agenda, through participatory action research that combines both systematic qualitative research and innovative quantitative methods, is essential to illuminating how discrimination and exclusion continue to occur.

In addition to learning from the bottom up, it is important to study power and exclusionary processes from the top down. Critical theory has identified important insights about the role of private sector power in shaping housing markets in order to generate concentrated profits and of using public policy to preserve these inequality-generating structures (Marcuse, 1978; Harvey, 1989; Harris, 1993; Vale, 2013; Taylor, 2019). HUD should focus some of its learning on the expression of structural racism and other systemic inequities in housing markets, and the role of public policy in structuring those markets, in ways that concentrate inequitable wealth gains or facilitate resource hoarding. For example, the movements for Black lives, tenants' rights, and affordable housing have together focused public attention, particularly on the role of zoning in limiting access, agency, and opportunity, by driving up the costs of housing and excluding households on the basis of income and race. The Supreme Court, in its 2015 *Inclusive Communities* decision, specifically discussed cases at what it called the "heartland" of disparate impact liability under the Fair Housing Act, challenging laws, policies, and practices that "unfairly exclude" protected classes from wealthy neighborhoods or municipalities (*Texas Department of Housing and Community Affairs v. Inclusive Communities Project, Inc, 2015)*. Popular movements have led to the

transformation of zoning laws in cities such as Minneapolis and states like Oregon to allow the development that could both reduce housing costs and open access. Advocates have also raised concerns that more targeted rezoning has disproportionately increased development in low-income communities and communities of color, producing or threatening displacement of incumbent households and bypassing or even reducing development in wealthier and whiter communities. HUD can play a crucial role in this fair housing learning by gathering and analyzing data on these land-use policies and their implications for fair housing and housing affordability. The same is true for the practice of home appraisal, where the systemic, longstanding devaluation of Black-owned property is receiving much-needed attention from policy researchers, HUD, and the appraisal industry (Perry, 2022; 2020).

The AFFH requirement in the Fair Housing Act and the AFFH Rule are important levers in HUD's efforts to realize its strategic goal of supporting underserved communities. Learning from the HUD grant recipients, community-based organizations, and residents who participated in the creation of Assessments of Fair Housing about what dimensions of the rule catalyzed conversations about racial equity and changed local housing and community development policies are important, and so is understanding what additional data and questions could be useful in the HUD-supplied AFFH Tool going forward.

Returning to land use patterns and policies, nationwide data on zoning would be particularly helpful for HUD to gather and analyze. This plan is doable—as The Urban Institute's Land Use Lab at Urban[4] (LULU) shows—and long overdue. For instance, through the AFFH tool or the Consolidated Plan process, the agency could gather relatively simple data on the share of land within a municipality (or even a state) that is zoned for multifamily development as of right compared with the share of land zoned for single-family development as of right, or similarly the share of land where living communities for people with disabilities are a use permitted by right. HUD could also gather data on the share of land consistent with each of these uses in areas of concentrated poverty (or, in a more demanding but flexible version of this data call, obtain geocoded zoning data and overlay these demographic or other variables, such as climate risk). Such data on local land-use regulations would help us understand the local political and legal processes that continue to drive up housing costs and divide communities on the basis of race and income.

To build on a point in the prior section of this essay, the ability of voucher holders to obtain housing ("lease up") and realize, over time, the expanded choice the program was designed and reauthorized to create, is increasingly fundamental to HUD's goals, given the shift in Congressional appropriations from public housing to vouchers used in the private rental market. HUD has proposed researching the experiences of voucher holders in jurisdictions with local prohibitions on source of income discrimination. This research is important, and it should be paired with research on landlord policies for broadly screening tenants and how the use of minimum income policies and credit scores, along with other criteria, may disproportionately or completely exclude voucher holders from rental units, and in so doing have disparate impacts on protected classes. This research also presents an opportunity to continue to evaluate Small Area Fair Market Rents as more public housing authorities (PHAs) adopt them.

[4] https://www.urban.org/research-area/land-use#about

Along with warnings about limits of policy evaluation, early observers of the Great Society heritage, of which HUD is a part, underscored just how much policy gets made in implementation, that is, in the discretion allowed to public managers. This policy is especially true where devolution is the rule, as it is with most HUD programs: They are not administered directly by the agency but by the state, local, tribal, and territorial governments that receive HUD funding. Identifying exclusionary dynamics in the highly varied management of HUD programs is another important learning goal consistent with HUD's effort to support underserved communities. As a starting point, it would be important to learn systematically, from Fair Housing Initiatives Program agencies and others conducting fair housing investigations, what processes of exclusion, if any, they are identifying in HUD grantees and programs. Building on qualitative learning from the Fair Housing Initiatives Program agencies, HUD could analyze data that it already collects from PHAs to identify where there may be concerns about wealthy, White communities excluding disproportionately non-White households through local residency preferences or inappropriate waiting list policies for public housing units or Housing Choice Vouchers (*Fair Housing Justice Center., Inc. v. Town of Eastchester, 2020)*.

The rise of new technologies in housing searches for prospective home purchasers and renters, and in landlord screening of prospective tenants, creates opportunities and risks. On the one hand, these technologies can reduce the costs of housing searches and increase the agency of movers by opening up access to a wider range of neighborhoods. Learning about how PHAs and private providers of search algorithms can help low-income households identify opportunity bargains and make informed choices about the broad options available to them is important. On the other hand, increased consumer reliance on these technologies creates new risks of discriminatory advertising (see, for example, *National Fair Housing Alliance v. Facebook, Inc. 2018*) and discriminatory provision of services (for example, *National Fair Housing Alliance v. Redfin Corp.*); such discriminatory practices are arguably more pervasive and less visible than before (*National Fair Housing Alliance v. Facebook Inc.)*. To address these risks of discrimination and make the most of these opportunities to improve housing searches, HUD should learn with and from fair housing organizations and other federal agencies focused on the role of new technologies in housing searches, brokerage, and financing, as well as landlord screening—to enhance HUD's stated focus on appraisals and automated valuations. Building on HUD's four decades of work in evaluating discrimination through systematic audit testing, HUD could conduct more targeted testing studies going forward, focusing on "pockets" of discrimination, protected classes that have historically been neglected in research, and methods of discrimination that are harder to observe.

Finally, as we explore in the next section, environmental risk and disasters create opportunities to address racial inequality. Recent federal policy appears to widen disparities by race and housing tenure (with the policy favoring owners more than renters), and these disparities could help reproduce the racial wealth gap and other inequities over generations (Howell and Elliott, 2019). Learning from fair housing advocates and others participating in the disaster recovery process how best to bring a fair housing lens to bear on the diverging long-term outcomes of the Community Development Block Grant Disaster Recovery (CDBG-DR) program for homeowners, as compared with renters, as well as by race or ethnicity and disability, could help ensure that federal investments are narrowing those disparities, as these investments support households in recovery, instead of expanding them.

Learning About Equity in the Built Environment, Environmental Risk, and Climate Action

One area of HUD's Learning Agenda that is less frequently engaged through formal research and evaluation, but is often well-funded when it does, is the physical quality of housing and communities in both human-made and environmental conditions. Considerations of equity, however, have rarely factored into these learning opportunities.

Examples of HUD reports and data-collection efforts that address these issues periodically include the American Housing Survey and Worst Case Housing Needs reports to Congress. There are also case or project-specific efforts, such as evaluations of the aforementioned CDBG-DR program, technological change, housing innovation (including the barriers to adoption and scaling of the same), capital needs assessments, and energy consumption in HUD-assisted homes. Across HUD, however, there are a larger number of data-collection and maintenance efforts that could also be considered part of the Learning Agenda and that address physical conditions and technological and environmental change, such as the data collected and managed by the housing, public housing, and community-planning and development divisions. Finally, HUD's Learning Agenda with regard to physical conditions is also informed by data collection and analysis in other parts of the federal government, such as the Federal Emergency Management Agency's (FEMA) Individual Assistance data after disasters and the Department of Energy's Residential Energy Consumption Survey.

The main point is not that these issues are ignored, or are for now stovepiped rather than integrated (although they are), but that these efforts and datasets address equity in perfunctory ways, if at all. Equity can, in more than one way, be operationalized into dimensions that can inform research and policy that is specific to physical interventions and qualities (Martín and Lewis, 2019). For example:

1. *Understand historical legacies of inequality and their ongoing effects.* The local histories and experiences of legacy physical effects—such as substandard housing or disproportionate energy cost burdens—could be used to prioritize those same projects, places, and people for additional research and learning. There simply needs to be more attention to equity in the research project scopes.

2. *Monitor the current demographic makeup of a physical intervention's users, beneficiaries, or other affected stakeholders.* The identification of demographic and behavioral groups in a research or learning project has long been an essential step toward measuring the differential effects of an intervention. In HUD's social programs, such as low-income rental housing assistance, this method has been the standard procedure for decades. Several opportunities for conducting this basic descriptive analysis are overlooked when it comes to physical and environmental conditions, however, such as receipt of FEMA and HUD disaster aid and analysis of racial and other forms of inequity in that receipt. Ensuring that basic demographic data are collected and analyzed would be a major step forward.

3. *Engage stakeholders from end to end.* Involve all stakeholders in all phases of a research project's development, design, staffing, and management. This step, which is one expression of

procedural equity or fairness, has been partially addressed in HUD's evaluation equity statement. It acknowledges the importance of who frames questions and interprets findings, not just who collects data or performs analysis, and it highlights the fact that engagement can extend from basic input by stakeholder groups to the co-creation of research agendas and methods to pursue them. Consistent with the emphasis on learning from lived experience and on the value of participatory research methods, highlighted in the prior sections of our essay, there are myriad ways to work with communities to collect data on housing quality in construction and the environment, such as working with "citizen scientists." This study should not only be addressed in the form of the research scope and in the hiring of research contractors but also in HUD's internal staffing of its research and learning work.

4. *Use accessible, inclusive language.* Ensure that access to a research or learning project is not made exclusionary, such as through jargon or overly technical language. This principle is especially important for the physical and environmental dimensions of HUD's Learning Agenda, given the default to the specialized vocabulary of the building industry and environmental science. Additional resources should be used to ensure that the methods and media for communicating to individuals and communities regarding technical housing concepts should be scrutinized to ensure that access is inclusive.

5. *Track variation in learning participation and learning product use by group and geography.* These factors can be key indicators of underlying inequities in access to research knowledge and debates about what should be researched, by whom, and how. Typically, scholars are primary targets for HUD's research dissemination, but this policy should extend further to communities, while ensuring that the scholars in question are consistently diverse and that the teams are also inclusive.

With regard to specific projects, there is also a range of learning opportunities at the intersection of equity and the physical qualities of homes and communities:

1. Refine definitions of housing adequacy (and the aggregate statistics currently used). For example, include energy-efficiency and consumption performance standards, exposure to community-wide environmental hazards, and property climate exposures.

2. Overlay housing adequacy on demographic characteristics and spatial patterns of settlement and mobility, especially to enable analyses of differential exposure, risks, and consequences.

3. Assess access to federal assistance programs for improved energy performance, hazard mitigation, and disaster recovery by race and other identifiers.

Supporting Learning Itself, Not Just Program Evaluation and Policy Analysis

Over nearly six decades, and particularly during changes in which political party ran the executive branch, HUD's political leadership has shown very uneven attention to equity priorities, not to mention uneven rigor in analyzing equity and applying lessons to HUD's programs. The agency has

vacillated in another fundamental way as well—on the importance of any form of research in support of the agency's mission and the evolution of the wider field, on what quality research requires in the way of adequate commitment and resources, and on how—and under what conditions—research might come to have a meaningful impact on policy and program learning. The targets, scale, and impact of HUD's policy development and research work, in other words, have varied widely over time. A large body of empirical literature, provocatively synthesized in Elaine Kamarck's book, *How Change Happens—or Doesn't: the Politics of U.S. Public Policy* (2013), documents the challenges to improving practice in the public sector in sustained ways and the even greater obstacles to scaling important innovations. Suffice it to say that HUD has not been immune to those forces, including pointed efforts to ignore the agency's less politically popular findings or to let ideology, rather than facts, drive decisionmaking. These forces have shaped both program delivery and research functions at HUD.

For many reasons, it matters that HUD and other agencies not only commit to systematic research, and do so with a creative and evolving equity lens, but that this nation's government *modernizes the way it understands learning*. It is not enough to exalt data-driven decisionmaking, although to be sure, we should never take for granted that facts will matter to policymakers, implementers, or the public. Perhaps more than ever before in the agency's history, unabashed racial bias in our politics and disinformation in our media are very real threats. Our broader concern is that, for all the commendable attention to what equity demands of research and researchers, there is remarkably little said in HUD's Learning Agenda about learning itself—what it is or how it happens. For the most part, this official document is about producing evidence and making it available. To be more specific, it is about seeing that *better* evidence can be made *more* available to enable learning *if* the conditions are right. The last, critical part is largely implicit.

HUD and its staff cannot ensure those right conditions, but they can do more, and be supported to do better, than hew to the wishful rational policy and planning model in which learning follows from producing evidence. In this final argument about advancing equity, we reflect on what learning is and how it actually happens.

A basic model of learning, one that understands it to be a social and sometimes political process and not just a cognitive one, focuses on who can or should learn what, why, and how. In other words, it begins by putting learning in context. Exploring this concept in depth across the range of policy goals and specific puzzles in HUD's Learning Agenda would require a book-length volume, not this brief essay, but some of the fundamentals are:

- Reconsider *who learns,* underscoring that the learners are embedded in specific institutional contexts—such as Congress, with its lawmaking and oversight responsibilities, or the mortgage finance industry, with its business models and investors, to name but two—as well as a wide range of knowledge and practice networks and places. Rarely have uniform learning products or mechanisms served all these actors in all these settings well. HUD should seek to produce learning, not just evidence as an input to learning, in creative ways that reflect this range of learners, the kinds of actions they can or should take (where learning meets purposeful action), and where and how they learn best in context. There are multiple ways to do this tailoring, and there are many potential partners for doing it well and within resource

constraints. Below, we offer simple examples of this concept in practice. For now, the essential points are that a focus on learning spotlights (1) the range of active learners and (2) contexts in which they are embedded, which in turn help clarify (3) the process by which they actually learn, not just receive a report or briefing, or attend a webinar discussion. We delve into point (3) after the next point.

- Reconsider *the what and why* of learning. This reconsideration does not ignore large inventories of specific program questions (the core of HUD's Learning Agenda document), but it adds needed perspective to what learning might happen around those questions and how. Since that modernist historical moment in which HUD was founded, observers have shown persuasively that even policy analysis can be understood, variously, as multi-stakeholder puzzle-solving or engaged and critical listening, or, in a more disembodied and traditional conception, as mere advice-giving by those with appropriate training (Moran et al., 2008). It follows that learning is a many-splendored thing when it comes to what policy intends, what it becomes, and how it affects people and the planet. In the introduction, we emphasized three meanings of learning as crucial to applying an equity lens: (1) surfacing new knowledge about what is at stake and for whom (agenda-setting learning); (2) expanding the sense of what is possible in the way of planned change or intervention (option-centered learning); and (3) improving understanding of the full effects of policy (feedback-loop learning), especially where those effects are disparate or differential by race, place, gender or other identifiers. Even the third meaning is, in practice, contestable. We do not mean purely subjective as to what defines the facts or "state of the world," but rather the meaning is subject to debate about whether some discovered pattern, in fact, represents a problem—moral or environmental or otherwise—that should be remedied somehow (Gaventa, 1980; Kingdon, 1984; Briggs, 2008; Freeman, 2008).

It is telling and instructive that private funders of housing and community development innovation, especially in philanthropy, made notable shifts in this direction of learning during the past two decades while continuing to fund careful evaluation work. Initially, most of the nation's private, social-impact funders trailed and mimicked the federal government, creating evaluation offices and officers to gauge program effectiveness, trusting that active knowledge use and learning would follow. They were generally disappointed by the limited application of evidence within their organizations, not to mention the wider field of policy and practice, in part because the traditional, evaluation-centered theory of knowledge impact has dealt so poorly with the complexity, contention, and uncertainty that shape real-world decisionmaking and its effects. Now those funders are arguably ahead of government, emphasizing what organizational, collective, or field-level learning requires and deploying formal evaluations together with other approaches to further that learning (cf. Patrizi et al., 2013).

Evaluators, who have been central to the evolution of policy analysis as a field since mid-century, have long recognized that evaluation can serve a wide variety of learning objectives, from gauging whether a program is achieving its goals to scrutinizing the goals themselves, illuminating the conditions that make innovation possible or thwart it, and other vital purposes. Our emphasis here is on the fundamental importance of centering the learning goals and the means by which critical

learning can happen, rather than leading with what evaluations are possible—or what their specific limits are. Centering learning would challenge familiar practices of agencies such as HUD and thus of what could be true centers *of* learning within government (for now, they mostly commission in-house analyses as well as external studies). That centering would reveal a dynamic range of active learning mechanisms available to HUD and to other federal, state, local, and tribal governments and their partners in the field, all of which go beyond the traditional study-production capacity. To illustrate a few of those mechanisms:

Communities of practice (CoPs) are arguably the best-developed mechanisms for organizing continuous learning and innovation around well-defined fields of practice—such as equitable delivery of housing assistance or supporting equitable disaster recovery—and sometimes for inventing new fields (Wenger et al., 2002; Snyder and Briggs, 2003). Formally organized CoPs came first to the private sector, thanks to surging interest in business innovation and managing knowledge in the 1990s, and were systematically documented and compared after that. Soon, however, the first public sector and multi-sector public interest CoPs, such as for workforce development or disaster preparedness, were launched and analyzed as well, generating evidence on effectiveness over time (Pyrko, Dorfler, and Eden, 2016).

Fully considering what CoPs add to policy and program learning and under what conditions requires some decentering, namely to focus on fields and the outcomes they seek more than specific government programs. CoPs can also operate as learning vehicles around specific programs, as the Economic Development Administration is showing now in its innovative Build Back Better Regional Challenge grant program. The defining feature of an effective CoP is a focus on the productive *use*, not just the generating, of new knowledge. This focus, in turn, requires sustained effort to generate knowledge that is, in fact, *actionable* and not just *relevant*, to use the classic distinction suggested by Chris Argyris (1996). The potential for all federal agencies is significant, even if agencies initially help organize or join looser "learning communities" rather than more formally structured CoPs.

In a related vein, a growing body of ideas about what defines *strong fields*—elements such as a vibrant knowledge base and active policy support—is applicable to federal work to advance equity in collaborative and durable ways. This strong-field work calls for sharing knowledge more dynamically and in much more targeted ways than traditional, centralized models of study and dissemination, which follow the bureaucratic and often inflexible norms of official reporting, have ever allowed (Bridgespan Group, 2009). The through-line here is seeking social impact at scale and understanding that to be a fundamentally collaborative project, one that requires the sustained efforts of fields of actors that do not, over time, devolve into new orthodoxies resisting healthy change (i.e., the vanguard becoming the defensive old guard). In this view, it is the fields, not just government programs within them, that must be made and kept strong—through collective investment and scrutiny over time.

Continuing on the topic of scrutiny, social audits are believed to have originated in Europe in the 1970s. By the 1990s, they were being deployed in poor communities in India, and soon after in South Africa and other nations in the global South, to illuminate and change chronic underperformance and inequities in the delivery of government programs (Pekkonen and

Sadashiva, n.d.). Audits organize civil society groups, sometimes independently and sometimes jointly with the government, to monitor, track, analyze, and evaluate government performance and accountability (Hausmann-Muela, 2011).

Next, user-centered design has been applied effectively to the design and redesign of benefits delivery and other government functions in recent years, including notable achievements in the area of homelessness prevention and reduction (McGuinness and Schank, 2021). Employing user-centered design would be a boon to HUD's efforts to advance equity through more dynamic approaches to knowledge. The approach shares with social audits the premise that users are not just clients with needs but holders of unique knowledge, creativity, and agency. These approaches not only valorize but activate the value of lived experience and empower the co-creation of better approaches that get measurable results.

Finally, as we highlighted in the prior section, citizen science emphasizes the participation of everyday people, not just conventionally trained scientists, in generating scientific knowledge and monitoring conditions critical for scientific understanding. Like the other mechanisms we have highlighted here, citizen science promises more active, broader-based engagement in discovery and the greater legitimacy that such engagement can help confer on new knowledge. While citizen science is best known as an organizer of monitoring, for example of air and water quality, for environmental health and justice (Corburn, 2005), this approach could be applied to a wide variety of puzzles or problems, from housing quality to climate risk or indicators of housing discrimination, for which *distributed* knowledge in *diverse* forms, *blended* effectively, enriches both the questions asked and the answers generated. Citizenscience.gov now operates to promote the use of these methods across the range of government goals and functions.

As that final approach underscores so explicitly, it is not the supplanting of the scientific method but democratizing it and blending its outputs with other forms of knowledge and influence that are so powerful and so long overdue. The essence of that leads us to the road ahead.

The Right Kind of Progress

HUD was born at a unique moment in the history of the nation and, as such, with a very particular set of convictions about what defines good policy and how to improve it through learning. As Jim Collins and Jerry Porras argued in their best-selling *Built to Last: Successful Habit of Visionary Companies* (1994), it falls to every organization, and each generation that operates it with the hope of making it great, to determine how best to "preserve the core and stimulate progress." HUD's evidence-centered standards—rigor, relevance, transparency, independence, ethics, and technical innovation—are core. Not only are those standards well worth preserving at the heart of HUD's Learning Agenda, but they matter more than ever because of persistent inequity, because of what we are learning, however imperfectly, about what advancing equity requires in America, and because of intensified threats from disinformation and well-funded campaigns to deepen distrust of public institutions generally. Surprising as it may seem, however, therein lies the path to progress as well. If the past is prologue, success in practicing the new ways of seeing and learning we have advocated will not only advance equity but help redefine learning itself, generating important new concepts, methods, and questions—and the hope of greater legitimacy, public trust, and support.

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Incorporating Equity into HUD's Learning Agenda: Thoughts on Studying Structure

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Abstract

This article presents informal recommendations for incorporating equity principles into the U.S. Department of Housing and Urban Development's Learning Agenda. An understanding of social and economic structures is essential for understanding contemporary inequities. This article presents several recommendations for how to understand the structural barriers faced by traditionally marginalized groups. Also noted is the importance of taking an intersectional perspective on housing discrimination research.

Introduction

Despite the informality of this exercise, it seems necessary to begin with a brief discussion of what equity means in housing research. The Biden Administration's Executive Order On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government and the U.S. Department of Housing and Urban Development's (HUD's) amended *Evaluation Policy Statement* (2022) take an appropriately comprehensive view of the concept to include an awareness of implicit bias, the promotion of researchers from marginalized communities, the advancement of equal opportunities and anti-discrimination, and an affirmative disruption of structural racism.[1]

[1] Executive Order 13985 of January 20, 2021, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government. *Code of Federal Regulations, 86 FR 7009: 7009-7013.* https://www.federalregister.gov/documents/2021/01/25/2021-01753/advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government.

Although all these goals are laudable, I will focus on the affirmative disruption of structural racism in this commentary. This choice is primarily because the explicit recognition of structural racism in federal policy documents represents the potential for a significant discontinuity in U.S. housing policy. Indeed, one must only glance at the vitriolic backlash it has engendered to understand its potential to advance equity at a pace not seen for decades (and the very real threat of retrenchment).

Structural racism has been defined in many ways by both theorists and empiricists (for example, see Graetz, Boen, and Esposito, 2022; Powell, 2007), but my working definition begins with the recognition that the end of racial animus is necessary but not sufficient to promote racial equity (Bonilla-Silva, 2003). In other words, social structure normalizes itself in a way that maintains (or exacerbates) racial inequalities even without intention (Bonilla-Silva, 1997). Equity thus requires an affirmative attempt to shift this structure in ways that are explicitly advantageous for marginalized racial groups. Of course, although structural *racism* has dominated the public conversation during the past several years, we should not forget that *sexism, ableism, heteronormativity*, and *nationalism* (to name a few) are all also embedded within the social structure in ways that are not purely additive.

With this definition in mind, I can now fulfill the assignment of providing my thoughts on how best to integrate equity into HUD's Learning Agenda. To avoid operating from a purely critical academic standpoint, I want to mention that the proposed research in the Learning Agenda shows both the remarkable breadth of HUD's Policy Development and Research (PD&R) mandate and the agency's commitment to equity. From an intellectual perspective, it zeroes in on many of the core empirical questions of our time and, assuming satisfactory answers can be produced, will greatly improve domestic housing policy.

Researching Structure

Given my desire to prioritize the structural components of inequality, it may come as no surprise that my primary recommendation is to expand the aspects of HUD's research that approach structural questions most directly. HUD has a long tradition of research on the marginalized communities that benefit from its various programs, but its work on the structures in which those individuals must operate has been sporadic. To advance equity, it is essential to equally study those with the greatest power to shape the structure and those struggling against those structures. If we do not understand the processes of exclusion by looking directly at those with the power to exclude, we will fail to design programs that effectively promote inclusion.

Some examples of such investigations might include:

> ***Landlords:*** Perhaps the most obvious case for understanding the structural barriers confronted by HUD-subsidized families is the case of landlords, rental property investors, and property managers. At a fundamental level, the actions of these individuals define the geography of subsidized housing in most American metropolitan areas. Certainly, legal screening and illegal discrimination play a substantial role, but these individuals also make choices about tenant management, eviction, marketing, property acquisition, sale, and redevelopment.

As indicated by the Learning Agenda, HUD has conducted several projects to better understand these individuals, including direct data collection from landlords and property managers (Garboden, Rosen, DeLuca, et al., 2018; Garboden, Rosen, Greif, et al., 2018; Garboden and Rosen, 2018), a quasi-experimental evaluation of landlord incentives (Peck et al., 2022), and audit studies designed to understand voucher acceptance (Cunningham et al., 2018). In addition, the Learning Agenda's continued support for the Rental Housing Finance Survey will provide invaluable data on the financial characteristics of rental properties.

Gaps nevertheless remain. Although we are increasing our understanding of how rental property owners respond to the voucher program, we still know little about the owners themselves (aside from a series of qualitative studies such as those cited previously). Various local attempts, sometimes supported by rental registration mandates, have attempted to piece together the ownership profile of particular cities' rental stock, but no consistent best practice has emerged. In addition, the extant datasets do not provide the sort of rich ownership data that was available in the ill-fated *Property Owners and Managers Survey* in the mid-1990s.

Similarly, although our knowledge of Housing Choice Voucher (HCV) landlords has increased during the past decade, far less is known about the owners and managers of Low-Income Housing Tax Credit (LIHTC) subsidized properties at a national level (Bratt, 2008; O'Regan and Quigley, 2000). As noted in the Learning Agenda, such an analysis would be contingent on developing a more accurate address-level dataset of LIHTC subsidized properties.

Nothing about developing such a data infrastructure is easy, but the evidence increasingly suggests that the ownership profile of rental housing in a given metro has profound implications for tenant well-being (Garboden, Rosen, DeLuca, et al., 2018; Immergluck et al., 2020; Raymond et al., 2016; Stegman, 1972), and the equity concerns are substantial.

Housing Developers: In a similar vein, there is a remarkable lack of understanding of housing developers as individuals and institutions. An abundance of work (some of which is expanded on in the Learning Agenda) seeks to address the question of affordable housing finance and the impact of regulatory barriers on development (Glaeser, Gyourko, and Saks, 2005; Saiz, 2010). There is a remarkable lack of information on developers and real estate investors as institutions, particularly those outside the traditional Community Development Corporation (CDC) and neighborhood redevelopment systems (Goetz, 1993; Levine, 2021; Levine, 2016).

As with landlords, it is important to study developers without falling into the traps of reductionism or demonization. Developers certainly respond to housing and financial markets, but their strategies go well beyond that, particularly when working on in-fill development where they are required to work within existing communities (Garboden and Jang-Trettien, 2020). On the demonization side, much of the gentrification literature dismisses developers as agents of displacement. There is no doubt that the behavior of some developers can (and does) harm the well-being of low-income communities; however, the demonization of structural actors does little to advance our understanding of how to incentivize their behavior.

Given HUD's commitment to equitable community revitalization, it is essential to bring nuance into these conversations to understand the roles that various development entities play in processes of neighborhood change. Of course, such studies present significant methodological challenges; the study of institutions and networks necessarily requires long-term commitments to particular cases and the use of both quantitative and qualitative data (creating issues of generalizability and replicability). I am encouraged that the Learning Agenda expresses enthusiasm for a multitude of methodological approaches.

Exclusionary Affluent Communities: The Learning Agenda contains three important research questions regarding exclusionary communities: (1) how does exclusionary zoning affect housing supply and how can it be changed to align with demand; (2) to what extent do development restrictions impact affordability; and (3) are gentle density initiatives (such as Accessory Dwelling Units [ADUs] and duplexes) effective at creating new housing supply? Each of these concepts is important, but I would suggest work that builds toward a deeper understanding of the exclusionary communities themselves (Goetz, Damiano, and Williams, 2019). This study can involve everything from basic questions of what these neighborhoods are and how they are changing to more complex issues related to self-interest, wealth, and rent-seeking among those who are able to oppose development.

Public Housing Authorities: As with developers, it is important to take an institutional lens on Public Housing Authorities (PHAs), particularly those outside the two dozen most familiar to the research community. Although the largest PHAs certainly serve the majority of low-income families, the "long-tail" of small PHAs has important implications for equity in rural communities and other areas outside of central cities. For example, consider the recent research on waitlist preference structures, which has clear implications for the allocation of benefits within eligible communities (McCabe, 2020; Moore, 2016). It strikes me as essential to understand how PHAs develop these policies. Similarly, recent work has confirmed the value of counseling and support to encourage opportunity moves (Bergman et al., 2019), suggesting that a close examination of how PHAs operate within the status quo is incredibly important for program design.

Technological Infrastructures: Finally, the Learning Agenda identifies several places where technological infrastructures have begun to shift traditional housing practices. The most mature example is how real estate websites have begun to replace traditional housing search processes for many demographics (Besbris et al., 2022). Other examples abound, such as Zillow's attempt to estimate the values of homes and its unsuccessful attempt to use that approach to purchase undervalued properties. Tenant screening has also become increasingly based on black-box technologies, creating key questions about the data used for these screenings and the inherent biases that may be hidden within the technology (Fields, 2022; Nelson et al., 2021; Rosen, Garboden, and Cossyleon, 2021). A robust research agenda seems warranted for HUD to maintain programs responsive to these evolving technological structures.

These concepts are only a few brainstormed examples of how HUD can continue to engage in structural issues more directly in its research agenda. They can be roughly summarized as my belief that institutions (broadly defined) matter. They shape the ability of low-income families to access

critical resources, to move to particular neighborhoods, and, ultimately, realize the type of upward mobility that is necessary to redress our nation's inequalities. As suggested by the (highly incomplete) previous citations, there is ample work on which to build, but critical gaps remain.

Intersectional Identities and Discrimination

As described in the introduction, the study of equity issues needs to understand intersectional complexities such as race, gender, class, disability, sexuality, and gender identity. Thus my second recommendation centers around HUD's fair housing mandates and how best to understand exclusion and discrimination in contemporary America.

Hawai`i, where I live and work, represents a distinct racial/ethnic context within the United States. The state famously lacks a majority racial group, and nearly one-fourth of the population identifies as more than one race. These figures are based only on the top-level racial categories available from the U.S. Census, with many more individuals tracing their genealogy back to multiple Asian or Pacific Islander nations. Although this special context is unlikely to reflect U.S. demographics in the foreseeable future, there is no doubt that racial identity is becoming increasingly complex in many American cities (Parker et al., 2015).

Moreover, we have come to understand how race intersects with other characteristics of an individual, such as gender, class, gender identity, and even program participation, to shape how housing market intermediaries perceive them. Whereas the literature is often more theoretical than empirical at this point, it is nonetheless important to incorporate an equity lens in our study of fair housing by explicitly examining the intersectional experience of low-income households.

What might this study mean in concrete terms?

First, as noted in the Learning Agenda, there is enormous potential in measuring discrimination using email correspondence studies. Not only do these studies allow researchers to pick up discrimination happening at different points in the housing search process, but they are much cheaper to implement than in-person audits. Researchers can (and have) conducted many hundreds of tests across dozens of metropolitan areas with relatively low marginal costs to increase their sample size (Aliprantis, Martin, and Phillips, 2022; Cunningham et al., 2018; Moore, 2018) Assuming that the research community can confirm best practices, the dramatic cost reduction will allow correspondence studies to test multiple identity vectors simultaneously.

For example, the literature suggests that Asian Americans are systematically disadvantaged in housing searches relative to Whites, albeit in complex ways (Quillian, Lee, and Honoré, 2020; Reina and Aiken, 2021). Indeed, this discrimination may have been recently exacerbated by the spike in anti-Asian sentiment that resulted from the COVID-19 pandemic. Little discrimination research has systematically disaggregated the enormous heterogeneity of what constitutes "Asian American," nor has there been much systematic insight into how contexts impact the severity of anti-Asian discrimination. Are Asian Americans at an advantage when seeking housing in historically Asian communities that align with their ethnic identity? In which neighborhoods are they at a disadvantage?

All the same questions could also be posed of the vast heterogeneity of the Latino experience, with the particular nuance that national origin, ethnicity, and formal citizenship potentially represent separate vectors of exclusion (Asad and Rosen, 2019; Reina and Aiken, 2021).

From HUD's perspective, it is additionally important to understand how program participation intersects with other aspects of identity to shape how individuals are perceived. For example, the Learning Agenda rightly proposes testing reforms to the HCV program that provide funds directly to tenants. This logic makes sense given that voucher holders can be stigmatized in some contexts, but it must also confront the fact that low-income renters are sometimes only able to convince a landlord to accept them if they have the economic security of a voucher (Rosen, 2014). This consideration does not necessarily mean that the advantages of a cash program outweigh the cons; however, it does suggest that we still have much to learn about how vouchers intersect with other forms of discrimination and how that varies by neighborhood context and housing market (see Faber and Mercier, 2022 for an example).

Finally, stepping outside my expertise, I found the lack of projects specifically addressing transgender discrimination quite noticeable, particularly given the anecdotal and journalistic evidence of the challenges that transgender and non-binary individuals face accessing the homeless shelter system.

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Advancing Racial Equity within Federal Housing Policy

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Given the historic movements to redress the government's role in perpetuating racial inequality, HUD's Learning Agenda for Fiscal Years 2022–26 invites us to collectively reflect on the role of race, racism, and racial equity in federal housing policy. Without a doubt, the Biden-Harris Administration is committed to building an inclusive urban recovery that drives resources to disinvested neighborhoods through equitable development. Along with other federal agencies, HUD leaders are charged with implementing Executive Order 13985, which instructs federal agencies to pursue a comprehensive approach to advancing equity and support for underserved communities. In this short essay, I invite us to consider how federal housing policy can advance racial equity in ways that has catalytic impacts for years to come.

For generations, academics, policy experts, and researchers have employed traditional learning and evaluation methods that are extractive and, at times, exploitative. Evaluation goals are typically determined by researchers, government administrators, or foundation representatives with limited input by community members or on-the-ground stakeholders. What input exists typically comes in the form of needs assessments, which have a strong deficit framing. This traditional way of approaching learning and evaluation has harmed Black, Indigenous, and People of Color (BIPOC) communities by promoting transactional and often one-sided learning dynamics while leading to more resources, publications, media attention, and other accolades for historically White-led institutions (such as universities and think tanks). It has also arguably led to a lack of meaningful impact for the BIPOC communities that these same institutions intend to support. *We would all benefit from a radical shift away from this extractive, one-sided approach to one that is grounded in collaboration and racial equity.*

As an antidote to the current status quo, I propose that HUD's leadership, particularly those who are part of HUD's Equity Workgroup, should engage in a process of learning directly from and about the most valued HUD constituency: those individuals and families living within HUD-funded programs. This process would aim to center the voices of BIPOC community members. To start with, a few key topics are identified below that would be helpful to emphasize with a particular commitment to ensure racial equity within HUD's Learning Agenda.

Land Ownership

Land costs and ownership can be major drivers in the production and preservation of subsidized housing. The loss of Public Housing Authority (PHA) land and hard housing units (such as project-based Section 8 and traditional public housing buildings) is most experienced within majority-BIPOC communities where disinvestment and segregation readily occur. No major national research studies document the trends and long-term effects of the disposition of federally subsidized housing and land. It would be helpful to explore questions related to the shift of land and housing away from PHAs/HUD control and toward market entities. What are the pros and cons of PHA land and property disposition for low- and moderate-income individuals and local communities, and what is the ongoing role of the federal government in supporting subsidized housing and the land it occupies?

Building Wealth and Power Through Emergent Local Strategies

Many local communities are advancing emergent policy strategies aimed at mitigating wealth extraction via market-based housing provision. Many of these local policies focus on building wealth and power among BIPOC communities. Along with a research team led by Larry Vale, Mariana Arcaya, Patrice C. Williams, and Justin Steil at the Massachusetts Institute of Technology (MIT), we are looking toward exploratory research that is not easily attached to a HUD program or policy. For example, we are hopeful about developing an evidence base on the following types of programs and policies: (1) community land trusts, (2) public housing policies that expand the stock of decommodified housing, (3) local reparations efforts for African-American residents in the form of housing assistance, and (4) inclusionary housing policies that prioritize anti-racism. I believe there is much to be discovered about how to advance racial justice within the field of housing and community development—if we are open to learning about these emergent policy strategies. I would suggest adding a question such as this: What emergent policy strategies are being implemented in local communities with the aim of addressing racialized wealth extraction and structural racism in the housing market?

Equitable and Resilient Communities

Finally, new initiatives across the nation are sparking change focused on ensuring disinvested, low-wealth BIPOC communities are equitably resourced. One example is the Partnership for Equitable and Resilient Communities (PERC), a new philanthropic effort anchored by the Melville Charitable Trust. The goal is to support collaborative decisionmaking between communities and government to ensure federal resources target equitable solutions. Initially, select cities, regions, and tribal governments will have access to funding and technical assistance in order to maximize the use of federal resources and support populations who have been consistently and disproportionately left behind. The partnership is also committed to understanding how equity is advanced within local communities in ways that lead to shifts in practices, policies, and systems. HUD's Learning Agenda would benefit from the inclusion of an evaluation focused on racial equity initiatives, such as PERC. I would suggest adding a question such as this: How do local communities, philanthropic partners, government, and other key stakeholders advance equity

through the early implementation of racial equity initiatives, and what difference does that make for BIPOC communities?

For this and future generations, we must not just sit by with hopes of infusing racial equity into our federal housing policies. We must create and sustain the brave spaces that are necessary in ways that continually center BIPOC communities. We need transformative shifts that ensure federal resources target equitable solutions so all people can thrive. We need to be the future ancestors that we want our descendants and their descendants to respect.

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Researching Homeownership Inequalities: A Life-Cycle Perspective

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Introduction

In 2019, the median Black household in the United States held only one-eighth the wealth of the median White household—$24,100 in total net wealth, compared with $188,200 in net wealth for White households (Bhutta et al., 2020). This large racial disparity in wealth has its roots in disparities in homeownership. Housing wealth is the primary source of wealth for many Americans, and Black households own homes at much lower rates than White households. In 2019, only 42 percent of Black households owned a home, compared with 72 percent of White households (McCargo and Choi, 2020)—a 30 percentage point gap in the homeownership rate. This gap has persisted over decades due, in part, to historically racialized policies that locked Black households out of ownership (Rothstein, 2017).

The U.S. Department of Housing and Urban Development's (HUD's) *Learning Objectives* related to homeownership can be a critical opportunity to advance more informed policies. The foundational learning question asks: *"How can federal policy make first-time homeownership more available and attainable to all Americans and more likely to result in housing stability and wealth-building for underserved populations?"* This is an important question that deserves serious attention. As researchers, however, a well-intended but narrowly conceptualized approach to informing this question can, at the very least, have no impact and, at worst, lead to policies that exacerbate inequities.

While we strive to be objective and unbiased, research is undoubtedly shaped by our perspectives and normative assumptions about the mechanisms underlying a particular relationship (Cancian, 2021). We are further limited by available data and methods to explore a given question. For example, home purchase, credit, and mortgage datasets used to evaluate homeownership outcomes typically lack information on household savings and wealth. Wealth, however, is at the core of all aspects of the homeownership life cycle—from the ability to take out a mortgage to purchase a home, to the ability to maintain a home and make mortgage payments, and ultimately, to be able to pass on housing equity to the next generation. Lack of attention to household savings and wealth may lead to narrow policy solutions that disparately impact racial minorities and other historically marginalized groups.

Researchers must move beyond including race as an indicator variable in regressions to think more systematically about the underlying mechanisms that lead to differences by race (Brown et al., 2019; Darity et al., 2018). Simply observing a significant (or insignificant) coefficient on race in a model predicting loan approvals or loan performance does not advance solutions to close the racial wealth gap. We must think carefully about *why* we observe differences in access to credit. We must move beyond attributing wealth creation with home *buying* to think more holistically about the home *ownership* life cycle.

In this article, I interrogate four specific research topics at different stages in the homeownership life cycle—from mortgage underwriting to post-purchase support, as proposed in the HUD learning objectives. In reviewing each topic, I attempt to broaden the framing to shed light on mechanisms that contribute to observed disparities by race. These mechanisms include institutional practices and processes that may perpetuate inequalities and that could be the focus of targeted interventions for improvement. I also offer caution about potential pitfalls associated with a given topic that should be top of mind for researchers.

Before delving into my perspectives on the research topics, it is important to acknowledge my positionality as a researcher. I am a White, middle-class homeowner who identifies as a woman. I am trained as a policy scholar, which contributes to my pragmatic, problem-oriented methodological approach (Schneider and Ingram, 2003). Homeownership policies, specifically housing finance, are a context where I have worked as a practitioner and researcher. Much of my research uses quantitative or mixed methods—both descriptive and causal—thus, I interpret research topics and questions through that lens. Other scholars with different philosophical perspectives, trained in different methods, and who live and work in different contexts will undoubtedly shed light on other important aspects of the research topics.

Understanding Mechanisms that Contribute to Homeownership Inequalities and the Role of Policy

Algorithmic Underwriting and Equity in Mortgage Lending

Since the 1990s, mortgage approval decisions have largely been driven by automated underwriting models rather than rule-based thresholds (for example, debt-to-income ratios) or loan officer discretion (Foote, Loewenstein, and Willen 2019). On the one hand, computer algorithms may reduce overt racial discrimination in the underwriting process, increasing access to mortgages for previously underserved populations. There is increasing evidence, however, that the inputs to automated underwriting models—particularly credit scores—are biased in ways that disproportionately restrict credit access for historically marginalized groups of consumers (Blattner and Nelson, 2021; Di Maggio, Ratnadiwakara, and Carmichael, 2021).

Understanding the role of automated underwriting in perpetuating inequitable access to mortgage credit is an important research topic to address the racial homeownership gap. It is critical that studies undertaken on this topic explicitly investigate the mechanisms that contribute to variation in disparate predictions by race. For example, Blattner and Nelson (2021) found that credit scores

are less predictive of credit risk for lower-income, Black, or Hispanic mortgage applicants because the historical credit data used to construct credit scores tends to be thinner for these groups. This deficiency results in credit scores that are "nosier" and less accurate—and it contributes to the disproportionately higher rates of mortgage denial for Black mortgage applicants. The mechanism here is a higher probability of having a thin credit file—not higher underlying credit risk.

Research must also move beyond documenting disparate rates of loan approvals to informing solutions. How can underwriting systems be redesigned to accommodate thin credit files? Are there more reliable and less biased indicators on credit reports—such as recent payment history data? What alternative sources of data can be used, such as bank account activity, rental payments, or other indicators of household liquidity? Fintech lenders increasingly rely on these alternative indicators, denying fewer applicants than lenders using traditional underwriting criteria (Di Maggio, Ratnadiwakara, and Carmichael, 2021). Do these alternative credit indicators and sources of data have other forms of inherent bias?

A note of caution is that *any* underwriting system based on predicting default risk will disparately impact historically marginalized individuals. We can (and should) work around the margins to improve underwriting systems that unnecessarily restrict access (for example, based on people being less risky than signaled by a credit score). Income and wealth are not equitably distributed in the United States, however. When a homeowner loses their job or experiences a significant unexpected expense, their ability to keep up with mortgage payments depends on having a savings cushion—which is systematically non-existent for lower-wealth households. This disparity raises the need for alternative mortgage products and programs that buffer against liquidity shocks on the back-end rather than denying access to credit on the front-end, such as forbearance policies and post-purchase support—described in more detail in the following section.

Effects of Down Payment Assistance for First-Time Homebuyers

The racial wealth gap and the racial homeownership gap in the United States are intertwined and reinforcing. Lower levels of homeownership across generations of households contribute to lower levels of wealth held by those households and prevent them from accessing homeownership in the future. Down payment and closing cost assistance programs are designed to break this cycle—providing homebuyers with the cash needed to qualify for a mortgage and pay up-front costs such as a home appraisal or inspection fees. Various federal, state, nonprofit, and even privately funded programs offer grants, forgivable second loans, and other affordable financing options to cover down payment and closing costs—with one study identifying more than 2,500 programs nationwide (Goodman et al., 2017).

Not all sources of assistance are created equally, however, and research can inform which types of down payment assistance are associated with better outcomes. Research must go beyond documenting differences by assistance type to investigating the mechanisms underlying the differences. For example, prior studies found increased rates of default among borrowers with privately funded down payment assistance but lower rates of default among borrowers with public or nonprofit funded down payment assistance (Fout et al., 2020; Hembre, Moulton, and Record, 2021; Leventis, 2014). A key question is *why*? Is it something about the structure of the assistance

that places borrowers at greater (or lesser) risk of default? Or do additional forms of borrower support (such as housing counseling), which are often bundled with public and nonprofit down payment assistance programs, reduce the risk of default? Or is it all about selection—where the types of borrowers who sort into (or persist through) more onerous down payment assistance programs are less likely to default? These *why* questions are critical to informing good policy—as they imply different mechanisms and thus different implications for equitable homeownership.

If some of the effects of homebuyer assistance programs can be attributed to borrower selection, then these programs may unintentionally exacerbate disparities. Particular groups of marginalized homeowners may be less likely to persist through a more onerous down payment assistance process due to competing time and budget constraints. This issue may exacerbate racial inequalities in housing finance. There is a growing body of research in other policy domains that finds people who persist through more complicated or time-consuming application processes may be those who have the slack resources to do so. These extra steps disproportionately reduce take-up from the same populations who are targeted for benefits (Bertrand, Mullainathan, and Shafir, 2004; Deshpande and Li, 2019; Foote, Grosz, and Rennane, 2019). Studies of down payment assistance programs should consider the administrative burdens placed on homebuyers who navigate these processes and how the burdens may disproportionately affect marginalized populations.

Caution must be exerted when attempting to draw causal connections between down payment assistance and homeowner outcomes. This is a research context fraught with selection bias—and often, this bias is on a critical unobserved characteristic—household savings—for which there is no good proxy in existing mortgage and credit data. People who select to use down payment assistance have low levels of liquid savings prior to buying a home (hence the motivation to seek assistance), and they presumably have low levels of liquid savings after buying a home that places them at a higher risk of default if they experience an unexpected income or expense shock. Thus, one could falsely conclude that down payment assistance is associated with a higher risk of default when, in fact, it is lower levels of wealth (the often omitted variable) that cause a higher risk of default. Ideally, a study of this type would incorporate bank account data or other administrative data with *dynamic* information on household savings levels to better disentangle the effects of down payment assistance from the effects of access to liquidity before and after a home purchase.

Down payment assistance is also a research area where the framing of the question may narrow the policy solutions considered. Framing the question to focus on traditional forms of down payment assistance may miss an opportunity to consider the role of deeper subsidies. Rather than traditional down payment programs that provide just enough assistance to clear the bar of *buying* a home (for example, 3 percent down), considerable subsidies may be required to jump-start wealth creation while *owning* a home. Substantial subsidies may be particularly important for Black households who have been historically shut out of mortgage markets and thus missed generational opportunities to build wealth through homeownership (Hamilton et al., 2015; McCargo and Choi, 2020). Research designs that include forward-looking interventions—such as varying the size of the subsidy—can better inform this sort of policy alternative.

Forbearance and Crisis Recovery

The unprecedented roll-out of mortgage forbearance in the wake of the COVID-19 pandemic likely prevented waves of mortgage defaults and foreclosures that would have occurred otherwise (Dettling and Lambie-Hanson, 2021). Preliminary research indicates that Black homeowners were more likely to enter into forbearance than White homeowners—yet Black homeowners have also been slower to exit forbearance (An et al., 2022; Gerardi, Lambie-Hanson, and Willen, 2021). These findings raise important questions about the implementation and outcomes of forbearance during the current crisis on disparate groups of homeowners. It also raises questions about the future role of forbearance-like policies in the presence of economic shocks and the extent to which such policies can be a tool to increase more equitable homeownership outcomes for homeowners who may be disproportionately affected by economic shocks.

Although it is important to document who benefited from forbearance, such an analysis must move beyond forbearance take-up to examine forbearance outcomes—including how missed payments were ultimately resolved and the extent to which homeowners remained in the home and resumed payments post-forbearance. One of the ways that people exited forbearance was through home sale—repaying missed payments through the proceeds of the sale. Were exits of forbearance through home sale more common along racialized lines? Another way people exited forbearance was by restructuring the mortgage to add the missed payments to the balance of the loan. How does this strategy affect home equity and wealth creation for Black homeowners? Are subsidies needed to reduce mortgage balances for homeowners exiting forbearance in areas with lower rates of house price appreciation or who held lower levels of housing wealth prior to the COVID-19 pandemic? These types of questions are critical to understanding the longer-term effects of COVID-era forbearance policies on homeownership disparities by race, wealth, and income.

COVID-era forbearance policies also offer an opportunity to reconsider how the housing finance system can be better designed to buffer economic shocks for lower-income and lower-wealth households. Mortgage products can be created that have built-in "shock-absorbers" to reduce, pause, or subsidize payments when unemployment rates spike in a region or when people lose their jobs (Collinson, Ellen, and Keys, 2021; Eberly and Krishnamurthy, 2014; Foote et al., 2009; Moulton et al., 2022; Orr et al., 2011). An example is the mortgage insurance (MI Plus) program administered by the Massachusetts Housing Finance Agency. All first-time homebuyers receiving mortgage financing through their program also receive mortgage payment insurance that covers their monthly mortgage payment for up to 6 months if they lose their jobs.[1]

These interventions are not simply about preventing default for existing homeowners—they also increase the supply of mortgages to households who may previously have been denied access using conventional underwriting criteria. If mortgage default is primarily about liquidity (income flow and savings), as suggested by recent research (Farrell, Bhagat, and Zhao, 2019; Gerardi et al., 2018), a more equitable housing finance system should identify ways to insure against cash flow risks on the back-end rather than deny access to credit on the front-end. Research can inform when

[1] Mass Housing's MI Plus Program is described online at https://www.masshousing.com/en/home-ownership/homeowners/mi-plus-eligibility

and under what conditions prospective homeowners may benefit from this additional insurance to offset default risk—rather than denying the loan.

Post Purchase Borrower Support

Perhaps one of the most promising and simultaneously understudied areas of homeownership research is the support system for homeowners after purchase. Decisions and experiences during the *owning* stage of homeownership are critical to wealth creation—and moderate the extent to which homeownership reduces or exacerbates racial wealth disparities. For example, studies indicate that Black homeowners refinance less when it is in the money to do so (Gerardi, Lambie-Hanson, and Willen, 2021; Gerardi, Willen, and Zhang, 2020), resulting in higher interest rates and lower levels of housing wealth accumulation among Black homeowners compared with White homeowners. Lower-income homeowners are also more likely to purchase older homes with higher maintenance costs and have fewer financial resources to pay for unexpected repairs (Van Zandt and Rohe, 2011). Delayed maintenance can reduce the value of the home (Harding, Rosenthal, and Sirmans, 2007) and the level of wealth created through ownership. First-generation homeowners may lack the support systems that are in place for higher wealth and higher-income homeowners (Reid, 2013).

Research is needed to better understand the effects of post-purchase borrower support systems on homeowner sustainability and, ultimately, wealth creation. One form of support to homeowners is post-purchase counseling provided through HUD-approved housing counseling agencies. Most research on housing counseling and education tends to focus on pre-purchase services or on counseling provided to homeowners in default on their mortgages to prevent foreclosures (Collins and O'Rourke, 2011; Peck et al., 2019). There is increasing evidence, however, that preventative forms of support after purchase—such as access to a financial coach, can help homeowners stay on track with their financial goals and increase mortgage sustainability (Moulton et al., 2015). In addition, there is some evidence that at least a portion of the beneficial effects of pre-purchase counseling on homeowner outcomes can be attributed to access to the counselor after purchase if a hardship arises (Brown, 2016; Stacy, Theodos, and Bai, 2018).

One of the key lessons from preliminary research in this area is the importance of timely, targeted support that connects homeowners to resources throughout the homeownership life cycle rather than generic forms of education and counseling. It is critical that research in this area differentiate between generic forms of post-purchase education and more targeted and timely interventions. Much of what is referred to as post-purchase counseling and education in the housing counseling community is generic information—often in the form of workshops or training material. This approach is very different from embedding a homeowner in a support system that begins prior to purchase and continues at regular intervals during the first few years as a new homeowner. Research in this area should consider how to leverage technology and integrated dynamic data to provide targeted information and financial resources to homeowners after purchase.

It is also important to caution that information alone is not enough—reducing racial disparities in the wealth created through homeownership requires access to financial resources after purchase. How can post-purchase support systems be designed to connect homeowners to financial

resources? For example, when a water heater breaks or a roof needs to be replaced, homeowners need access to funding to pay for these repairs. In this situation, financial resources could include home repair and rehabilitation subsidies—such as the Federal Housing Administration (FHA)'s Title I Insured Loans for Property Improvements. When a homeowner without a savings cushion loses their job, they need financial resources to keep up with mortgage payments during their temporary spell of unemployment. In this situation, financial resources could include the types of shock absorbers described in the previous section. Support for lower-income and lower-wealth homeowners after purchase must shift from reactionary efforts to intervene after a crisis occurs to putting in place systems of support ex ante. Research is needed to inform the design and delivery of such systems.

Putting it All Together: A Life-Cycle Perspective on Equitable Homeownership

In the United States, homeownership is embedded in a system with unequally distributed wealth, income, and access to credit. As researchers, we must consider how inequitable access to financial resources shapes the outcomes we observe at every stage of the homeownership life cycle—not just the purchase decision. Although owning a home is the primary source of wealth for most U.S. households, it would be short-sighted to assume that simply increasing the rate of home purchases will close the racial wealth gap.

The irony is that building wealth through homeownership requires wealth—not only to afford a down payment but also to have a liquidity cushion to buffer the income and expense shocks that most people inevitably experience at some point in their lives. Water heaters break. People get sick. Employees are laid off. For homeowners without access to liquidity—including a cushion of generational wealth passed down over time from parents and grandparents—these shocks have the devastating potential to unravel any equity gained through the purchase of the home.

A higher rate of default among homeowners with lower levels of liquidity not only accelerates exits from homeownership for marginalized homeowners, it also reduces the supply of credit to the same populations often targeted by housing policies. Lenders are less willing to make loans if projected losses are higher, which raises borrowing costs and reduces the supply of mortgage credit. There is evidence that tightened underwriting requirements in response to the housing market crash during the Great Recession disproportionately affected non-White prospective homebuyers (Acolin et al., 2016).

Research is needed on policies and interventions to reduce default risk and maximize homeowner wealth creation throughout the ownership life cycle. A life-cycle perspective requires a fundamental rethinking of housing finance for marginalized groups, such as leveraging insights from the COVID-19 era forbearance policies to build mortgage products with built-in shock absorbers ex ante or creating life-of-loan access to liquidity rather than simply providing a small 3 percent down payment to purchase a home. Such policies and interventions not only help stabilize the current stock of homeowners but may also help increase the supply of credit to future generations of homeowners.

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Embedding an Equity Approach in HUD's Learning Agenda

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Abstract

Achieving equity in housing means dramatically improving living conditions for the 23 million households in this country—disproportionately people of color who face the additional burdens of systemic racism—that experience housing insecurity and economic insecurity. To advance equity at the scale needed, HUD's Learning Agenda must both reach beyond the agency's current programs and constituents to inform the next generation of housing policy and approach every learning question with an equity lens. We offer three recommendations: (1) expand the scope to include questions that identify program and policy solutions that leverage contributions by other government agencies and other housing system actors; (2) adopt a framework for equity analysis that includes assessing multiple dimensions of equity (procedural, distributional, structural, and restorative), integrating deeply disaggregated data, and focusing on those households with the highest housing needs as a strategy to build a housing system that works for all; and (3) incorporate into the agenda key housing issues and solutions that are gaining traction at the community level and are being demanded by the housing justice movement, such as eviction prevention, social housing, rent stabilization, corporate ownership, and housing reparations.

Introduction

As an organization founded in 1999 with the mission of advancing racial and economic equity through policy and systems change, PolicyLink has been, at different times, an advocate, a coach, and a cheerleader for federal government agencies' adoption of an equity lens in their work. The U.S. Department of Housing and Urban Development's (HUD's) latest 5-year Learning Agenda exemplifies this practice, and we want to both celebrate that intention and offer suggestions for strengthening the agency's equity muscle.

The Equity Challenge

We define equity as just and fair inclusion into a society in which all can participate, prosper, and reach their full potential. When we think about how to manifest equity, we ask: what policy and systems changes are needed to positively transform the lives of the nearly 100 million people in this country who are economically insecure, including 53 million people of color who face the additional burdens of systemic racism? How do we implement these solutions effectively? Finally, does the voice, wisdom, and experience of those most impacted by inequity drive these solutions?

These 100 million people reside in 36 million households, and ensuring that each of them live in a quality, safe, affordable home is fundamental to achieving equity in America. Housing is a cornerstone for health, well-being, and economic success. The home and neighborhood you live in play a significant role in determining your access to opportunities and life outcomes. Decades of research demonstrate that neighborhoods with "opportunity structures"—high-quality schools, safe streets, clean air, parks, reliable transit, and proximity to jobs, retail, and services—promote positive life outcomes. On the other hand, living in a neighborhood that lacks these essential conditions can have negative impacts on health, access to educational and economic opportunities, and economic outcomes—particularly for children (Acevedo-Garcia, Noelke, and McArdle, 2020).

Economically insecure households—especially households of color—face immense and growing challenges in accessing quality, safe, affordable homes in opportunity-rich neighborhoods. The majority of economically insecure households are renters (59 percent), and renting is more common among households of color; for example, 73 percent of Black households are renters.[1] Across all racial/ethnic groups, a large majority of economically-insecure renter households—77 percent—spend too much of their already-strained household budgets on rent and utilities, leaving them with far too little to spend on the rest of their household needs (National Equity Atlas, 2022a).[2] Residential segregation is just as bad now as it was in 1990 (Menendian, Gambhir, and Hsu, 2021). Many renters living on low incomes lost work and income during the pandemic, and they either accrued debt to stay current on rent or fell behind (National Equity Atlas, 2022b). In 2021–22, rents have skyrocketed in most metropolitan regions, and the price of gas and other household necessities has also increased (Bhattarai, 2022). Evictions, which negatively impact health, education, household finances, and future prospects, are commonplace among the most economically insecure renters, especially women of color with children, and they are on the rise in many metropolitan regions in the post pandemic emergency moratoria era (Hepburn et al., 2022).

The challenges cited above are the challenges that we face as a nation in creating a housing system that meets the needs of the 100 million who are economically insecure; they are the challenges that

[1] PolicyLink analysis of 5-year 2019 American Community Survey data on Tenure. Among economically-insecure households, 73 percent of Black households, 70 percent of mixed-race households, 68 percent of Latinx households, 65 percent of Asian and Pacific Islander households, and 57 percent of Native American households rent, compared with 50 percent of White households.

[2] Rent burdened is defined as paying more than 30 percent of household income on rent and utilities. Note that there are some racial differences: among economically-insecure renter households, 67 percent of Native American households and 75 percent of White households are rent-burdened, compared with 81 percent of Asian or Pacific Islander households, 79 percent of Black households, 78 percent of multiracial households, and 77 percent of Latinx households.

the U.S. Department of Housing and Urban Development (HUD) must take on to advance racial and economic equity at a meaningful scale.

How Equity Shows Up in HUD's 2022–26 Learning Agenda

Ushered into office during a global pandemic that spotlighted systemic inequities alongside a racial reckoning, precipitated by uprisings following the police murder of George Floyd, President Biden's very first Executive Order, "On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government," made advancing equity the official policy of the federal government and instructed executive departments and agencies to "recognize and work to redress inequities in their policies and programs that serve as barriers to equal opportunity" (The White House, 2021).

For HUD, embracing an equity approach is not a novel endeavor. Under the Obama Administration, HUD doubled down on its mission to "Affirmatively Further Fair Housing," piloted a "Fair Housing and Equity Assessment" tool to help communities measure and address racial disparities in access to opportunities, and implemented the Sustainable Communities Initiative, a competitive grant program with a focus on equitable community engagement in regional planning efforts. The Trump Administration stalled this forward progress, however, revealing the impact of vacillating executive-level political priorities on federal agencies. But even without this political roadblock, embedding equity into the mission of an agency like HUD that has more than 7,000 employees spread across more than a dozen different offices is a significant undertaking that will take years, if not decades, to accomplish.

HUD's strategic plan, its proactive approach to developing a racial equity action plan in response to the Executive Order, and its 2022–26 Learning Agenda demonstrate that the agency has begun integrating an equity approach into its mission.[3] The strategic plan takes the important first step of naming increasing equity across all programs as one of two overarching agency-wide goals, alongside improving customer service. The plan also identifies many equity-focused strategic goals, including advancing housing justice, reducing homelessness, investing in equitable community development and wealth-building (particularly for communities of color), strengthening environmental justice, and integrating health and housing.

The Learning Agenda draws connections to HUD's work to institutionalize an equity focus throughout its operations, and it includes learning questions that address four equity topics: (1) addressing homeownership and wealth-building; (2) addressing the health needs of residents in HUD-assisted properties; (3) understanding whether recipients of HUD funding are affirmatively furthering fair housing (AFFH); and (4) filling data gaps. While not explicitly identified as an equity topic, we emphasize that the Learning Agenda also includes questions related to automated decisionmaking in housing markets, which is an important new frontier for discrimination and therefore a critical area of equity inquiry (Schneider, 2020).

[3] In the fall/winter of 2021 and 2022, HUD participated in a Racial Equity Governing Pilot Project led by PolicyLink and Race Forward, which focused on supporting agencies to fulfill the Racial Equity Executive Order.

These are important learning questions that can generate actionable information to increase equity through HUD's operations. We see several ways that HUD can more firmly center equity throughout its Learning Agenda.

Recommendations for Strengthening the Equity Focus of HUD's Learning Agenda

To advance equity at scale, HUD's Learning Agenda must both reach beyond the agency's current programs and constituents to inform the next generation of housing policy and approach every learning question with an equity lens. We offer the following recommendations.

Learn at the Scale Needed to Achieve Housing Justice

A more broadly scoped learning agenda would better position HUD to envision and then manifest the policy and systems changes needed to achieve housing justice. The current Learning Agenda includes many very good research questions about the effectiveness of its existing programs and the ways that pandemic response programs such as eviction moratoria and emergency rental assistance can inform future programming. While the Agenda includes a few questions about potential new programs, by and large it focuses on learning from program implementation and understanding contextual factors to inform program and policy design. This is a logical and grounded approach to incremental policy improvement, and it is insufficient to meet our housing equity challenge at scale.

As described previously, there are 36 million economically insecure households in America. Taking housing unaffordability as an overarching challenge that must be addressed, as of 2019, there were 23 million economically insecure households paying unaffordable rent or mortgages (more than 30 percent of their income) (National Equity Atlas, 2022a).

Achieving housing equity means securing safe, quality, affordable housing in opportunity-rich neighborhoods for all of these households, yet millions of these households are not touched at all by HUD's programs. In 2017, HUD directly served about 5 million households through its voucher and public housing programs, which are targeted to extremely low-income households, and only one in four households that qualify for federal housing assistance receives it (Fischer, Acosta, and Gartland, 2021). The Low-Income Housing Tax Credit produces about 110,000 units per year (Scally, Gold, and DuBois, 2018). While no precise data exists about the households living in federally financed buildings, it is clear that HUD assists many households through its role in housing financing. The Urban Institute estimates that the Federal Housing Administration, Fannie Mae, and Freddie Mac back the mortgages of about 12 million housing units (Goodman, Kaul, and Neal, 2020).

Given HUD's relatively limited reach into the 23 million economically insecure and housing-burdened households, to make measurable progress on equity, HUD will need to expand its impact on this population or use its influence to convince other housing system actors to take actions that contribute to meeting housing needs. Therefore, its Learning Agenda needs to include questions that help identify program and policy solutions that allow the agency to reach beyond its current constituency and leverage contributions by other government agencies and other housing systems actors.

Embed an Equity Analysis Throughout the Research

To truly become an equity-maximizing institution, HUD should integrate an equity analysis throughout its research. We recommend adding a section to future learning agendas that describes HUD's analytical approach to assessing equity across all of its learning questions.

This approach should include a framework for analyzing the multiple dimensions of housing equity. The Urban Sustainability Directors Network, the Urban Institute, the Kinder Institute, and others have begun articulating a multidimensional framework for analyzing equity across a range of policy arenas that can readily be applied to housing policy (Buchanan and Rivera, 2020; Kilolu, 2020; Stern, MacDonald, and Odeh, 2020). These include:

- *Procedural equity*—The groups that are most negatively impacted by inequities and structural racism are inclusively and meaningfully engaged in designing and implementing housing policies and programs and gain power, voice, and authority.
- *Distributional equity*—Housing programs and policies distribute benefits and burdens equitably across communities, providing maximum benefits to those with the greatest needs.
- *Structural equity*—Housing institutions and systems have processes, practices, and policies in place that operationalize equity in decisionmaking.
- *Restorative equity*—Policymakers acknowledge systemic harms—past and ongoing—against certain people and ensure commensurate investments to repair those harms.

HUD's equity research approach should include at least two other analytical foci:

- Deeply disaggregating data by race/ethnicity, ancestry, gender, income, geography, and other characteristics to understand the scope and scale of inequities and develop effective remedies. Data by ancestry in the National Equity Atlas, for example, reveal how Vietnamese, Cambodian, and Korean renters have similarly high rates of rent burden as Black and Latinx renters, although Asian renters as a whole have far lower rates of rent burden (National Equity Atlas, 2022a).
- Analyze how to serve those with the highest housing needs as a strategy to build a housing system that works for all. We know, for example, that low-income Black women with children face alarming rates of eviction that cause even greater economic insecurity (Desmond, 2014). Latina women have also faced the greatest threats of eviction during the pandemic (Wedeen, 2021). It is also important to understand and address intersectional vulnerabilities, or the overlapping barriers faced by individuals or groups that face discrimination and barriers across multiple identities, such as race, gender, and disability status. Implementing strategies that meet the housing needs of the most marginalized can create a ripple effect of cascading benefits which we call the "curb cut effect" (Blackwell, 2017).

Focus on Additional Topics Critical to Advancing Equity in Housing

In addition to broadening the Learning Agenda to inform larger scale policy solutions that engage additional systems players, HUD should expand its Learning Agenda to incorporate key housing issues and solutions that are gaining traction at the community level and are being demanded by the housing justice movement. While the only authentic way to align this Learning Agenda with the aspirations of the grassroots movement is through an inclusive process, from our vantage point as an intermediary and movement-support organization, we offer the following suggestions for important and missing topics:

- Eviction prevention, including in public housing managed by HUD, as well as private housing. While the Learning Agenda examines pandemic response eviction protections for nonpayment of rent, there are no questions relating to the prepandemic eviction epidemic, although public housing authorities are oftentimes the largest evictors in communities.
- Social housing (owned and operated by government and nonprofit organizations) as a strategy to increase the supply of affordable homes, and policy and financing strategies to build it at scale.
- Strategies to preserve affordable and subsidized housing in perpetuity.
- The potential for rent stabilization and tenant protections to increase housing stability for low-income renters in the private housing market.
- Informing state and local reparations programs that focus on acknowledging the harms of racist housing policies and implementing remedies.
- Understanding the impact of corporate landlords on equitable access to quality, safe, affordable housing.

HUD's new Learning Agenda offers an exciting opportunity to deepen the agency's equity analysis and, ultimately, improve housing conditions for the 23 million households that are both economically insecure and housing-burdened in America. We hope the suggestions we have offered support the agency in delivering on its equity goals.

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Departments

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Data Shop

Data Shop, a department of Cityscape, presents short articles or notes on the uses of data in housing and urban research. Through this department, the Office of Policy Development and Research introduces readers to new and overlooked data sources and to improved techniques in using well-known data. The emphasis is on sources and methods that analysts can use in their own work. Researchers often run into knotty data problems involving data interpretation or manipulation that must be solved before a project can proceed, but they seldom get to focus in detail on the solutions to such problems. If you have an idea for an applied, data-centric note of no more than 3,000 words, please send a one-paragraph abstract to chalita.d.brandly@hud.gov for consideration.

HUD Administrative Data Now Linked to National Longitudinal Study of Adolescent to Adult Health

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Abstract

This article describes a new dataset that links U.S. Department of Housing and Urban Development (HUD) administrative data (1995–2017) to survey and biomarker data from the National Longitudinal Study of Adolescent to Adult Health (Add Health).[1] *Add Health is a nationally-representative cohort study that aims to broaden understanding of how overlapping life contexts—such as school, family, and*

[1] Add Health is directed by Robert A. Hummer and funded by the National Institute on Aging cooperative agreements U01 AG071448 (Hummer) and U01AG071450 (Aiello and Hummer) at the University of North Carolina at Chapel Hill. Waves I-V data are from the Add Health Program Project, grant P01 HD31921 (Harris) from *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), with cooperative funding from 23 other federal agencies and foundations. Add Health was designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill.

Abstract, continued

peer context—influence the outcomes of adolescents as they age into adulthood, with a primary focus on health and well-being. Add Health has tracked these outcomes through five waves of data collection between 1995 and 2018. The linked HUD-Add Health dataset identifies 1,159 Add Health respondents who received federal rent assistance between 1995 and 2017 and provides information about their stay in federally assisted housing (for example, type of assistance received, years assisted). This article describes how this dataset was created and outlines analytic considerations for researchers.

Introduction

Housing is an important social determinant of health, with numerous studies showing that low-income households often experience housing stressors that degrade their health, such as eviction, rent unaffordability, and foreclosure (Alidoust and Huang, 2021; Singh et al., 2019). This general finding has sparked significant interest in the potential for housing policy interventions to promote positive health outcomes among low-income households (Bourdeaux et al., 2020; Fenelon et al., 2018, 2017; Simon et al., 2017; Slopen et al., 2018). Recently, HUD has aimed to advance this body of research by supporting the linkage of HUD administrative data to nationally representative health studies, such as the National Health Interview Survey (Golden and Mirel, 2021; Lloyd et al., 2017). Such linked datasets provide researchers a unique opportunity to explore best practices for promoting positive health outcomes among families who receive federal housing assistance.

In 2018, HUD's Office of Policy Development and Research awarded a grant to the Center for Urban and Regional Studies (CURS) and the Carolina Population Center (CPC) to link HUD administrative data (1995–2017) to the National Longitudinal Study of Adolescent to Adult Health (Add Health). The research team used probabilistic linkage methods to search 70.6 million HUD administrative records for Add Health study respondents. Through both statistical and manual review, the research team ultimately identified 1,159 Add Health respondents who lived in HUD-assisted housing at some point between 1995 and 2017.

Because Add Health is a longitudinal study, the linked dataset provides a unique opportunity to explore the relationship between HUD rent assistance and health outcomes across the life course. The dataset is also complex, however, and has caveats that researchers should account for when conducting their analyses. This article highlights some of these caveats and provides practical guidance about how to address them by describing (1) the underlying data sources of the linked dataset, (2) the methods used to link these sources, and (3) analytic considerations researchers must account for when using the data.

Data Sources

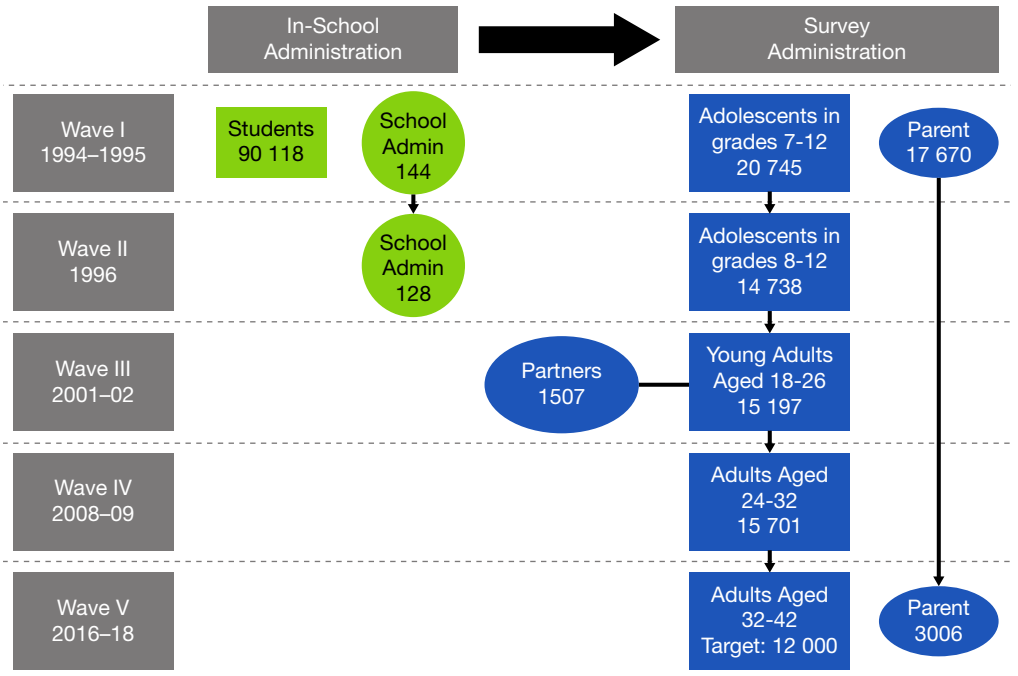
Add Health

Add Health is a cohort study that has tracked a nationally representative sample of U.S. adolescents as they age into adulthood (Harris et al., 2019). The Add Health study began in 1994–95 with the initial goal of understanding how multiple life contexts influence health and health behaviors during adolescence. In subsequent years, the study's goals expanded to include how adolescent and early adult experiences influence health and well-being outcomes in mid-adulthood.

To shed light on these topics, Add Health collects both survey data and biomarker data, such as blood samples, blood pressure, and body mass index (BMI). Add Health researchers have also linked a variety of geographic "contextual" data to respondents' data files, such as Census data on neighborhood characteristics and county-level health data. At Wave I of the Add Health study (1994–95), researchers used a multistage, stratified, school-based, cluster-sampling design to select an initial cohort of 20,745 adolescents in grades 7 to 12 who attended 132 different schools across 80 communities (Harris et al., 2019). Add Health researchers have continued to survey members of the Wave I cohort as they age into adulthood through four additional Waves of data collection: Wave II, 1996; Wave III, 2001–02; Wave IV, 2008–09; and Wave V, 2016–18 (see exhibit 1).

Exhibit 1

Add Health Study Design



Add Health = National Longitudinal Study of Adolescent to Adult Health
Source: Harris et al., 2019

HUD Administrative Data

HUD helps low-income renters and their families access affordable homes that meet basic livability standards through a variety of housing assistance programs (McCarty, Perl, and Jones, 2014). The largest programs include "Section 8" Housing Choice Vouchers (HCVs), public housing, and multifamily housing programs. Local entities that administer these programs regularly collect administrative data on program participants and their household members (Lloyd et al, 2017). Data are typically collected at two times: when a tenant initially moves into a unit and, at minimum, annually thereafter. Public housing agencies (PHAs)who participate in the Moving to Work (MTW) demonstration, however, often collect data less frequently in an effort to achieve cost efficiencies, which is a key goal of the demonstration (Webb, Frescoln, and Rohe, 2016). The data collected on program participants include a broad range of topics, such as date of data collection, Social Security numbers, household size, and income.

Since the mid-1990s, data on program participants have been uploaded to different centralized data repositories; each data upload is referred to as a "transaction record" (Lloyd et al., 2017). Prior to the early 2000s, PHAs submitted data on HCV and public housing recipients to the Multifamily Tenant Characteristics System (MTCS). After the early 2000s, PHAs submitted data to the Public and Indian Housing Information Center (PIC), which was recently updated into the Information Management System of the Public and Indian Housing Information Center (IMS/PIC). For multifamily program participants, data is uploaded to the Tenant Rental Assistance Certification System (TRACS). Data uploaded to these repositories are substantively identical across programs. To complete the HUD-Add Health data linkage, data from MTCS, PIC, and TRACS were used, as the Add Health study (1995–2018) spanned the time periods when each of these data systems was used by HUD.

Linkage Methods and Results

Research staff at the University of North Carolina's CPC used probabilistic linkage methods to search HUD administrative records (1995–2017) for Add Health respondents. The linkage identified 1,159 Add Health respondents who had received HUD rent assistance at any point between 1995 and 2017. Some of these respondents were living with a parent when they received HUD assistance (as they have transaction records before their 18th birthday), others received assistance as an adult, and some received assistance as both a child and adult. The final linked dataset includes 8,587 HUD transaction records on 1,159 unique Add Health respondents. This section describes the methods used to create the linked dataset, the structure of the linked dataset, and how it can be accessed.

Methods

CPC research staff used probabilistic linkage methods to search 70.6 million individual HUD residents (members) and household-level records to locate the Add Health respondents. Probabilistic linkage methods use multiple partial identifiers (for example, name, date of birth) to determine the probability that two people listed in disparate data sources are the same person (Winkler, 2015). To ensure valid "links," probabilistic linkage methods assign stronger "agreement

weights" to partial identifiers that are particularly unique in both data sources. For example, an uncommon last name will have more discriminatory power—that is, the ability to distinguish between two people—than a common last name and, therefore, will be assigned a more substantial agreement weight (Winkler, 2015). After assigning those weights, the overall match or linkage score is calculated as the sum of agreement weights for the full set of partial identifiers. A low score indicates a low degree of agreement across partial identifiers—thus an unlikely match—whereas a high score indicates the opposite. If the linkage score is high enough, it is assumed that partial identifiers belong to a single person.

Probabilistic methods differ from deterministic matching, which identifies matches based on exact matches of partial identifiers (for example, Social Security number + name). The research team opted not to use deterministic methods because they are difficult to implement in longitudinal studies as partial identifiers can change over time; for example, last names may change after a person marries. Further, Add Health does not collect information on reliable person identifiers (for example, Social Security numbers). Thus, the probabilistic linkage was most appropriate given the context of the Add Health study.

For this linkage, CPC research staff used Centers for Disease Control and Prevention's Link Plus (version 2.0)[2] software and eight partial identifiers: (1) first name; (2) middle name; (3) last name; (4) month of birth, (5) day of birth, (6) year of birth; (7) sex; and (8) 12-digit Federal Information Processing Standard (FIPS) code for the county of residence.[3] Prior to the linkage, the research team determined which Add Health and HUD administrative records were deemed "linkage eligible" because they were free of apparent data errors. Add Health respondents were considered linkage eligible if they had complete data for all partial identifiers. HUD administrative records were considered linkage eligible if they *did not* have the following data errors: (1) records sharing unique member IDs but having different birth dates and (2) unique member IDs that were associated with different household IDs within the same calendar year and form type. After determining linkage eligibility, the research team searched the HUD records for the 7 years in which the Add Health study was actively surveying participants. Those 7 years are significant because they are the source of the current name and 12-digit FIPS code of Add Health respondents that are used in the match; thus, the linkage implemented the most recent address—as summarized by the 12-digit FIPS code—to conduct the link. Next, the research team used unique HUD household head and member identification numbers from these matches to search for additional HUD records for these Add Health participants across the full set of 23 annual HUD administrative files (1995–2017). Rationales for these pre-linkage steps and general linkage steps are outlined in further detail in an expanded technical report (Jaramillo et al., 2022).

All Link Plus-recommended matches were subjected to two stages of review. First, all Link Plus-recommended matches were programmatically evaluated using SAS, which was previously known as the Statistical Analysis System. Recommended matches were rejected if the comparison of both first and last names yielded values exceeded 300 (as evaluated by SAS's string comparison function (i.e., "COMPGED"), which indicated the names were highly dissimilar. Further, matches were

[2] Link Plus has been successfully applied to link a variety of databases, such as hospital discharge data (Bigback et al., 2015) and vital records (Zhang et al., 2012).

[3] See Jaramillo et al., 2022 for more details.

rejected if the date of birth did not match satisfactorily; digit transposition (for example, 9/12/1977 versus 9/21/1977) or differences of one were tolerated (for example, 9/12/1977 versus 9/13/1977). Finally, matches were rejected if respondent sex disagreed. Second, all remaining records underwent manual review. Through these two stages of review, the CPC research staff rejected 142 recommended matches based on linking variables and approved 1,159 Link Plus-recommended matches. The main limitations of these steps are that (1) the decision of COMPGED thresholds and date of birth rejections were ultimately subjective and (2) rejecting matches based on sex agreement assumes HUD administrative records are accurate, which may not be the case. Due to these limitations, some accurate matches may have been wrongly rejected. Ultimately, however, the research team opted for these steps to ensure the most conservative match possible.

Variables and File Structure

The linked dataset on the 1,159 Add Health respondents is a single file that includes two general pieces of information. First, unique Add Health respondent identifiers, known as AIDs, are provided for each respondent. Researchers can use these identifiers to merge the linked dataset to all other Add Health data files, including data from each Add Health survey wave, geographic contextual data, and biomarker data. Second, the file provides key variables from household and person-level HUD transaction records (N=8,587) for the Add Health respondents.

The linked dataset is organized in a "hierarchical" or "long" format, with each row corresponding to a unique transaction record. Each row also includes several data points about that transaction record, including: (1) the year and financial quarter for the record; (2) the type of administrative form the record is based on; (3) the type of housing assistance the respondent was receiving (for example, public housing, Housing Choice Voucher); (4) the record type (for example, annual income certification, move-out certification, etc.); (5) total household members; and (6) an episode demarcation flag. A full codebook and detailed documentation for these variables are available on the Add Health user website.[4]

The episode demarcation flag is a particularly important variable. This variable allows researchers to determine whether HUD records depict a single, continuous housing assistance "episode" or two distinct episodes. An episode is a single, sustained period of time in which a linked sample member was living in a HUD-assisted unit. To determine episodes, the research team used standards that were developed to complete a similar linkage of HUD administrative data and National Center for Health Statistics (NCHS) data (Lloyd et al., 2017). These criteria are different for PHAs that participate in the MTW demonstration versus those that do not, as MTW PHAs are subject to different data reporting standards. The specific criteria are:

- Non-MTW records: if a break in transaction records was 425 days or more, those records were to represent two distinct episodes. If the break was less than 425 days, those records were considered to represent a single episode. The 425-day period is the standard because non-MTW sites must complete recertifications every 425 days (1 year plus 60 days of leeway).

[4] Link: https://addhealth.cpc.unc.edu/documentation/codebooks/

- MTW records: if a break in transaction records was 790 days or more, those records were considered to represent two distinct episodes. If the break was less than 790 days, those records were considered to represent a single episode. The 790-day period is used as the threshold because most MTW sites complete recertifications every 790 days.

Subsample Characteristics

Exhibit 2 provides unweighted descriptive statistics on the subsample of Add Health respondents in the linked dataset, but Add Health also includes sampling weights that researchers can use to compare weighted results and assess link quality. The HUD subsample is primarily composed of females (73 percent) and non-Hispanic African-Americans (59 percent). Slightly under one-half of the subsample (42 percent) first began receiving assistance as adolescents (18 or younger), and all remaining members first began receiving assistance as adults. Most HUD subsample members received HCV assistance (42 percent). A sizable proportion of respondents, however, also received some form of place-based assistance, including public housing assistance (11 percent), project-based Section 8 (18 percent), or multifamily assistance (3 percent). With these points in mind, one important insight provided by exhibit 2 is that the racial composition of Add Health respondents in the linked sample differs from the overall Add Health cohort and the overall population of HUD-assisted adults (for example, overrepresentation of women and Black or African-American households). Thus, statistical estimates from this sample may be biased toward or against certain racial and ethnic minority groups.

It is notable that a relatively large proportion of households received assistance through two or more programs, which may be attributable to two potential explanations. First, some respondents may have, in fact, received two forms of assistance. Second, over time HUD has implemented a variety of demonstration programs and policy reforms that can alter the type of assistance that households receive. For example, the HOPE VI program transitioned many households from public housing to HCV assistance, and the Rental Assistance Demonstration (RAD) allows PHAs to transition public housing units to project-based Section 8 or project-based HCV. Unfortunately, due to data confidentially concerns, the research team was unable to identify whether respondents receiving housing assistance were served by a PHA participating in such a demonstration.

Exhibit 2

Linked Subsample Characteristics Versus All HUD Householders (1 of 2)

	Linked Sample		Add Health		HUD Householders
Demographics	**N**	**%**	**N**	**%**	**%**
Female	850	73	10,480	51	70
Male	309	27	10,263	49	30
Non-Hispanic White	323	28	10,455	50	46
Non-Hispanic Black or African-American	681	59	4,320	21	45
American					
Other Race	155	13	2,424	12	8
Hispanic or Latino (all races)	76	16	3,525	17	18

Exhibit 2

Linked Subsample Characteristics Versus All HUD Householders (2 of 2)

	Linked Sample		Add Health		HUD Householders
Assistance Characteristics	**N**	**%**	**N**	**%**	**%**
Assisted as Adolescent (18 or under)	489	42	–	–	–
Assisted as Adult (18 or older)	670	58	–	–	–
Housing Choice Voucher	488	42	–	–	–
Project-Based Section 8	206	18	–	–	–
Public Housing	126	11	–	–	–
Multifamily	31	3	–	–	–
Assisted by Two or More Programs	308	27	–	–	–
Total Observations	**1,159**	**100**	**20,745**	**100**	**–**

Add Health = National Longitudinal Study of Adolescent to Adult Health

Notes: Linked sample characteristics based on Wave I (1994–95) Add Health Survey Data. Information for all HUD households only includes head-of-households and is obtained from Eggers' (2020) analysis of 2017 HUD administrative data. Tabulations for the overall Add Health sample may not perfectly match the total sample size (N=20,745) due to missing data. Percentages may not add to 100 due to rounding.

Sources: Add Health; Eggers (2020)

Access Options

Although the linked HUD-Add Health dataset excludes all personal identifiers, and the data have undergone deductive or statistical disclosure risk assessment, they are considered restricted-access data and will not be released as public-use files. Consequently, researchers interested in obtaining access to the linked data set and any other restricted-use Add Health data must apply for a restricted-use contract using the CPC Data Portal. To learn more about how to obtain a restricted-use contract, see the CPC Data Portal website.[5]

Analytic Considerations

This section highlights four analytic considerations that researchers should be aware of when using the linked dataset, including: (1) survey bias and sampling weights; (2) HUD data quality; (3) sequencing of HUD data collection and Add Health survey collection; and (4) geographic specificity. The main purpose of this discussion is to raise awareness of these considerations rather than provide specific analytic guidance, as researchers are encouraged to think carefully about how to address these considerations based on the goals of their analysis: there is no "one-size-fits-all" solution. To this end, the authors strongly encourage researchers to consult the articles and resources referenced in this section before using the dataset.

Survey Bias and Weights

Researchers should consider if three forms of survey bias may confound their analysis when using the linked HUD-Add Health dataset, including: (1) sampling bias; (2) attrition bias; and (3) missing data bias, which arises due to question non-response. With respect to sampling bias, it is

[5] Link: https://data.cpc.unc.edu/

crucially important to researchers to remember that the respondents in the linked Add Health dataset differ from the overall Add Health cohort and the overall population of HUD-assisted adults; thus, researchers must think carefully about the potential for such differences to bias their analysis (see exhibit 2). A common issue affecting school-based samples is potential bias due to the exclusion of school dropouts. High school dropouts during the 2 years of Wave I (1993–95) were eligible for selection into this study (Harris et al., 2019), however. Further, Udry and Chantala (2003) found that no problematic dropout bias existed on a host of key outcomes. It is also important to note that some school dropouts are still included in the study, as they may have dropped out after the first survey wave.

A related sampling consideration is whether researchers should use sampling weights, which adjust statistical estimates based on Add Health's sampling strategy. Add Health recommends that researchers use sampling weights if they wish to generalize their results to the overall U.S. population (Chen and Harris, 2020). Thus, weights should be used if the HUD-Add Health linked dataset is used to create a variable that, for example, aims to understand whether adolescent receipt of HUD assistance is a risk factor for health outcomes among the overall population of U.S. adolescents. Using weights on the subsample of Add Health respondents using the linked dataset, however, is more complex, as researchers may need to adjust these sampling weights given subpopulation characteristics. Researchers should consult Chen and Harris (2020) for more information about the Add Health sampling weights and how they can potentially be adjusted for sub-sample population analysis.

Like all longitudinal surveys, attrition is a potential issue. Harris et al. (2019) summarizes previous evaluations of attrition bias across Add Health study waves and finds that attrition is lower among "female, younger, higher socioeconomic status, urban, native-born, and White respondents at Wave III and IV" (Harris et al., 2019: 1415b). Although there are clear attrition patterns, attrition bias is "minimal" (Harris, 2019). That noted, a caveat of the Add Health data is that respondents may participate in some, but not all, waves of the study; for example, respondents may participate in Wave I and IV, but not Wave III. This issue can complicate the longitudinal analysis of the Add Health data and should be considered by researchers.

Finally, data missingness is also a potential source of bias, as respondents may not answer all survey questions. In such instances, it is important for researchers to determine whether there are systematic differences between respondents with missing and complete data, as systematic differences between these groups can introduce bias (Bhaskaran and Smeeth, 2014). Because the Add Health study collects a vast body of data, there is no single study that explores the issue of data missingness among respondents. Numerous articles provide practical insight into how researchers can assess and address bias due to missing data, however, and we encourage researchers to use these resources.

HUD Data Quality

The U.S. Government Accountability Office (GAO) and HUD's Office of the Inspector General (OIG) have identified data quality issues associated with MTCS, PIC, and TRACS data used to complete this linkage (Lloyd et al., 2017). Some major errors of the MTCS data, as identified by GAO and

OIG reports, included missing addresses, names, or Social Security numbers. Those omissions are considered "fatal" because it is virtually impossible to accurately identify a person without those variables, and it affects an average of 7 percent of data fields. Other reports have further found that HUD did not have sufficient data collection or management controls in place during the early 2000s. Specifically, at that time, the PIC system did not ensure that Social Security information was accurately collected, although this information was not used in this linkage. Not only did the system allow for the submission of incomplete or inaccurate Social Security numbers, but it also did not require the use of a common format (for example, 123-45-6789 versus 123456789).

These data-quality limitations are important because they may have prevented accurate cross-identification of people who resided in HUD-assisted housing *and* participated in the Add Health study. The risk is noteworthy because Add Health participants were adolescents during roughly the same period of time when HUD data were arguably the least reliable. That noted, HUD undertook several actions to improve data quality during the 2000s, and those efforts have greatly improved the accuracy and completeness of HUD data. Nonetheless, it is important for researchers to keep in mind that the linked dataset is based on administrative records subject to data quality issues.

Sequencing

The sequencing of when HUD administrative records were collected versus when the Add Health interview took place may be important to some researchers, particularly when researchers aim to draw conclusions about the linked subsample life circumstances while living in HUD-assisted housing. Each Add Health data record includes an interview date—that is, when that data was collected. Researchers can use this interview date in tandem with HUD transaction record dates to determine whether a given linked sample member was living in HUD-assisted housing at the time of the Add Health survey. The research team consulted with HUD to determine a general guideline for determining "concurrence" and decided on the following standard: if an Add Health respondent had a transaction record for the same year and quarter when they responded to an Add Health survey, it could be assumed that those respondents were living in HUD-assisted housing at the time of their Add Health interview.

Geographic Specificity

Add Health collects extremely sensitive data on respondents, such as their exposure to sexual abuse, use of illegal drugs, and even their genetic information. Consequently, Add Health maintains strict data confidentiality and deductive disclosure protocols to ensure that Add Health respondents cannot be identified based on their survey data. One such protocol is to anonymize the specific communities and states where respondents live: researchers can only determine the Census region (for example, Midwest, South) where respondents live. To address this issue, Add Health provides a variety of geographic contextual data (for example, neighborhood census data, county health data) with pseudo-GEOIDs and geographical relationship files, the latter of which can help researchers identify whether respondents live in a common neighborhood or metropolitan area.

Conclusion

The linked HUD-Add Health dataset provides a unique opportunity to explore the health and well-being outcomes of a subsample of low-income adolescents (N=1,159), now adults, who received federal housing assistance between 1995 and 2018. Researchers should account for a variety of analytic considerations when using this dataset, however, including (1) survey bias and sampling weights; (2) HUD data quality issues; (3) the sequencing of HUD data collection and Add Health survey collection; and (4) geographic specificity. This article provides a high-level overview of these analytic considerations, but we encourage researchers to consult the resources cited in this article to gain a better understanding of how to use the linked HUD-Add Health dataset appropriately. The authors also encourage researchers to consult the Add Health user website to obtain further information about how to access and analyze this dataset.

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Geospatial Processing Tools to Enhance Longitudinal Employer-Household Dynamics Commute Data

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The views expressed in this article are those of the authors and do not represent the official positions or policies of the East-West Gateway Council of Governments.

Abstract

This article introduces ETURAS, a suite of software tools designed to analyze commute patterns using Longitudinal Employer-Household Dynamics (LEHD) data. LEHD offers detailed information on workforce housing patterns, job locations, and transportation connections between home and work. ETURAS enhances the analysis of changing commute patterns by linking LEHD to road network files, allowing estimates of commute distance. ETURAS also offers visualization tools, including the generation of dot density maps showing changes in the place of work for residents of any user-defined geography (UDG) and changes in the place of residence for workers in any UDG. This article will demonstrate ETURAS's output using two analysis areas as examples. Case studies offer two main conclusions: (1) ETURAS enhances the ability of planners to analyze locational affordability and balancing jobs and housing; and (2) although LEHD is a powerful tool for analyzing commute patterns, it is necessary to validate LEHD using other data sources and local knowledge.

Introduction

Detailed information about commute patterns is useful in various planning-related fields, including transportation, community development, and housing. Because it offers Origin-Destination (OD) data at a block level, the Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics (LODES) data set (U.S. Census, 2019a) is used by a growing number of planning agencies (NYC Planning, 2019; Schroeder, 2017). Housing analysts use LODES to analyze the balance between housing and jobs, with an aim toward identifying places in need of additional workforce housing (Benner and Karner, 2016; Kneebone and Holmes, 2015). In addition, the

recently passed Infrastructure Investment and Jobs Act authorizes Metropolitan Planning Organizations (MPOs) to "develop regional goals for the integration of housing, transportation, and economic development strategies to better connect housing and employment while mitigating commuting times."[1] An understanding of commute patterns is useful for developing strategies to connect housing and employment.

The Longitudinal Employer-Household Dynamics (LEHD) provides OnTheMap (U.S. Census, 2022), an online tool that is useful for analyzing LODES and downloading the analysis results and data. Two key features of OnTheMap are (1) the ability to upload a shapefile of any user-defined geography (UDG) and (2) the Distance/Direction analysis.

For example, using OnTheMap, an analyst could upload a shapefile of a local residential development area and then run the Distance/Direction analysis to calculate the number of jobs that are within 10 miles, 10–24 miles, 25–50 miles, and more than 50 miles away. To generate a histogram of commute distances (for example, at 1-mile increments), however, more granular commute data are required than what are available with OnTheMap. In addition, even if that level of detail were present, the analysis would have to be repeated for each UDG.

The analyses in this article require numerous outputs, including a plot of the commute distance distribution for a significant number of UDGs. For this use, OnTheMap and the base LODES data are limited by two factors: (1) LODES data do not provide driving distances between two points and cannot be used to calculate changes in commute distances accurately, and (2) in a medium-sized region, there can be several million unique worker commute routes grouped into a number of different UDGs.

Staff at the East-West Gateway Council of Governments (EWG), the MPO for the St. Louis region, developed the ETURAS software toolkit to address these challenges. Using software tools and custom script, the authors added spatial attributes to calculate commute distance and visualize changes in commuter flow at any spatial extent, whether or not it is a U.S. Census-defined geography. In addition, because the aggregation process is automated, the size and number of the UDG are limited only by the workstation's processing power. EWG is making ETURAS available in the hope that it will be of use to the LODES user community.

Following is a high-level description of the data and methods used to create ETURAS, including examples of ETURAS output.[2]

Analyses using ETURAS were conducted in the St. Louis region, which is served by EWG. Exhibit 1 shows the eight-county region, consisting of five counties in Missouri and three in Illinois. A key motivation for ETURAS is the desire to generate maps and other visualizations for UDGs. As the authors use the term, a UDG can be any area defined by a polygon, whether a single polygon of interest or a set of polygons such as ZIP Codes or census tracts that cover an entire region. For this analysis, the region was divided into 36 Analysis Areas (AA) (see exhibit 1). Using ETURAS, a

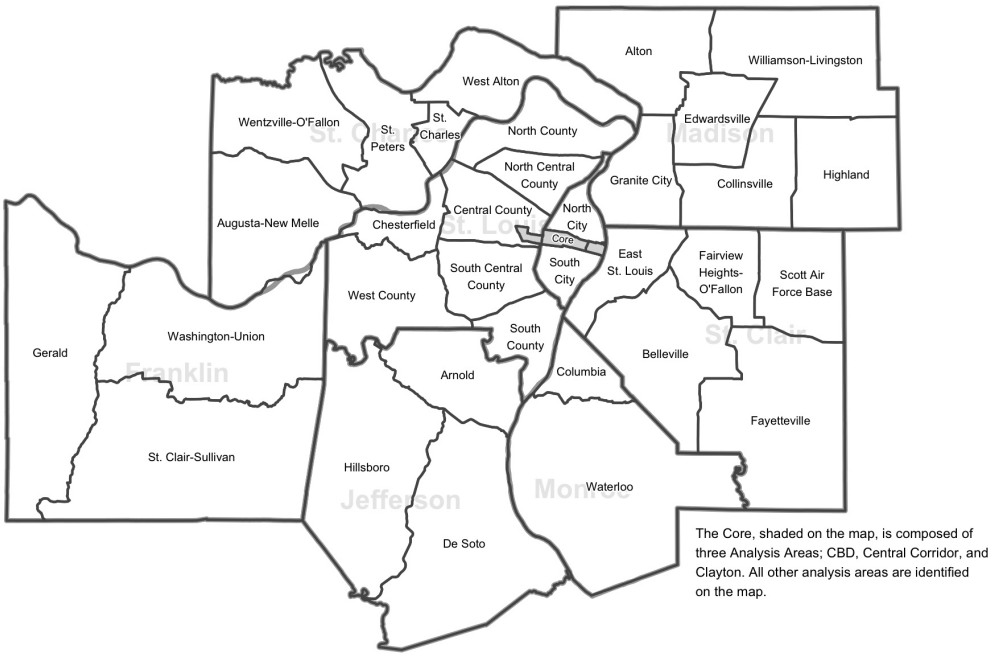
[1] *Infrastructure Investment and Jobs Act.* P.L.: 117-58 (11/15/2021). https://www.congress.gov/bill/117th-congress/house-bill/3684

[2] The complete set of scripts, data model, and technical documentation are available at https://www.ewgateway.org/eturas.

single script generates OD maps showing the place of work (POW) for residents and the place of residence (POR) for workers for each polygon in the UDG.

Exhibit 1

East-West Gateway Council of Governments Region in the City of St. Louis and Seven Surrounding Counties



CBD = central business district.
Sources: East-West Gateway Council of Governments; U.S. Census Bureau

Software Toolkit

LEHD / LODES

The U.S. Census Bureau created the LEHD program to develop information about employers and workers across the country. Through their partnership with the states, the U.S. Census leverages administrative data, employer data, and wage data, along with Census person data and other federal administrative datasets. The LEHD program provides five core products from this source data, but this analysis will focus on LODES.

The LODES dataset contains three core tables: (1) Origin-Destination (OD), (2) Residence Area Characteristics (RAC), and (3) Workplace Area Characteristics (WAC). The OD table contains job totals for unique worker residence-to-workplace commutes. The RAC table adds the North American Industry Classification System (NAICS) sector and worker demographics. The WAC table adds information about the employment firm. These tables are organized by year, state, and job type and are keyed at the block level.

Of these three tables, the primary focus was the OD table. Each row of the OD table contains a unique residence-to-workplace commute along with the total number of workers for that commute. In addition, each row includes limited information on worker age, earnings, and industry. The data are keyed to the year, which allows for year-to-year comparisons of commutes.

Objectives

The ETURAS software toolkit was designed with two key objectives in mind.

1. Subdivide a region by any boundary, whether that boundary was a U.S. Census-defined geography or not, and perform statistical analysis on worker commutes within that boundary. Although OnTheMap provides the ability to upload a boundary saved as a shapefile, ETURAS simplifies the process by accessing LODES locally and quickly processing a large number of boundaries through automation. Furthermore, using ETURAS, commutes can be aggregated and the aggregates then compared to illustrate a change in commuter flow over time.

2. Identify the distance of every commute, which is not possible with OnTheMap. Commute length is an important contributor to planning outcomes such as transportation costs, Vehicle Miles of Travel (VMT), and emissions. LODES only contains the origin and destination points, however, and not the commute route or distance. Although it would be simple to compute great-circle distance (as the crow flies) from origin to destination based on centroid coordinates, this distance bears only a tenuous relationship to actual driving distance. Therefore, ETURAS programmatically links the commutes to the road network and calculates the route distance.

In addition, ETURAS can be extended. Several example R scripts are included to demonstrate the range of analyses enabled by ETURAS. Example output includes a change in place of work or place of residence maps, origin-destination matrices showing commuter flow between any set of analysis areas, and commute distance distribution plots, among others.

Data Sources

The data sources used in this analysis were LEHD/LODES, Census Topologically Integrated Geographic Encoding and Referencing (TIGER) files, OpenStreetMap (OSM)/Geofabrik, and a UDG.

- **LODES:** LODES data are separated into Comma Separated Values (CSV) files, grouped principally by year, state, and job type. Data files for Illinois and Missouri were downloaded for the years 2010 and 2019 and loaded into three database entities: (1) commute, (2) residence, and (3) workplace. In addition, the LODES Crosswalk tables were downloaded and inserted into the database to link LODES to U.S. Census-defined geographies.

- **TIGER:** TIGER shapefiles (U.S. Census, 2021) are extracts from the U.S. Census Bureau's Master Address File and include polygon boundaries and line and point features for the United States. Boundary shapefiles for counties, tracts, block groups, and blocks were downloaded and loaded into the database to spatially filter and aggregate the LODES data.

- **OSM:** OSM is an initiative supported by the not-for-profit organization OpenStreetMap Foundation to provide crowdsourced road network data. Network files for Illinois and Missouri were downloaded from Geofabrik (Geofabrik, 2021), which extracts and shares OSM data for various geographies.
- **UDG:** This source can be any boundary layer of interest. At EWG, AAs were defined using economic and demographic data to analyze development trends.

Software Requirements

The tools used for this analysis are open source and freely available to planning organizations of any size. Although a degree of internal expertise with scripting languages and database management will be required, the authors hope that this article will be useful as a guide for preparing the analysis environment. Links to all the tools are listed in the appendix.

Scripting and Query Tools

A working knowledge of the following languages is required to modify the scripts and queries.

- R is a scripting language widely used for statistical computing that supports an active ecosystem of third-party extensions. Each automated step was coded in R script because of its simple syntax and bias toward working with datasets.
- Structured Query Language (SQL) is a standard database query language. Statements were written to join, filter, and aggregate the data.

Data Processing Tools

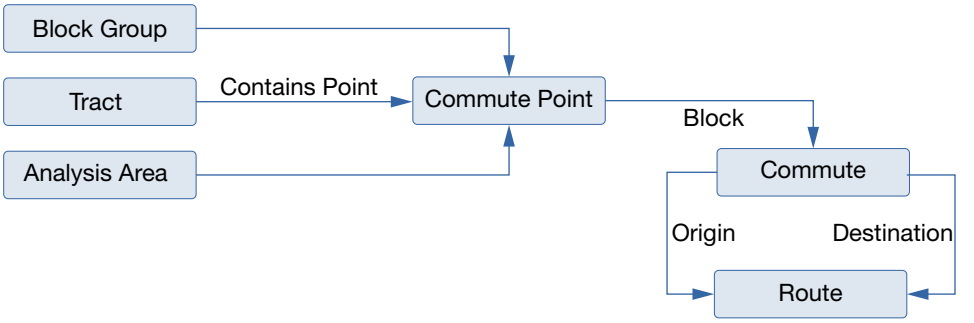
The following tools are required to create the data model and populate the database.

- PostgreSQL is an enterprise-grade database server capable of processing terabytes of data. PostGIS is an extension to PostgreSQL that adds functions to perform spatial operations on geographic data. Popular mapping tools such as ArcGIS and the open-source QGIS can directly access a PostgreSQL/PostGIS database.
- Open Source Routing Machine (OSRM) is used to calculate street routes between points. Using the OSM road network data, the distance traveled was calculated for each commute.

Loading the Data

Exhibit 2

Data Model



Source: East-West Gateway Council of Governments

Adding Spatial Attributes to Commutes

LODES data are keyed on block and include longitude and latitude values for each block. Using the internal points, each commute was processed in PostGIS and the location saved to the database; shown as "Commute Point" in exhibit 2.[3]

Calculating Distance

In the EWG study area, there are several million unique routes in the LODES data. To process that volume of data, OSRM was configured and populated with the OSM road network for Illinois and Missouri. Using the Multi-Level Dijkstra[4] algorithm to compute the route, OSRM calculated the commute distance, which was subsequently stored to the database (shown as "Route" in exhibit 2).[5] Although the OSRM server supports profiles for car, bicycle, and walk modes of transportation, only car routes were calculated for this analysis.

Using ETURAS

Geographic Extent

There are two defining boundaries for the analysis: (1) the EWG region and (2) the study area.

The EWG region is the city of St. Louis and the seven surrounding counties. The independent city of St. Louis is considered a county-level jurisdiction under Missouri law (see exhibit 1).

The study area is the St. Louis, MO-IL Metropolitan Statistical Area (MSA) and the collar counties.

[3] See https://www.ewgateway.org/eturas for SQL statements.

[4] Multi-Level Dijkstra is an algorithm for solving the shortest path problem.

[5] See https://cran.r-project.org/web/packages/osrm/index.html for the R package used to call OSRM.

Visualizing the Data

ETURAS is a foundation that supports a variety of ways to explore commute patterns. In this section, the authors present two possible workflows, and in the Findings, they describe two analyses in the St. Louis region based on these workflows.

Change of Residence for Workers by Workplace Location

Because each endpoint of the commute route is geographically coded, commutes can be selected for any residence or workplace location. For this workflow, residence is any point in the region, and workplace is any point contained within the UDG.

All commutes with a workplace in the UDG are selected to calculate the baseline year. Next, the number of workers is summed for each of those commutes from each residential area. Then these two steps are repeated for each UDG in the region, resulting in a table of residence subtotals grouped by workplace UDG.

The process is then repeated for the comparison year.

The change of residence can then be calculated by comparing the residence subtotals for each year with each UDG.

The EWG analysis based on this workflow is detailed in the Findings section.[6]

Distance Distribution of Worker Commutes by Residence Location

Because the route for each commute has been calculated, the distance workers travel can be determined for any location. For this workflow, residence is any point contained within the UDG.

First, all commutes with a residence in the UDG are selected for a given year. Then, the histogram is computed using the distance from each of those commutes. Finally, those two steps are repeated for each UDG.

That process can be repeated for any number of years.

R was used to compute the histogram in the EWG analysis detailed in the Findings section.[7]

Additional Workflows

Because ETURAS extends commute data with geographic location and distance, several other workflows and calculations are possible, including changes in aggregate driving distance and VMT. Furthermore, any of the workflows can be run for any UDG or for the entire region.

Findings

Using the 36 AAs as the UDG, the major outputs using ETURAS are a set of maps showing the POW for the residents of the AA and the POR for the people who work in the AA.

[6] See https://www.ewgateway.org/eturas for example code.

[7] Ibid.

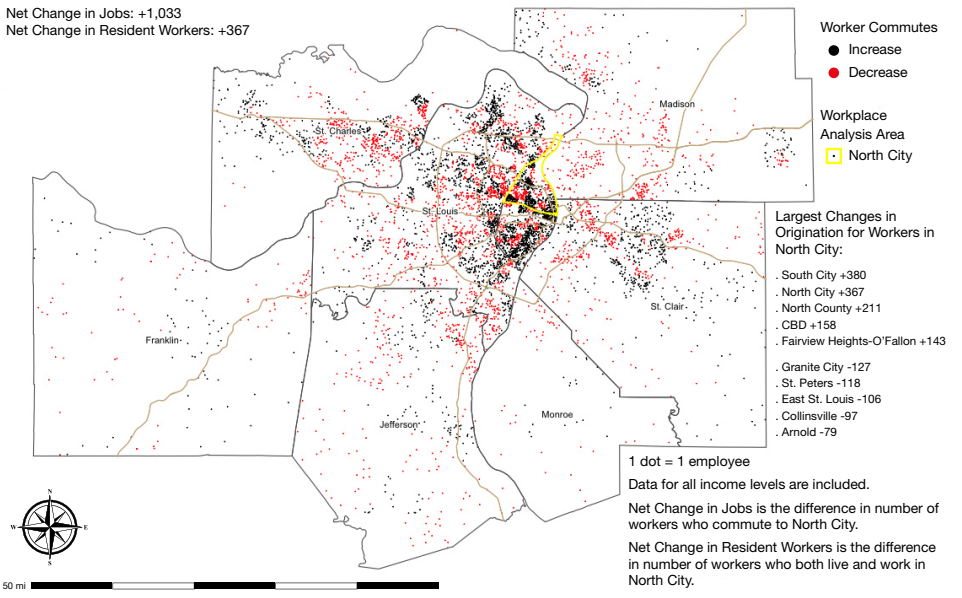
For the 36 AAs, this output represents 72 maps, all generated by a single script. ETURAS also generates change maps for both POR and POW. For example, a POW change map for a given AA uses black dots to show areas where an increasing number of AA residents work and red dots to show areas where a decreasing number are employed. Following are two examples of analyses conducted at the AA level. The first example shows a set of ETURAS outputs that show connections between housing and employment for people who either live or work in the North City AA.

With a population that is 95 percent African-American (U.S. Census, 2020) and a poverty rate nearly triple the regional average (U.S. Census, 2019b), North City is a key area for Environmental Justice (EJ) analysis.[8] Exhibit 3 shows POR for people employed in North City. From 2010 to 2019, the number of jobs in North City increased by 1,033. The AA has drawn increasing numbers of workers from portions of North City, South City, and North County, with decreasing flows from Granite City and St. Peters.

Exhibit 4 shows areas with increases in commute trips from North City. The number of employed residents of North City increased by 367 from 2010 to 2019. The most significant increases in employment opportunities were seen in Central County, South Central County, and North Central County. These increases suggest that there may be a need for additional study of connectivity needs between North City and these areas.

Exhibit 3

Change in Place of Residence for Commuters Who Work in North City from 2010 to 2019

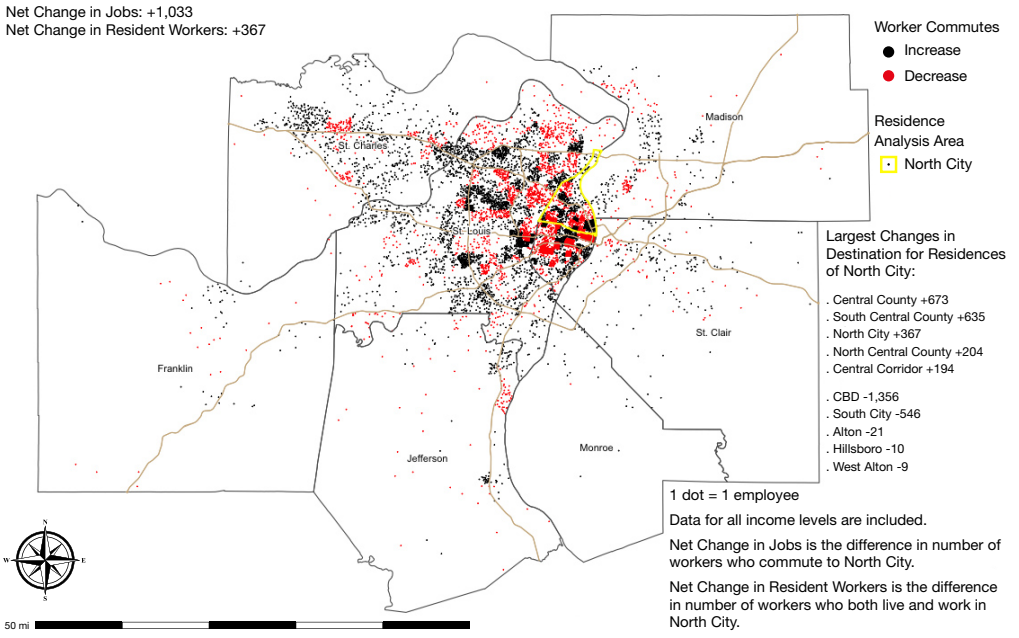


CBD = central business district.
Sources: East-West Gateway Council of Governments; Longitudinal Employer-Household Dynamics (LEHD) 2010 and 2019—U.S. Census Bureau; Topologically Integrated Geographic Encoding and Referencing (TIGER)—U.S. Census Bureau

[8] Executive Order 12898 of February 16, 1994, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Fed Reg 59, FR7629. https://www.epa.gov/laws-regulations/summary-executive-order-12898-federal-actions-address-environmental-justice

Exhibit 4

Change in Place of Work for Commuters Who Live in North City from 2010 to 2019



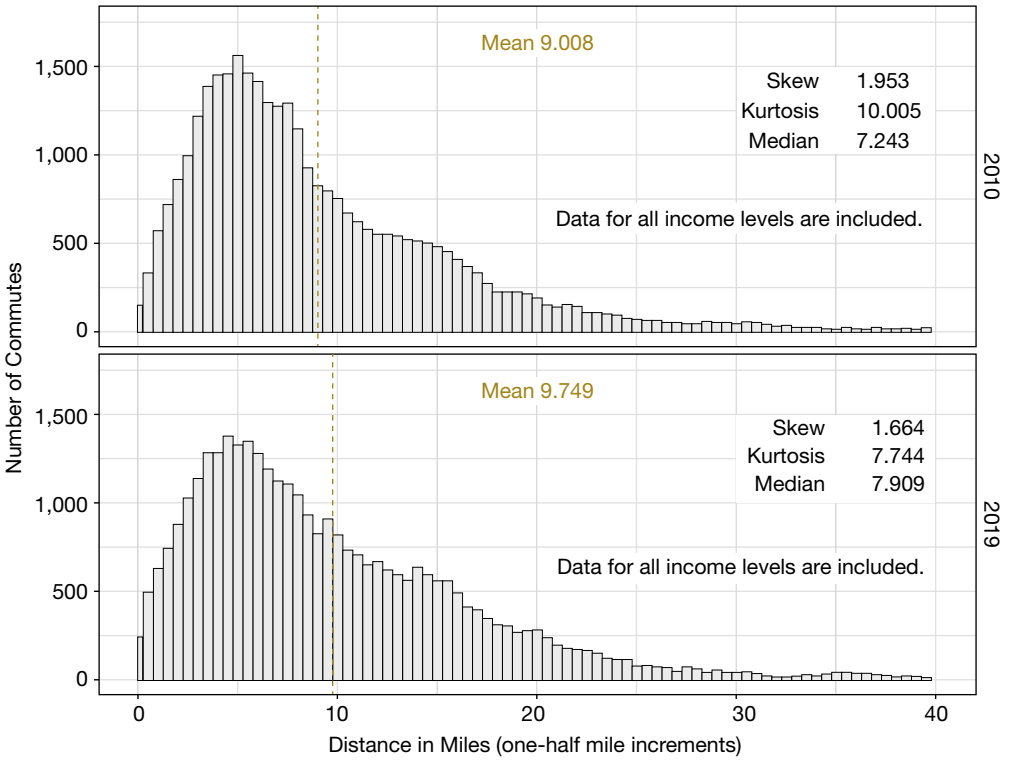
CBD = central business district.

Sources: East-West Gateway Council of Governments; Longitudinal Employer-Household Dynamics (LEHD) 2010 and 2019—U.S. Census Bureau; Topologically Integrated Geographic Encoding and Referencing (TIGER)—U.S. Census Bureau

Exhibit 5 shows the distribution of commute distances for workers who live in North City for the years 2010 and 2019. The distributions show the number of workers in each year by commute distance, in one-half mile increments. The mean travel distance for employed residents increased from 9.01 to 9.75 miles, an increase of 8.2 percent. In addition, ETURAS extensions scripted in R revealed that the percentage of commuters from North City who travel more than 10 miles to work increased from 33 percent in 2010 to 39 percent in 2019. These findings are consistent with research documenting increasing commute distances in recent decades (Barnes, 2007; Hu and Wang, 2016), with residents of EJ areas subject to longer commutes (Gottlieb and Lentnek, 2001).

Exhibit 5

Commute Distance Distribution for Commuters Who Live in North City, 2010 and 2019



Sources: Longitudinal Employer-Household Dynamics (LEHD) 2010 and 2019—U.S. Census Bureau; Open Source Routing Machine with OpenStreetMap data—https://github.com/Project-OSRM; East-West Gateway Council of Governments

ETURAS generated 36 x 36 OD matrices for 2010 and 2019, as well as a change matrix. Exhibit 6 shows a portion of the change matrix, with AAs from the city of St. Louis and surrounding St. Louis County. Column titles show AA names by place of residence. Names at the left show AAs by place of work. The first row shows the change in place of residence for people who work in the central business district (CBD). ETURAS reports that the number of people who both live and work in the CBD grew by 288, whereas the number commuting from North City to CBD decreased by 1,356.

Exhibit 6

Worker Change Matrix—Place of Residence by Place of Work from 2010 to 2019

		Place of Residence											
	Analysis Area	CBD	Central Corridor	Central County	Chester-field	Clayton	North Central County	North City	North County	South Central County	South City	South County	West County
Place of Work	CBD	288	-178	-709	-201	9	-1,129	-1,356	-881	-649	-2,468	-1,020	-800
	Central Corridor	223	621	999	267	164	707	194	1,165	1,307	1,515	964	665
	Central County	255	467	674	-229	222	351	673	1,504	364	2,218	846	-236
	Chesterfield	51	109	797	478	53	238	128	380	430	356	344	568
	Clayton	60	34	274	104	130	-99	19	-112	112	363	51	160
	North Central County	219	292	1,612	356	183	937	204	1,417	916	784	504	633
	North City	158	54	52	-11	37	51	367	211	49	380	62	-6
	North County	45	25	80	-182	-5	645	130	-174	-141	87	-140	10
	South Central County	239	226	1,513	249	195	879	635	837	1,452	1,561	1,462	1,247
	South City	123	-16	-242	-53	37	-310	-546	-91	-989	-970	-515	-374
	South County	70	32	-27	-126	19	60	173	6	-282	128	-659	-332
	West County	27	26	-45	-39	-8	78	80	94	158	44	302	186

CBD = central business district.

Sources: East-West Gateway Council of Governments; Longitudinal Employer-Household Dynamics (LEHD) 2010 and 2019—U.S. Census Bureau

The significance of the findings for the North City AA lies in implications for locational affordability. In recent years there has been a growing awareness that the total cost of living in a housing unit must include transportation costs. This finding is reflected in the Location Affordability Index (LAI) (HUD, 2019) and the Housing Plus Transportation (H+T) Index (Center for Neighborhood Technology, 2021). Commute distance is one determinant of transportation costs. The analysis enabled by ETURAS shows that in a low-income and predominantly African-American community, the average commute distance has risen in the past decade. Thus, ETURAS can be used to monitor a key component of locational affordability for households residing in EJ Areas.

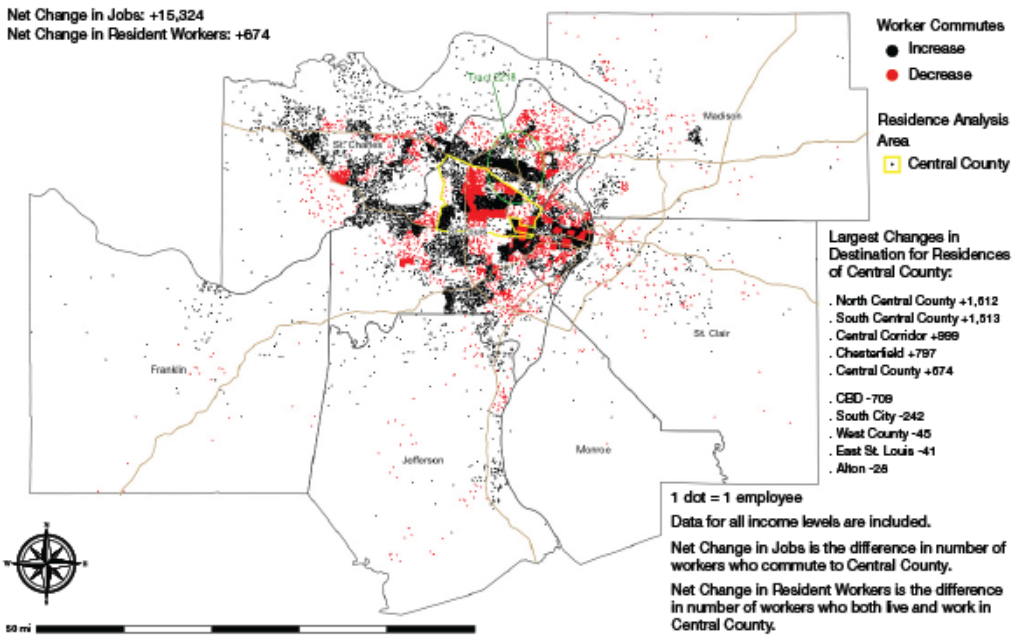
A second AA-level analysis using ETURAS is shown in exhibits 7 and 8.

Exhibit 7 shows a map that prompted additional scrutiny of a large and sudden change reported by LODES. This map shows that residents of the Central County AA had an increase of more than 1,000 commutes to a single tract, 2218. Further analysis showed that this tract was reported in LODES to have an increase in manufacturing employment of more than 11,000, from 664 to 11,104. A change this large would be significant even at the county level. Therefore, EWG staff pivoted to a county-level analysis to compare manufacturing employment as reported by LODES, the U.S. Bureau of Economic Analysis (2020), and the Quarterly Census of Employment and Wages

(U.S. Bureau of Labor Statistics, 2021). Results are shown in exhibit 8. Before 2015, LODES reported significantly lower manufacturing employment in St. Louis County than did either the Bureau of Economic Analysis (BEA) or the Bureau of Labor Statistics (BLS). LODES showed a sudden increase in manufacturing employment from 2015 to 2016, after which LEHD was reasonably consistent with the other sources. EWG staff concluded that a possible explanation for the sudden shift is that LODES was undercounting manufacturing employment prior to 2016 and corrected the issue after 2015. This variance led EWG staff to conclude that only a low level of confidence can be placed on the magnitude of increase in worker flow from Central County to Tract 2218. Thus, ETURAS can help identify changes in worker flow reported by LODES that warrant further scrutiny and validation using local knowledge.

Exhibit 7

Change in Place of Work for Commuters Who Live in Central County, 2010 to 2019

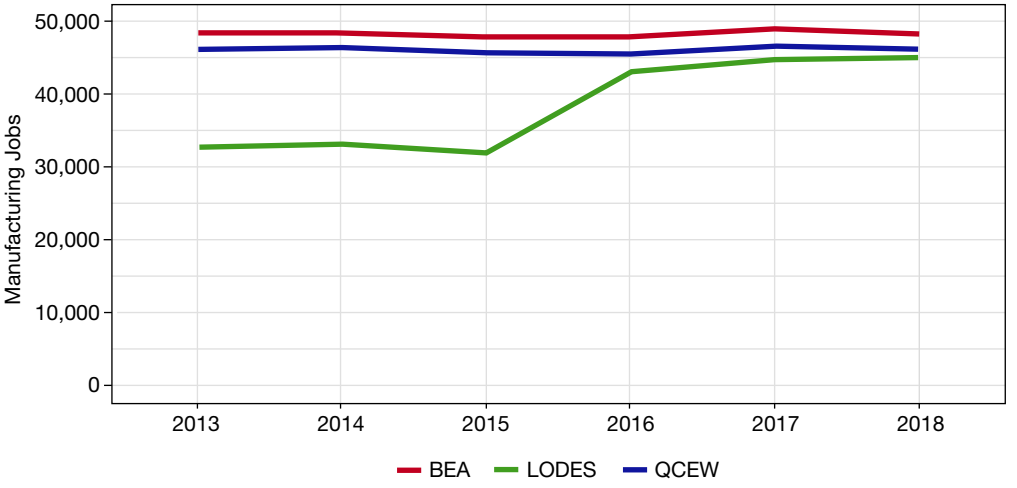


CBD = central business district.

Sources: East-West Gateway Council of Governments, Longitudinal Employer-Household Dynamics (LEHD) 2010 and 2019—U.S. Census Bureau; Topologically Integrated Geographic Encoding and Referencing (TIGER)—U.S. Census Bureau

Exhibit 8

Manufacturing Employment in St. Louis County



BEA = Bureau of Economic Analysis. LODES = Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics. QCEW = Quarterly Census of Employment and Wages.

Sources: Bureau of Economic Analysis—U.S. Department of Commerce; LEHD Origin-Destination Employment Statistics—Longitudinal Employer-Household Dynamics—U.S. Census Bureau; Quarterly Census of Employment and Wages—U.S. Bureau of Labor Statistics

Conclusions

The EWG staff have found ETURAS useful for analyzing changes in commute patterns in the St. Louis region. The authors hope that it will be useful to other LEHD/LODES users.[9]

ETURAS is a work in progress. There are two improvements planned for the future: (1) given the importance of validating trends reported in LODES, automate county-level comparisons between the LODES WAC file and both BLS and BEA datasets, as well as ZIP Code-level comparisons with ZIP Business Patterns. This comparison will help identify anomalous results that warrant further investigation. (2) Research the feasibility of creating a transit profile for the OSRM server. The OSRM server includes profiles for car, bicycle, and walking transportation modes. User-defined profiles can be added to the server, however, and a transit profile would be useful for analyzing a large urban area.

This article illustrated the use of ETURAS in analyzing changing commute patterns for North City, an AA with a large EJ population. The analysis showed increasing commute times for employed residents and highlighted several employment centers in the region that are attracting an increasing number of workers from North City.

The analysis also indicated increases in average commute distance for residents of North City. This increase suggests that the transportation component of locational affordability is trending in a direction that makes total H+T costs less affordable for many workers who reside in North City.

[9] To access ETURAS, visit the following link: https://www.ewgateway.org/eturas.

ETURAS also helped EWG staff to uncover a significant discrepancy between LODES and other publicly available sources, resulting in low levels of confidence in one change reported by LODES. This variance highlights the importance of validating LODES with other public sources and local knowledge before basing decisions on this information.

This finding is especially relevant because the U.S. Census Bureau has proposed using LODES to delineate Urban Areas, which would affect eligibility for federal funding (U.S. Census, 2021). It is to be hoped that the Census Bureau allows an appeals process by which local officials can challenge LODES results that they believe may be spurious.

Finally, as noted previously, federal law now authorizes MPOs to develop strategies to link housing, employment, and economic development. The authors hope that some MPOs will find the tools described in this article helpful in fulfilling this function.

Appendix: Software Tools

Eclipse: https://www.eclipse.org

OSRM Backend Source and Docker Container: https://github.com/Project-OSRM/osrm-backend

PostgreSQL: https://www.postgresql.org

PostgreSQL add-on PostGIS: https://www.postgis.net

R: https://www.r-project.org

R Package OSRM: https://cran.r-project.org/web/packages/osrm/index.html

Authors

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Additional Reading

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Graphic Detail

Geographic Information Systems (GIS) organize and clarify the patterns of human activities on the Earth's surface and their interaction with each other. GIS data, in the form of maps, can quickly and powerfully convey relationships to policymakers and the public. This department of Cityscape includes maps that convey important housing or community development policy issues or solutions. If you have made such a map and are willing to share it in a future issue of Cityscape, please contact alexander.m.din@hud.gov.

Tree Equity Scores and Housing Choice Voucher Neighborhoods

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The views expressed in this article are those of the authors and do not represent the official positions or policies of the Office of Policy Development and Research, the U.S. Department of Housing and Urban Development, or the U.S. Government.

Abstract

Urban greenery has considerable advantages to populations, particularly mental and physical health benefits. Tree canopy in urban areas is linked to reductions in surface temperature, reductions in chronic illnesses, improvements in air quality, and more. A new dataset, the Tree Equity Score, is a metric that describes the intersection between urban tree canopy cover and socioeconomic factors. This analysis examines Tree Equity Scores in six cities chosen on the basis of their participation in the C40 Cities Climate Leadership Group, then evaluates if differences exist between neighborhoods where Housing Choice Voucher households are present and neighborhoods where they are absent. In five of six cities, Tree Equity Scores are higher in neighborhoods where Housing Choice Voucher households are absent.

Background

Co-benefits of urban greenery[1] have been associated with greater physical and mental well-being, ecosystem services, social support, and even economic opportunities (Beyer et al., 2014; Bowler et al., 2010; Maas et al., 2006). Those benefits often are realized locally but distributed unequally, spurring environmental justice conversations about the need for more equitable green planning. Housing Choice Voucher (HCV) households frequently live in low-opportunity neighborhoods, and previous studies have shown that lower-income neighborhoods tend to have less greenery than higher-income neighborhoods (Locke et al., 2021). The purpose of this analysis is to further explore the relationship between HCV presence in block groups and Tree Equity Scores (TES).

Data

The HCV program subsidizes housing for more than 2.2 million low-income households (HUD, n.d.). HCV households have the potential to choose their own rental location but often remain spatially concentrated, particularly in areas of poverty and low opportunity (McClure, Schwartz, and Taghavi, 2015). HCV households are present in 72.7 percent–82.2 percent of block groups in the six cities included in this analysis, reflecting findings in previous HCV location research (Devine et al., 2003; McClure, Schwartz, and Taghavi, 2015).

The TES was released in November 2020 by American Forests[2] to identify neighborhoods that have sufficient (or insufficient) tree coverage to ensure that neighborhoods equitably experience the benefits of green space (American Forests, n.d.). The TES incorporates environmental data such as existing tree canopy and surface temperature along with socioeconomic data into its formula.[3] Tree Equity Scores are adjusted by American Forests in each city to account for local biomes.

This study analyzed HCV and TES data in Boston, Los Angeles, New York City, Portland (Oregon), Seattle, and Washington, D.C. These six cities were chosen because they have chosen to participate in the C40 Cities Climate Leadership Group (C40), an initiative for cities committed to tackling climate change and driving urban action that improves the health, well-being, and economic opportunities of urban citizens (C40 Cities, n.d.). These cities have committed to inclusive climate action goals set forth by the Paris Agreement.[4] Because of those commitments, the authors believe that analysis of low-income rental subsidized households and urban green equity is particularly relevant.

Analysis

Exhibit 1 visualizes the distribution of TES values for each city, delineated by the presence of HCV households in the block group as box and whisker plots. Outliers are shown as dots outside the whiskers. Values for the TES skew toward a score of 100 because this score represents "acceptable"

[1] *Urban greenery* is defined by the U.S. Environmental Protection Agency as "all vegetated land, including agriculture, lawns, forests, wetlands, and gardens. Barren land and impervious surfaces such as concrete and asphalt are excluded."

[2] American Forests, founded in 1875, is the oldest nonprofit environmental conservation organization in the United States.

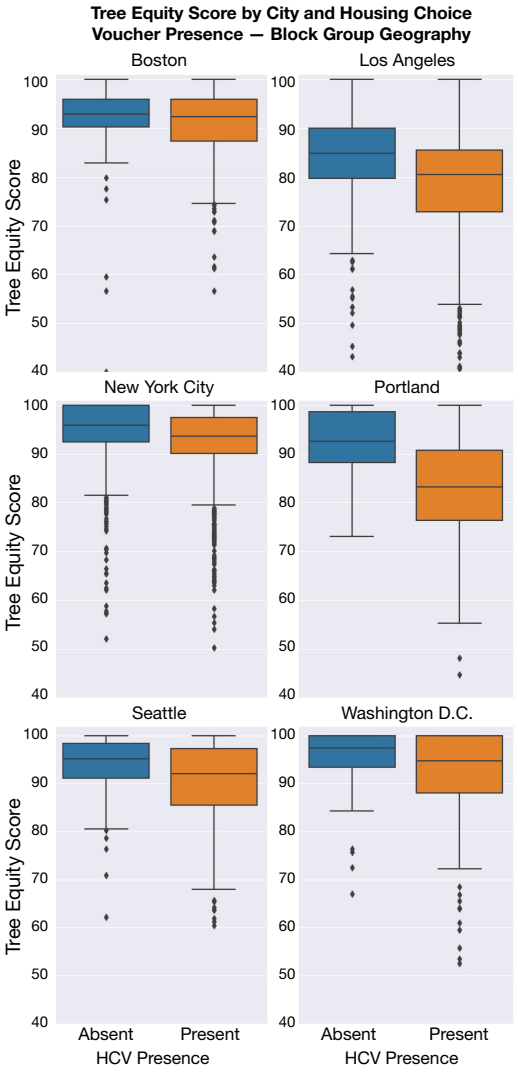
[3] The socioeconomic data include income, employment, race, age, climate, health, existing tree canopy, surface temperature, and population density.

[4] C40 Cities commit to limiting global temperatures to 1.5 degrees Celsius above preindustrial levels.

tree equity. The TES formula does not produce a "perfect" tree equity score; therefore, a wide range between tree equity scores is not as apparent. All cities had lower TES values in their HCV-present block groups than HCV-absent block groups, suggesting that HCV neighborhoods tend to have lower mean TES and higher variance in TES than non-HCV neighborhoods. Los Angeles had the lowest median TES in HCV-present and HCV-absent neighborhoods. Boston showed a minimal difference (0.6) in the median TES between HCV-present and HCV-absent neighborhoods. Portland HCV-absent neighborhoods had the lowest median TES compared with HCV-present neighborhoods.

Exhibit 1

Box Plot of Tree Equity Scores by City and Housing Choice Voucher Presence



HCV = Housing Choice Voucher.
Source: American Forests, n.d., with calculations and visualizations created by the authors

Because of the patterns observed from visual inspection of the distributions in the box plots, a comparison was made between the TES means of each group in each city. The TES means were bootstrapped at the 95th confidence interval to produce non-parametric 95th-percent confidence intervals for TES mean scores to determine if the values between HCV-present and HCV-absent neighborhoods are different (Pezzullo, 2013). This method was used instead of more traditional measures because of the non-normal distributions and unequal numbers of observations in each group. The results are shown in exhibit 2. In five of the six cites, the confidence interval values for TES means between HCV-present and HCV-absent block groups do not overlap; each pair of distributions is statistically significant, therefore the difference in TES means in each city is significant at the 0.05 level. Only in Boston, which had the lowest difference in TES medians (shown in the box plot in exhibit 1), did the means confidence intervals overlap, suggesting that no significant difference exists in TES values between HCV-present and HCV-absent neighborhoods in Boston. Portland had the largest gap between HCV-present and HCV-absent neighborhoods. Portland also had the largest difference in visual analysis of the box plot set and the largest difference between confidence interval sets, suggesting that Portland has relatively greater discrepancy between TES values across neighborhoods.

Exhibit 2

Bootstrap Means (95th Confidence Interval)

	Bootstrapped TES Means			
	HCV-Present Block Groups		HCV-Absent Block Groups	
City	2.5 Percentile	97.5 Percentile	2.5 Percentile	97.5 Percentile
Boston	90.37	91.67	89.70	93.19
Los Angeles	78.53	79.39	83.17	84.62
New York City	92.97	93.29	94.57	95.12
Portland	82.17	84.21	90.78	93.64
Seattle	89.81	91.53	92.65	95.26
Washington, D.C.	91.47	93.25	93.80	96.58

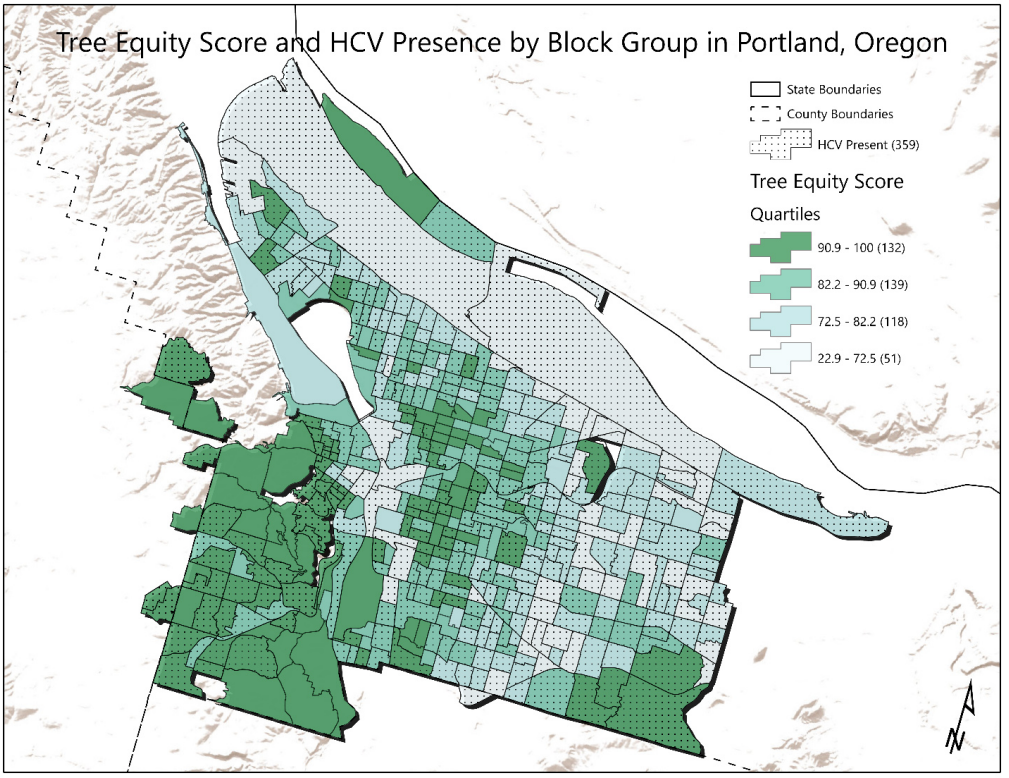
HCV = Housing Choice Voucher. TES = Tree Equity Score.

Source: Bootstrapped 95th Confidence Interval for Tree Equity Score by city and presence of HCV households from Tree Equity Score values

Exhibit 3 maps TES values and the presence of HCV households in Portland. The choropleth symbology indicates TES value; darker colors refer to higher TES. The dotted symbology indicates the presence of HCV households in a block group. A significant amount of greenery in Portland is west of downtown. This area contains several large parks, Lewis & Clark College, the Hoyt Arboretum, and the Oregon Zoo. The average TES value in the South Hills (Southwest Portland) and Forest Parks (Northwest Portland) neighborhoods is 95–100, and those neighborhoods have little to no HCV presence. Southwestern and northwestern Portland contains many of the wealthiest neighborhoods, which aligns with previous studies showing a correlation between neighborhood greenery and neighborhood incomes (Wolch, Byrne, and Newell, 2014). Outside those wealthy neighborhoods, most other neighborhoods in Portland have HCV households. Tree Equity Score values vary in those neighborhoods, but the majority have a score of 85 or less.

Exhibit 3

Tree Equity Score and HCV Presence by Block Group in Portland, Oregon

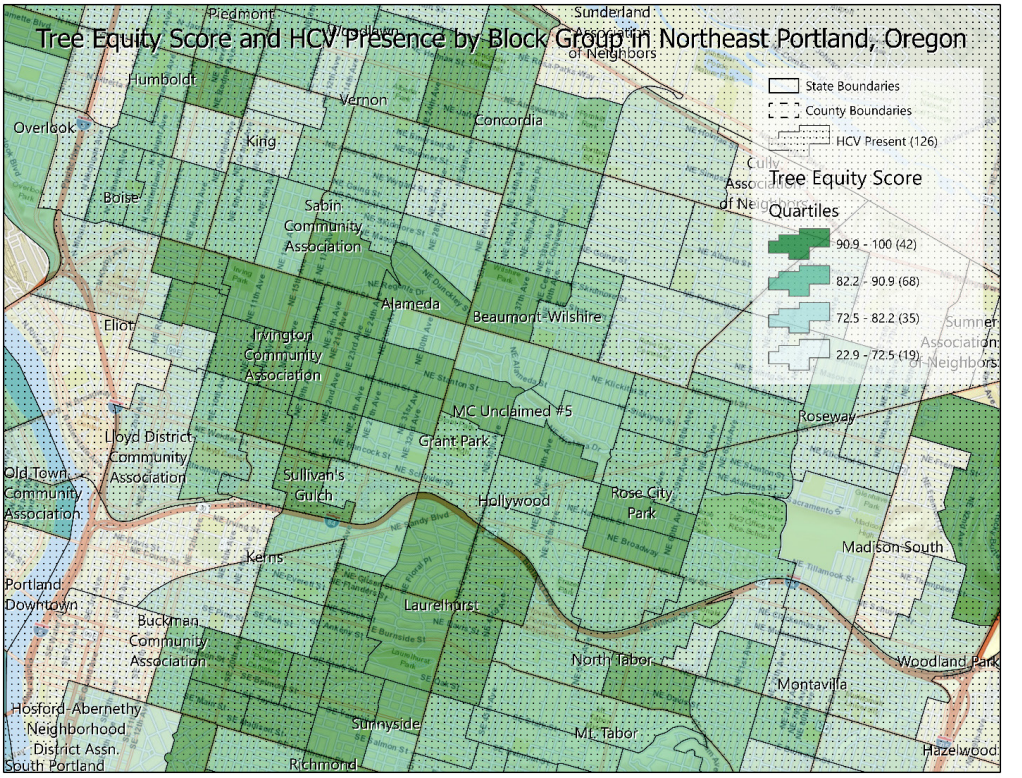


HCV = Housing Choice Voucher.
Note: Tree Equity Score is mapped by quartiles regardless of the presence of HCV neighborhoods.
Sources: Tree Equity Score; HUD Longitudinal Files

Exhibit 4 focuses on Northeast Portland, where many block groups do not have any HCV households and have higher TES values. Northeast Portland was formerly a working-class area but has experienced renewed interest in the area due to its proximity to downtown Portland and other amenities. Between the King and Alameda neighborhoods is the Alberta neighborhood, not shown with a label because its name is not included in Portland's neighborhood spatial layer. This neighborhood, historically known as Albina, was a once a small, predominantly Black community that was disenfranchised (Gibson, 2007) and has experienced intense gentrification over the past several decades (Sullivan and Shaw, 2011). Alameda has higher TES values and no HCV households, whereas King has lower TES values and HCV households.

Exhibit 4

Tree Equity Score and HCV Presence by Block Group in Northeast Portland, Oregon



HCV = Housing Choice Voucher.

Note: Tree Equity Score is mapped by quartiles regardless of the presence of HCV neighborhoods.

Sources: Tree Equity Score; HUD Longitudinal Files

Conclusion

Given the wealth of research indicating that HCV households locate in low-quality neighborhoods, it is unsurprising that HCV households are not only spatially concentrated in neighborhoods of poverty but also neighborhoods with low tree equity. Five of the six cities analyzed had TES values higher in HCV-absent neighborhoods compared with HCV-present neighborhoods. Given the noted benefits to urban greenery and the consistent disparity between HCV-present and HCV-absent neighborhoods, this analysis suggests that further investigation is necessary to demonstrate the benefits of greenery where America's most vulnerable low-income renters live.

Notes

Housing Choice Voucher data were retrieved from the 2018 Longitudinal Household file, an annual snapshot of Public and Indian Housing Information Center/Tenant Rental Assistance Certification System database. TES data was retrieved from the American Forests Tree Equity Score, which

contained tree canopy data from various sources and socioeconomic data from the 2018 American Community Survey 5-Year Estimates. More information about the Tree Equity Score can be found here: https://www.treeequityscore.org/methodology/.

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Vacancy Change in Vulnerable Census Tracts in Portland, Oregon

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The views expressed in this article are those of the author and do not represent the official positions or policies of the Office of Policy Development and Research, the U.S. Department of Housing and Urban Development, or the U.S. Government.

Abstract

This article examines areas of suspected blight in Portland, Oregon, by analyzing the increase of vacant addresses in vulnerable census tracts between 2015 and 2019 using U.S. Postal Service (USPS) data on vacant residential or no-stat addresses that are reported to the U.S. Department of Housing and Urban Development (HUD). From 2015 to 2019, 15.8 percent of vulnerable census tracts experienced suspected blight in the City of Portland, representing 11.4 percent of the total population of Portland. Trends from 2020 to 2021 indicate a general decline of vacancies reported by USPS, suggesting fewer instances of blight in Portland. Further analysis of 2020 to 2021 data and vulnerable census tracts is needed, pending the release of American Community Survey (ACS) data.

Blight and its Impacts on Neighborhoods

No single definition of blight exists; it is a weaving together of definitions from various levels of government across jurisdictions. Blight is a subjective understanding of places—like abandoned homes or empty lots—that seem to be falling into disrepair and abandonment. Considering that there is no definition or standard data collection system for blight, U.S. Postal Service (USPS) housing vacancy data are used here to infer where blight is likely occurring in Portland, Oregon. American Community Survey (ACS) data are incorporated to measure who lives in the neighborhoods being impacted by blight in Portland.[1]

Blight is problematic because it potentially depreciates home values and marketability of surrounding properties, depresses city tax revenue, and creates social challenges for low-income

[1] ACS data is released on a 5-year cycle; therefore, this analysis considers 2015–19 ACS data and 2015–19 USPS data.

populations who live in blighted neighborhoods (Pough and Wan, 2007). Blight negatively impacts neighborhood status by creating low-value areas, reducing property values and business investment, and increasing unemployment (Ferreira et al., 2022).

Blight in the City of Portland

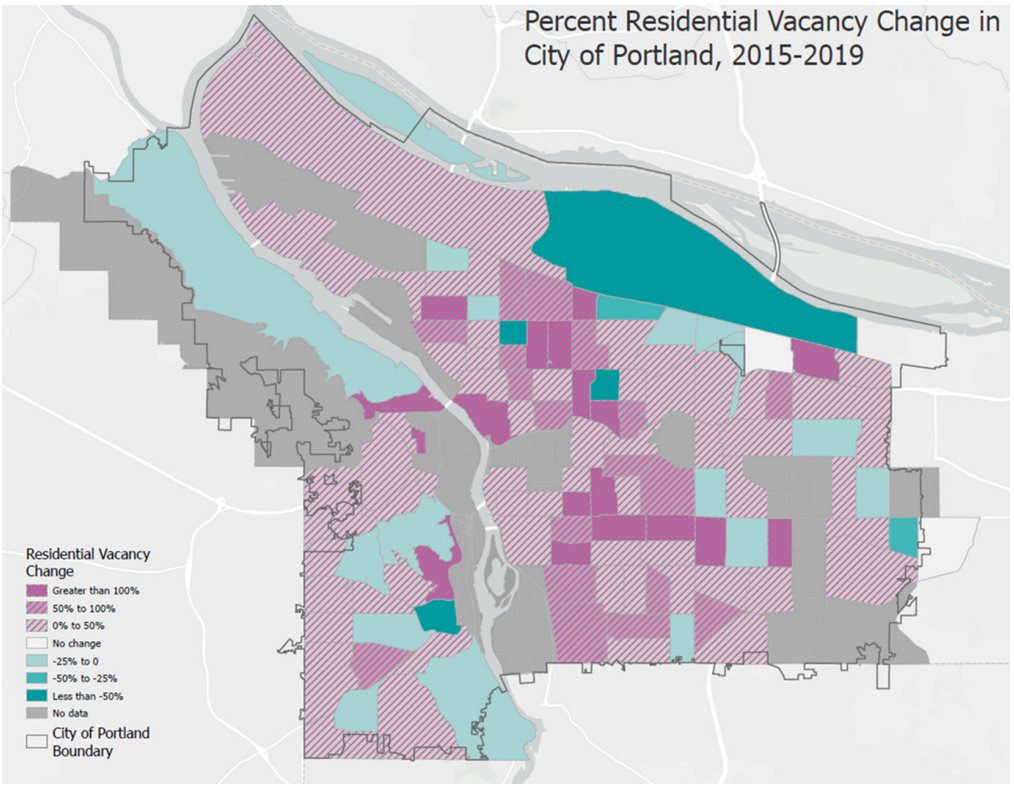
Blight in Portland is examined by analyzing USPS address data between 2015 and 2019. This dataset informs patterns in unoccupied residential units. The total number of unoccupied residential units includes the total vacant residential units and total no-stat counts reported by USPS. No-stat properties are addresses that are either abandoned or are under construction and are not yet habitable. No-stat properties are included in the approximation of supposed blight to maintain consistency with other research that examines blight with USPS data. If this data were omitted, this report might not be considered in broader analyses (Morckel and Durst, 2021; Morckel and Rybarczyk, 2018; Plier and Ortiz, 2012).

Vacant buildings as reported by the USPS are not equivalent to vacancy rates as reported by the Census Bureau. The Census Bureau does not include units that are likely abandoned in its vacancy count. The Census definition for vacant units states, "Vacant units are excluded if they are exposed to the elements, that is, if the roof, walls, windows, or doors no longer protect the interior from the elements, or if there is positive evidence (like a sign on the house or block) that the unit is to be demolished or is condemned" (U.S. Census, 2021). Therefore, USPS data provide a more holistic view of possible blight, and U.S. Census housing vacancy data are not considered in this analysis.

Exhibit 1 displays the percent change from 2015 to 2019 in vacant addresses in Portland, aggregated by census tract. More than three-fourths (78.5 percent) of the census tracts in Portland saw an increase in vacant homes between 2015 and 2019, as reported by USPS. Vacant housing grew in most census tracts, with the most growth centering around the Concordia neighborhood in northeast Portland and the Creston-Kenilworth neighborhood. The vacant housing stock declined in a few neighborhoods dispersed throughout the city. Darker shades with hatching represent the greater percent change in increased vacancy between 2015 and 2019, and darker shades without hatching symbolize a greater percent change of decrease in vacancy between 2015 and 2019.

Exhibit 1

Percent Change of Total Residental and No-Stat USPS Data from 2015 to 2019



USPS = U.S. Postal Service

Source: U.S. Department of Housing and Urban Development (2022)

Vulnerable Census Tracts in City of Portland

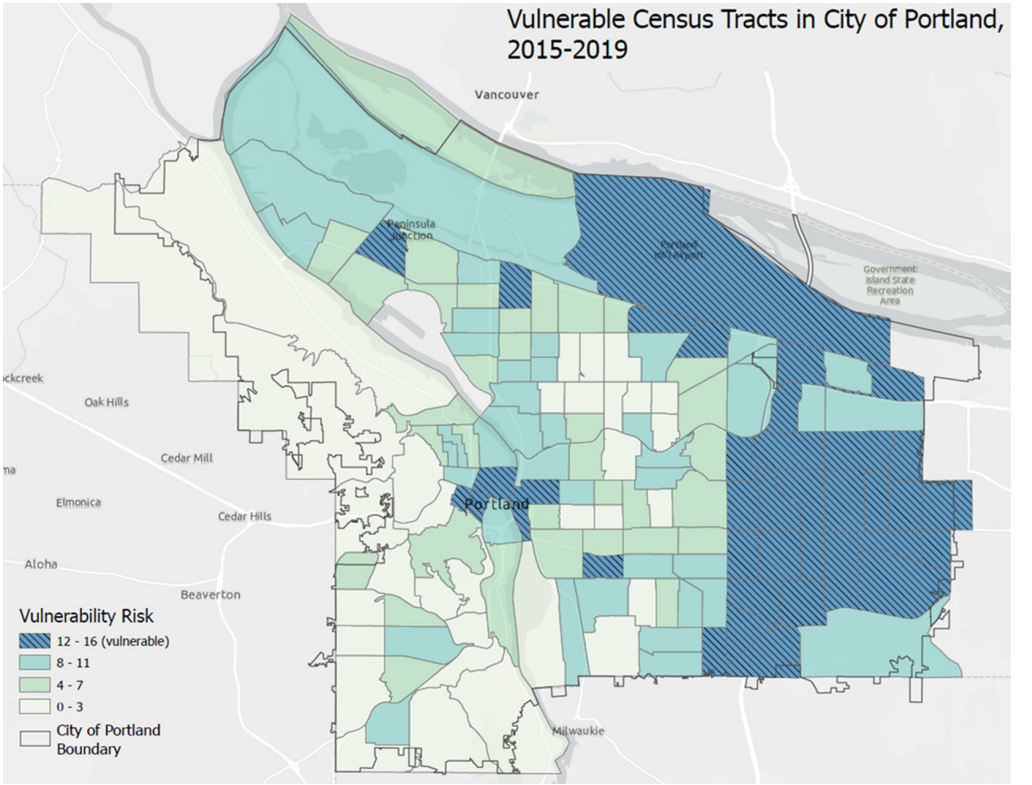
When analyzing blight, it is important to consider who lives in these regions because of disproportionate and compounding impacts to those populations (Haney, 2007). The Bureau of Planning and Sustainability analyzes socioeconomic data to determine which census tracts in Portland are vulnerable to changing neighborhood conditions as part of its city planning efforts (Bureau of Planning and Sustainability, 2021). The city defines a vulnerable census tract as having a significant proportion of renters, communities of color, residents aged 25 and older without a bachelor's degree, or households with income at or below 80 percent of Median Family Income (Bureau of Planning and Sustainability, 2012). This definition of a vulnerable census tract is used in this analysis to understand the disproportionate impacts of blight.

Exhibit 2 displays vulnerable census tracts in Portland. The share of census tracts in Portland defined as vulnerable is 19.7 percent, and 23.1 percent of the total population of Portland lives in vulnerable census tracts. Of the people who live in vulnerable census tracts, 34 percent are non-White, whereas 22.5 percent of the total population of Portland is non-White. Vulnerable

census tracts, indicated by the hatched polygons, are generally clustered in East Portland; 82nd Avenue marks the north/south corridor separating vulnerable census tracts from non-vulnerable census tracts. A smaller concentration of vulnerable tracts is located in downtown Portland and its inner eastside.

Exhibit 2

Vulnerable Census Tracts in Portland as Defined by the City of Portland Using 5-year ACS Data



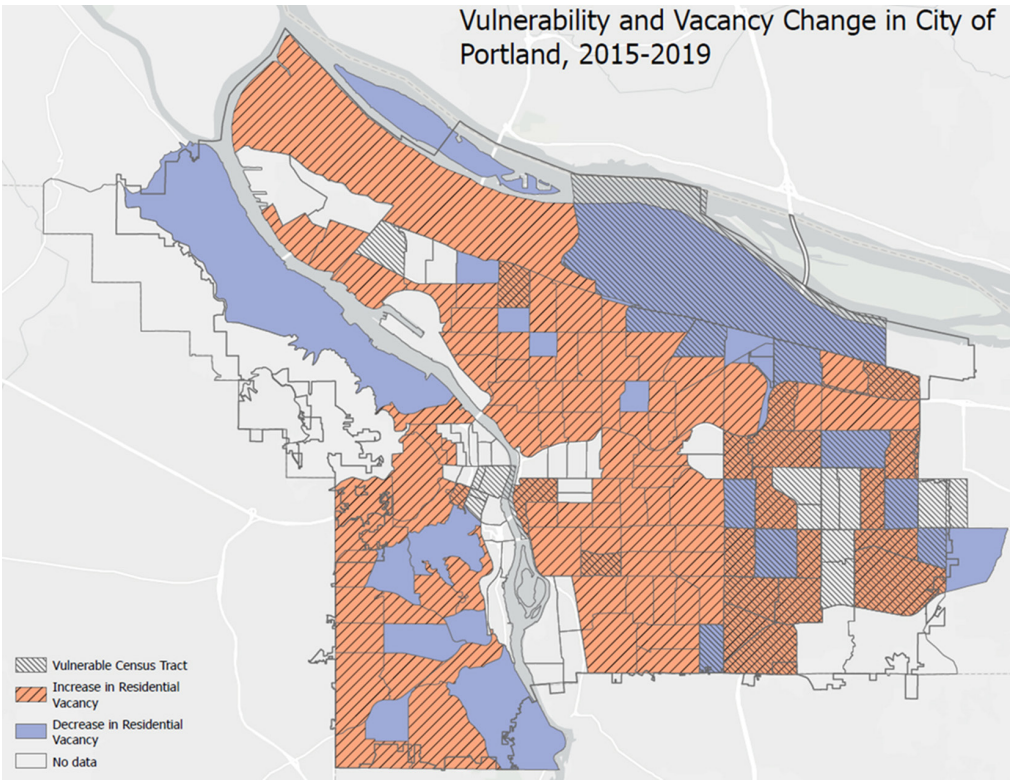
Sources: Bureau of Planning and Sustainability in City of Portland (2021); U.S. Department of Housing and Urban Development (2022)

Vacancy Change and Vulnerable Census Tracts

Exhibit 3 visualizes the relationship between census tracts with high and low changes in vacancy, utilizing data from exhibit 1—which combines no-stat addresses that are abandoned or under construction and residential vacancies—compared with census tracts that are considered vulnerable, as defined by the City of Portland (exhibit 2). This map represents the spatial distribution of vulnerable areas that saw increased blight; the division of vulnerable census tracts, shown with hatched fill, remains visible at 82nd Avenue.

Exhibit 3

Vulnerable Census Tracts and Vacancy Change from 2015–19



Sources: Bureau of Planning and Sustainability in City of Portland (2021); U.S. Department of Housing and Urban Development (2022)

Within the 78.5 percent of census tracts that saw an *increase* in vacant homes, 15.8 percent of the census tracts are vulnerable census tracts, as is depicted in exhibit 3 by polygons with cross-hatching. These regions comprise 11.4 percent of the total population of Portland. Of the population in vulnerable census tracts that saw an increase in vacant homes, 34.5 percent are non-White. Conversely, of the census tracts that increased in vacancies, 84.2 percent were not vulnerable, as represented by census tracts with wide-spaced hatching in exhibit 3. These regions suggest housing development as an indication of USPS-reported address vacancy. Of the non-vulnerable census tracts that experienced an increase of vacant homes, 18.5 percent of their populations were non-White.

Of the census tracts that saw *decreased* vacancies, 27.3 percent were vulnerable census tracts, comprising 3.4 percent of the total population of Portland, as represented by narrow-spaced hatching in exhibit 3. The suspected blight may have decreased in 72.7 percent of Portland's non-vulnerable census tracts, where 78.8 percent of the population is White. The solid fill

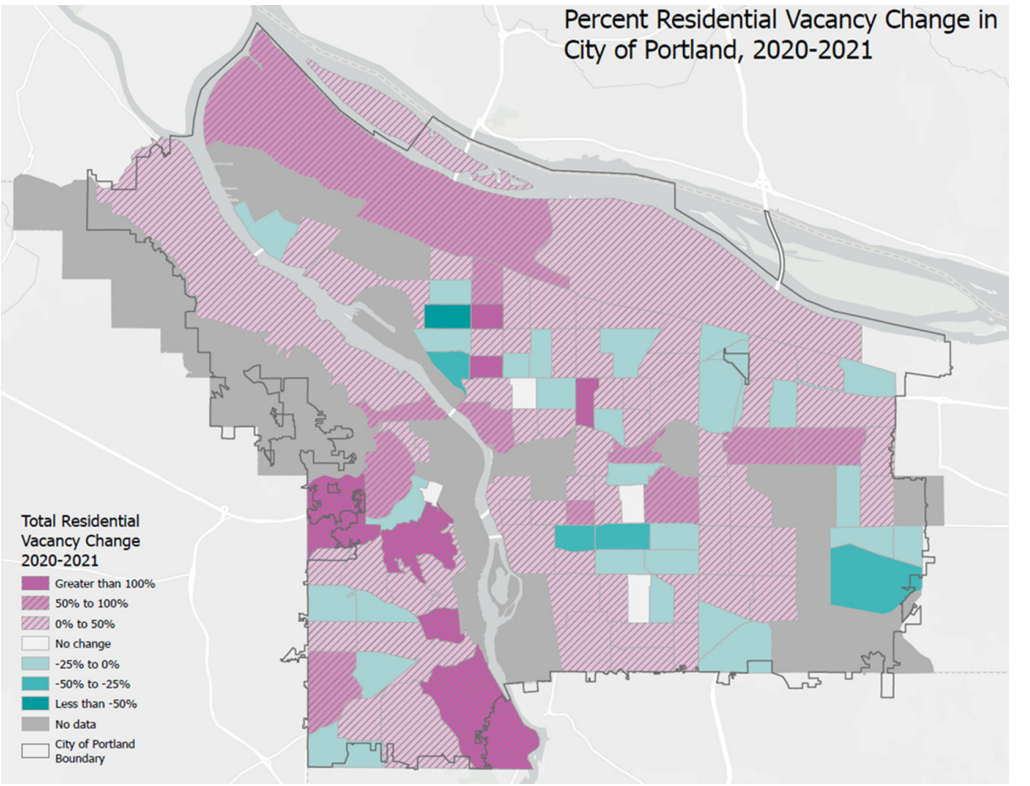
polygons, primarily situated in the Southwest Hills of Portland, saw minimal change in vacancy and do not represent vulnerable census tracts.[2]

Opportunities for Future Research

Quarterly reporting of address data from USPS allows for a recent analysis of vacant addresses in Portland. Exhibit 4 illustrates the percent change in inactive residential addresses between March 2020 and December 2021, roughly the same period as the beginning of the COVID-19 pandemic to when the latest data were available at the time this article was written. Most census tracts throughout Portland continue to see growth in vacant housing units; however, because this calculation includes residential addresses coded as no-stat, this may include housing under construction. Only a few census tracts had decreased rates of housing vacancy, most of which were on the east side of the Willamette River.

Exhibit 4

Percent Change of Total Residental and No-Stat USPS Data from 2020–2021



USPS = U.S. Postal Service

Source: U.S. Department of Housing and Urban Development (2022)

[2] USPS does not report on a total of 23 census tracts in Portland, 7 of which are vulnerable census tracts.

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Industrial Revolution

Every home that is built is a representation of compromises made between different and often competing goals: comfort, convenience, durability, energy consumption, maintenance, construction costs, appearance, strength, community acceptance, and resale value. Consumers and developers tend to make tradeoffs among these goals with incomplete information which increases risks and slows the process of innovation in the housing industry. The slowing of innovation, in turn, negatively affects productivity, quality, performance, and value. This department piece features a few promising improvements to the U.S. housing stock, illustrating how advancements in housing technologies can play a vital role in transforming the industry in important ways.

3D Concrete Printed Construction: Building the Future of Housing, Layer-by-Layer

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The views expressed in this article are those of the authors and do not represent the official positions or policies of the Office of Policy Development and Research, the U.S. Department of Housing and Urban Development, or the U.S. government.

Abstract

Three-Dimensional Concrete Printing (3DCP) is expected to address many challenges facing concrete construction today and offer new design possibilities. 3DCP is an automated construction process that builds structures layer-by-layer from 3D modeling data. With the looming housing crisis, the construction industry needs to rethink how to build safe, affordable, and sustainable homes. 3DCP technology offers potential innovative solutions to increasing the supply to homes across the nation.

The Status Quo

The typical American home built partially or fully with concrete is constructed using formwork, a technique that supports a wet concrete mixture as it cures in place. The formwork process uses temporary molds or structures fabricated with wood or steel to cast, curate, and harden concrete (see exhibit 1). The impermanent nature of conventional wooden formwork approaches means that eventually discarded materials are destined for landfills, constituting a major source of waste in the construction industry. Steel framework is also bulky and burdensome to store, transport, and erect.

Exhibit 1

Wood Formwork Used to Pour and Harden Wet Concrete

Typical formwork construction made with wood, used in the casting and hardening of structural building components from wet concrete mixtures used in traditional concrete construction practices.

Source: https://engineer-educators.com/lessons/formwork-2/

The installation and deconstruction of formwork are labor-intensive and time-consuming, amounting to roughly one-half the total cost of traditional concrete construction (Llatas, 2011). There are worker safety concerns related to traditional concrete formwork approaches, and the labor involved in the erection of molds and the placement of steel reinforcement is physically demanding.

3D Concrete Printed Homes

Emerging innovations in automated construction and additive manufacturing practices could significantly change how buildings are delivered. The idea is not entirely new: in 1917, Thomas Edison invented a device that would build a concrete house in a single pour (Edison, 1917). A century later, the advent of technological advances in concrete printing has become a reality. The introduction of Three-Dimensional Concrete Printing (3DCP) technology reveals new opportunities for innovation in the building industry. 3DCP, also referred to as additive manufacturing, might lead the United States to be able to build homes quicker, safer, and more sustainably. 3DCP involves an automated construction process that builds structures layer-by-layer from 3D modeling data. The 3DCP technology consists of a robotic arm connected to a nozzle from which the concrete flows and is poured in successive layers (see exhibits 2, 3, and 4).

Exhibit 2

Robotic Arm Over the Frame of a Home

Partially constructed wall showing layers of concrete built with 3D concrete printer; robotic gantry-arm system is shown in the background and above the wall structure.

Source: Zachary Mannheimer, Alquist 3D

Exhibit 3

The Outer Frame of the Home with Spaces for Doors and Windows

Layered walls that make up the outer frame of a home being built with 3D concrete printing construction.

Source: Zachary Mannheimer, Alquist 3D

Exhibit 4

Close-up of Double Wall Construction

Top view of newly printed wall with metal frame for robotic gantry-arm in the background.

Source: Zachary Mannheimer, Alquist 3D

With this technology, the concrete is formulated to optimize some combination of workability, setting, hardening time, and mechanical properties for the specific requirements of the building. There are two major techniques in 3DCP: (1) extrusion-based and (2) powder-bed-based. Both 3DCP techniques use material formulations which differ compositionally from traditional concrete by adding three new ingredients: (1) a reinforcing material; (2) an adhesive; and (3) a hydrator (Allouzi, Al-Azhari, and Allouzi, 2020). This formulation gives 3D concrete special attributes, including the ability to maintain its shape when wet, eliminating the need for formwork and reducing waste.

Extrusion-Based 3DCP

Modern 3DCP began more than two decades ago with Dr. Behrokh Khoshnevis' Fused Deposition Modeling (FDM) method, partially funded through a collaboration between the U.S. Department of Housing and Urban Development (HUD) and the National Science Foundation. FDM uses a computer-controlled machine to continuously extrude layers of a cementitious mixture (Khoshnevis, 2004). Today, Extrusion-Based 3D Concrete Printing is still using FDM techniques. Modern 3DCP instruments extrude wet mixtures from a nozzle mounted on a robotic arm, gantry, or crane to print structures layer-by-layer (see exhibit 5). Extrusion-Based 3DCP technologies and equipment are widely designed and used for on-site construction applications, such as large-scale building components with complex geometries.

Exhibit 5

Extrusion-Based 3D Concrete Printing

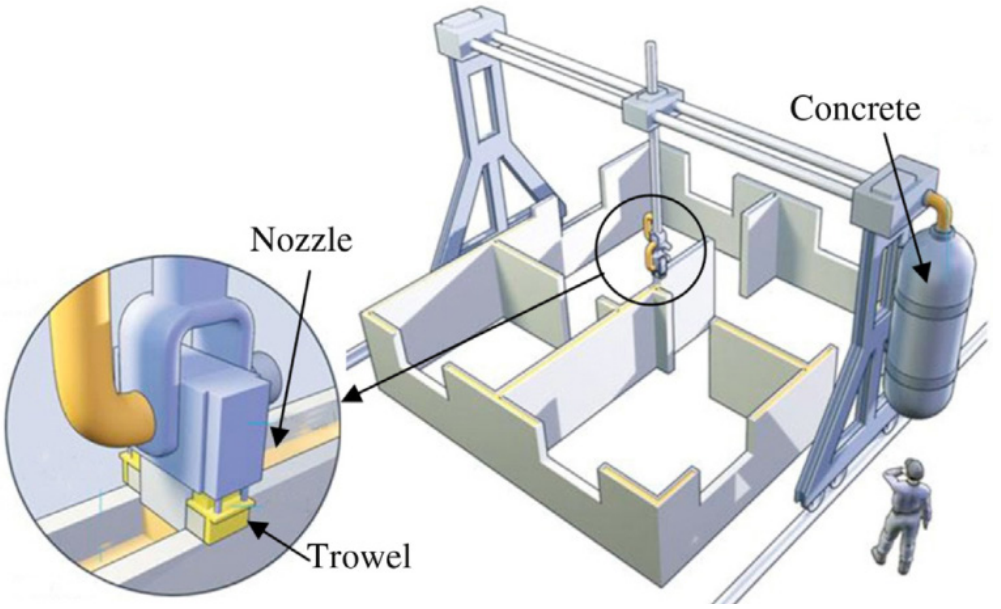

Illustration of extrusion-based 3D concrete printing technology depicting gantry-arm system with a close-up graphic of extrusion nozzle; includes a figure of a person as a portrayal of the scale and size of equipment.

Source: Sanjayan and Nematollahi, 2019

Enrico Dini developed the second major 3DCP technique (exhibit 6). It creates solid stone structures using sand and binding materials rather than traditional cement mixtures (Colla and Dini, 2013). This method involves 5mm segments of sand or other powder-based mixes that are continually and gradually injected with "ink" (binder liquid) in pre-programmed computer-specified locations, layer-by-layer. Once dry, whatever unbounded powder-based material remains is removed to be reprocessed, leaving only bounded materials and revealing the final desired structure. Powder-Bed-Based 3DCP techniques can create complex, creative, and interesting designs for buildings and structures. Off-site manufacturing processes predominately use it for precast components.

Exhibit 6

Example of Technology Used in 3D Powder-Bed Printing

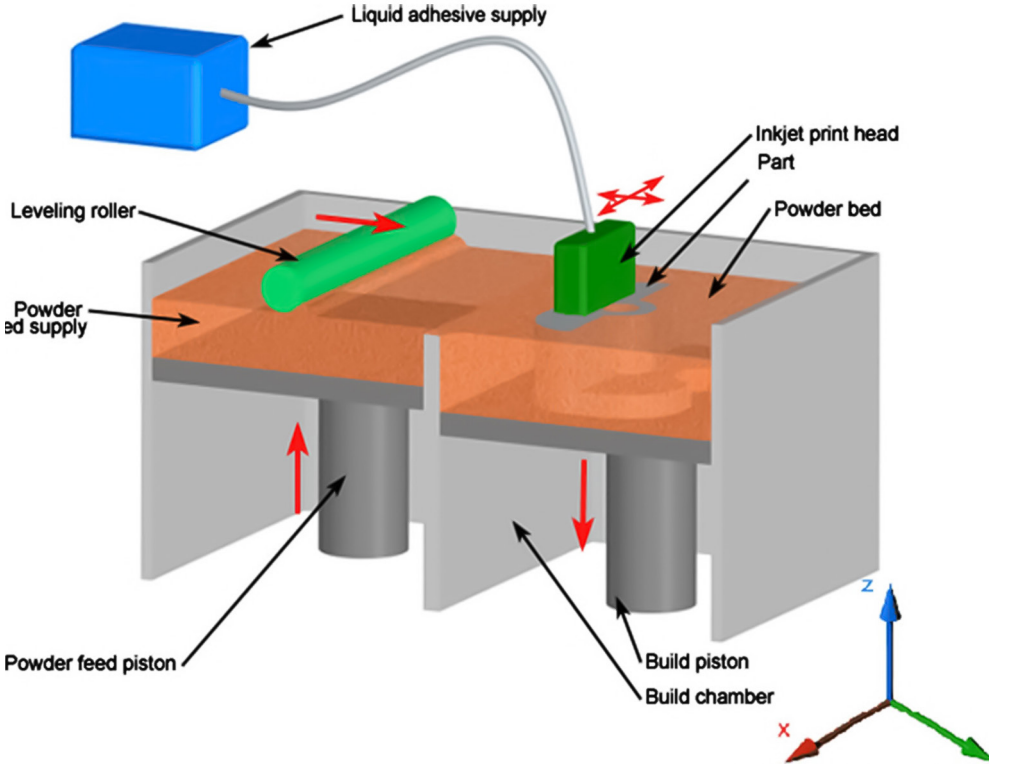

Illustration of powder-based 3D concrete printing technology depicting the process of chemically binding an adhesive liquid medium, or a binder, with a dry building material, the powder.

Source: Shakor et al., 2017

Current HUD Research and Industry Developments

As it exists today, construction-grade 3DCP technology is only compatible with a limited number of concrete formulations (Kidwell, 2017). Consequently, most current research studies are focused

on developing new concrete material formulations for 3D printing to obtain the appropriate material performance properties and extrudability that enables the material to be printed continuously in layers. HUD funded two studies to understand the role of 3DCP and affordable housing. HUD expects the final reports for the following two studies in winter 2023.

"3D Printed Walls: Identifying Best Practices for Residential Building Product System Integration and Conducting Market Barriers Research" —Home Innovation Research Labs, Inc.

> Home Innovation Research Labs, Inc. will partner with Black Buffalo 3D Corporation, a leading 3D Concrete Printing company, and the American Concrete Institute's (ACI) subcommittee on 3DCP to evaluate wall system components, including windows and doors (for example, flashing/sealing details), wall penetration methods for installing utilities (such as water and electrical), and wall connections between the roof and foundation. In addition, Home Innovation Research Labs, Inc. will conduct qualitative research among home builders and contractors at the job site and through a national survey to understand the challenges and opportunities to accelerate the adoption of 3DCP.

"Cooperative Research to Enable 3D Printed Concrete Single-/Multi-Family Housing Technologies" —Texas A&M Engineering Experiment Station.

> The objectives of this project are to: (1) demonstrate, document, and validate a rational design procedure for 3D printed concrete residential construction, accounting for seismic loads; and (2) develop, in coordination with a stakeholder-based Peer Review Panel, a "Best Practices document" to serve as a U.S. code proposal that can be adopted by local jurisdictions and national-level provisions and design codes. This project will include large-scale testing of 3D printed concrete walls with and without integrated reinforced concrete elements, development of design capacity equations, and a comprehensive seismic collapse assessment study of a set of 3D printed archetype buildings to demonstrate their margin against seismic collapse.

The Future of 3DCP Housing

Due to the emerging and innovative nature of 3DCP, the technology must face and overcome some challenges. Because this technology is still being explored and adopted, some aspects remain proprietary, such as the mixture of concrete and the design of robotic nozzles. The aesthetics of cured structures will therefore vary with each company. Ongoing research is still informing improvements to concrete mixtures for appropriate pours, ensuring stability in homes. Furthering industry knowledge is crucial for creating prescriptive methodology and standardization, making 3DCP more readily available and less expensive.

Possible benefits of 3DCP over conventional concrete construction include the following:

- 3DCP lends itself to precise and predictable outcomes, which reduce overall construction costs and time by building continually from start to finish at rapid rates.
- Automating construction allows builders to reallocate their labor toward more skilled tasks, such as plumbing and electrical.

- 3DCP reduces the volume of waste and discarded materials, lowering total construction costs and increasing sustainability.
- 3DCP increases worker safety and reduces injury rates by eliminating dangerous tasks associated with conventional formwork construction, such as working from heights or physically demanding labor.

Currently, most building codes and procurement standards do not recognize 3DCP technology. This impediment makes it difficult to build on a large scale because projects must be reviewed and approved through alternative means to demonstrate compliance with local building codes. The lack of integration into the International Building Code and the International Residential Code is a barrier to the widespread adoption of 3DCP in construction.

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Additional Reading

AC509 - International Code Council (ICC) approved an Acceptance Criteria for 3D Automated Construction Technology for 3D Construction. https://icc-es.org/acceptance-criteria/ac509/.

Revisions Enhance ICC-ES AC509 to Include Multi-Story Building Construction. https://icc-es.org/news/revisions-enhance-icc-es-ac509-to-include-multi-story-building-construction/.

2021 International Residential Code—Appendix AW: 3D-Printed Building Construction. https://codes.iccsafe.org/content/IRC2021P2/appendix-aw-3d-printed-building-construction.

UL 3401: Outline of Investigation for 3D Printed Building Construction—covers the evaluation of building structures and assemblies such as panels, walls, partitions, floor-ceilings, roofs, columns, and beams fabricated using an additive manufacturing or 3D printing process. https://www.ul.com/news/build-trust-3d-manufactured-buildings-ul-3401.

Policy Briefs

The Policy Briefs department summarizes a change or trend in national policy that may have escaped the attention of researchers. The purpose is to stimulate the analysis of policy in the field while the policy is being implemented and thereafter. If you have an idea for future Policy Briefs, please contact david.l.hardiman@hud.gov.

Survey of State Laws Governing Continuances and Stays in Eviction Proceedings

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Introduction

The survey presented in this article (exhibit 1) contains both a cumulative and detailed account of the laws and rules of each state governing continuances, adjournments, and stays in residential eviction proceedings. The survey compares the laws of each state on several aspects, including the standard for obtaining a continuance, the allowable length of the continuance, whether a bond must be paid, and any other restriction or limitation placed on the party seeking to continue an eviction proceeding. The survey also includes a listing of state statutes that provide a residential tenant the right to redeem the property upon payment of rent prior to the execution of the judgment. The survey was developed as a resource for policymakers and housing advocates exploring opportunities to improve the laws in their state by providing easy access to the comparable laws enacted elsewhere. It is also intended as a resource for attorneys, legal services organizations, and housing counseling agencies or others practicing in the field of landlord-tenant law or policy.

The information used in developing this survey was obtained through an exhaustive review of each state's relevant statutes and court rules, as well as a thorough review of appellate court opinions interpreting a relevant statute or providing guidance in the absence of statutory directive. The survey encompasses a review of each state's laws, current through December 31, 2021.

Overview

A continuance[1] of trial can be an important tool for ensuring just and lawful outcomes. For example, a continuance can give a party more time to conduct discovery, obtain legal representation, or ensure that a witness is available for trial. In an eviction setting, a continuance helps ensure that the tenant has a reasonable opportunity to appear at the trial, as the trial date is often selected without input from the tenant. A trial date selected by the landlord or the court can often conflict with the tenant's work schedule or a medical appointment, or it can occur on a day when the tenant is out of town, ill, or does not have childcare.

To prevent a party from unduly delaying trial by abusing the continuance mechanism, courts are given discretion on granting a request for a continuance. When determining whether to grant the request, the court can consider the merits of the request, the merits of the underlying matter, and the number of continuances previously granted, if any. Under most states' general rules of civil procedure, a party need only show "good cause" for the continuance.[2] States and courts will differ on what is required to show good cause, but good cause is typically viewed as a relatively low bar.

In an eviction matter, a trial continuance can be an essential tool for preventing improper or unlawful evictions. Under the laws of most states, tenants are initially given only a few days' notice of their trial, during which they must find an attorney and complete all the tasks necessary to prepare for trial. Understandably, there are some eviction matters where a continuance is unnecessary, such as when the tenant has no defense to the eviction or has already vacated the premises. In these circumstances, the imposition of strict limitations on continuing the trial are justified. However, in instances where the facts are contested or the eviction has been brought unlawfully, additional time may be necessary to limit the risk of tenants being unlawfully removed from their homes.

Despite this need, most states have enacted statutes limiting a tenant's access to a continuance in an eviction action.[3] State statutes vary in how they restrict a tenant's access to a continuance, but each includes one or all of the following: (1) a burden for obtaining the continuance that is higher or more restrictive than the traditional "good cause" standard, (2) a requirement to deposit funds with the court to secure a continuance beyond the date of trial, or (3) a limit on the number of days for which the matter may be continued. Note that some states also appear to limit a *landlord's* free access to a continuance, but this is typically of no consequence because a tenant will rarely object to a landlord seeking a continuance of an eviction proceeding. In addition, even in states where continuances are not specifically limited by that state's landlord-tenant laws, a continuance may be prohibited by virtue of the expedited eviction process requiring the trial occur within a specific number of days following the filing of the action.

[1] A continuance is a postponement of a hearing, trial, or other proceeding; in some states, it is labeled an adjournment.

[2] Thirty-two states utilize the "good cause" standard: Alaska, Arkansas, Arizona, California, Colorado, Connecticut, Florida, Hawaii, Illinois, Kansas, Louisiana ("good grounds"), Maine, Massachusetts, Michigan, Missouri, Mississippi, Montana, Nebraska, Nevada, New Mexico, North Carolina, North Dakota, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, and Wyoming. Among states that do not specifically establish "good cause" as the standard, most have caselaw establishing this decision as the standard.

[3] Notably, the Uniform Residential Landlord and Tenant Act of 1972 (URLTA) does not contain any specific text pertaining to continuances of an eviction matter. Unif. Residential Landlord & Tenant Act (Unif. L. Comm'n, 1972). Section 1.103 provides only that the law should be construed as consistent with other law unless displaced by its own provisions. The revised 2015 URLTA contains similar language. ***See*** Rev. Unif. Residential Landlord & Tenant Act § 110 (Unif. L. Comm'n 2015).

Many states also include other continuance-related provisions among their landlord-tenant laws. For example, many states specifically prescribe stays to allow an opportunity to appeal the judgment, and a handful permit a court to stay the proceedings upon a showing of hardship or exigent circumstances. At least two states provide a statutory right to continuance to obtain an attorney, and several states' courts have established or at least acknowledged this right. Finally, a handful of states permit a tenant to stay the matter indefinitely (or have it dismissed) upon payment of all amounts due prior to the entry or execution of the judgment—often viewed as a "right to redeem." A non-exhaustive list of states with these continuance-related provisions will be included at the end of the survey. At the end of this survey is a table containing the laws and rules of each state governing continuances in eviction proceedings.

Standard for a Obtaining a Continuance

In nearly one-half of the 30 states with a specific statute governing continuances of eviction proceedings, a tenant-defendant faces a higher standard for achieving a continuance than the landlord-plaintiff.[4] The burdens and requirements for seeking a continuance in an eviction matter vary greatly among the states, and include: (A) a reliance on the standard rule applied to all civil matters in the state, (B) a "good cause" standard specifically described in the laws governing landlord-tenant matters, (C) an "extraordinary cause" standard applied only to a tenant in an eviction case, (D) standards applicable depending on the situation, and (E) other miscellaneous requirements.

A. **Same as rule applied in all civil matters:** In 38 states, a motion for a continuance is governed, at least for purposes of the standard applied in ruling upon the request, by the broader rule governing requests for continuances applicable in all civil matters.[5]

B. **Good cause:** Eight states' landlord-tenant statutes specifically provide that a continuance may be granted for good cause shown.[6]

C. **Extraordinary cause:** Nebraska was the only state in the country that required the showing of extraordinary cause to obtain a continuance in an eviction action. Nebraska recently amended its statute to permit one continuance for good cause, but for any subsequent continuance, extraordinary cause must be shown. Extraordinary cause is not defined in Nebraska's landlord-tenant statute, nor in the state's caselaw.

[4] California, Idaho, Minnesota, Montana, Nevada, Ohio, Oregon, Rhode Island, South Dakota, Virginia, West Virginia, and Wyoming.

[5] Alabama, Arkansas, Colorado, Connecticut, Delaware, Florida, George, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Texas, Utah, Vermont, Virginia, Washington, Wisconsin, and Wyoming.

[6] Alaska, Arizona, California, Maine, Michigan, Nebraska, New Mexico, and Tennessee.

D. Situational continuances[7]

1. **California:** Continuance may be granted on motion by the defendant if the plaintiff amends his or her complaint. The defendant must show good cause by affidavit.[8]

2. **Colorado:** The court may continue the case until personal service on the defendant is achieved if the defendant has only been served by constructive service.[9]

3. **Iowa:** A continuance is granted to a defendant as a matter of right if the hearing is scheduled for fewer than 3 days after service.[10] Iowa statute prohibits continuances for the purpose of taking testimony in writing, however.[11]

4. **Maryland:** The court has discretion to continue the case for 6–10 days if either party fails to appear.[12]

5. **Montana:** The court may grant a continuance upon amendment of the complaint after trial begins, if the defendant upon affidavit shows good cause therefor.[13]

6. **Nevada:** The court may grant a continuance upon amendment of the complaint after trial begins, if the defendant upon affidavit shows good cause therefor.[14]

7. **New Hampshire:** The court may continue the action for 1 month if a defendant-tenant asserts a statutory defense based on the landlord's failure to provide fit and habitable premises; the landlord may be given 1 month to attempt to remedy the violation. If remedied, the matter will be dismissed and the landlord will be awarded rents paid into the court; if not remedied, judgment will be entered in favor of the tenant, and the tenant will be refunded all rents paid into the court.[15]

8. **Rhode Island:** The court may continue the matter to permit the tenant to conduct discovery, for good cause shown, if the tenant files an answer and initiates discovery prior to the hearing.[16]

[7] California and Colorado have more than one rule specifically applying to different situations. In Iowa and Maryland, the state's default rule would still apply on a motion for a continuance.

[8] West's Annotated California Code of Civil Procedure § 1173.

[9] Colorado Revised Statutes Annotated 13-40-115.

[10] Iowa Code Annotated 648.5.

[11] Iowa Code Annotated 648.16.

[12] Maryland Code Real Property section 8-402 and 8-402.1.

[13] Montana Code Annotated § 70-27-204.

[14] Nevada Revised. Statutes Annotated § 40.330.

[15] New Hampshire Revised Statutes 540:13-d.

[16] Rhode Island General Laws 1956, 34-18-35.

E. Other

1. **Colorado:** If the continuance will be for longer than 5 days, the requesting party must again show good cause and pay a bond into the court of an amount to be determined by the court based on how much the nonmoving party will be damaged.[17]

2. **Minnesota:** For any reason, the court has discretion to grant a continuance for no more than 6 days, but said continuance can go beyond 6 days only if all parties consent. If the eviction is for a reason other than nonpayment of rent, continuance can be for no longer than 3 months and only if a material witness is not present (plus other factors).[18]

3. **Montana:** A continuance may only be granted by party stipulation. If the parties stipulate, the tenant must pay undertaking with good and sufficient security to be approved by the court and must pay all damages and rent if judgment is against the tenant.[19]

4. **Nebraska:** If a subsequent continuance bleeds into a new rental period, the tenant may be required to pay rent into the court during the pendency of the proceeding.[20]

5. **Nevada:** In Nevada, each court may adopt its own rule on continuances. No matter the rule, a tenant must deposit rent to the court if judgment is delayed for any reason, including a continuance.[21]

6. **New York:** The first request for a continuance is automatically granted and must be no less than 14 days. Any subsequent requests are subject to the discretion of the court. Notably, the statute permitting continuances only applies if triable issues of fact are raised.[22]

7. **West Virginia:** A continuance may be granted on a showing of cause. To obtain a continuance, a tenant must pay any periodic rent coming due during the continuance. W. Va. Code, 55-3A-3. For a landlord-plaintiff, a continuance may be granted at the discretion of the court.[23] Handbook authority suggests that the movant must have some reason for the continuance.[24]

Payment for a Continuance

In 12 states, some form of payment is required to secure a continuance or to secure a continuance beyond a certain number of days in an eviction action. In 11 of these states, the requirement of

[17] Colorado Revised Statutes Annotated 13-40-114.

[18] Minnesota Statutes Annotated 504B.341.

[19] Montana Code Annotated 70-27-202.

[20] Nebraska Revised Statutes § 76-1443.

[21] Nevada Revised Statutes. 118A.490.

[22] McKinney's Real Property Actions and Proceedings Laws 745.

[23] *See Boyd v. Goffoli*, 216 W.Va. 552, 608 S.E.2d 169 (W.Va. 2004).

[24] Meyer, WVPRAC-TRH 3:1 (2020).

payment applies only to the tenant-defendant.[25] In Colorado, the payment requirement applies to the movant, regardless of whether the movant is a plaintiff or a defendant. Wyoming specifically requires a defendant in an eviction action to pay a bond for a continuance beyond 2 days, but also generally requires any movant to pay the costs of the continuance.

1. **California:** Initially, a continuance is governed by good cause under Cal. Rules of Court, Rule 3.1332. If the continuance is requested by the defendant and would push the trial beyond 20 days after the request for time of trial, the court holds a hearing to determine if there is a reasonable probability the plaintiff will win. If so, the court determines the damages the plaintiff will suffer because of the continuance. The defendant pays into the court the amount determined.[26]

2. **Colorado:** Initially, a continuance may be granted on a showing of good cause under Colorado caselaw.[27] If the continuance will be for longer than 5 days, the requesting party must again show good cause and pay a bond into the court in an amount to be determined by the court based on how much the nonmoving party will be damaged.[28]

3. **Idaho:** Initially, a continuance may be granted for good cause shown under I.R.C.P. Rule 2.2(b). If the continuance will be for longer than 2 days, the defendant must pay "a good and sufficient security" to the plaintiff. Payment may accrue if judgment is against a tenant.[29]

4. **Montana:** A continuance may be granted upon stipulation of the parties or payment by the defendant of a "good and sufficient security," the amount of which is to be approved by the court. The defendant must pay all damages and rent if judgment is against the defendant.[30]

5. **Nebraska:** Each party may obtain one continuance for good cause shown, and any subsequent continuance requires a showing of extraordinary cause or agreement by the parties. If the subsequent continuance extends into the next rental period, the court may require the tenant-defendant pay rent into the court.[31]

6. **Nevada:** A tenant must deposit rent to the court if judgment is delayed for any reason, including a continuance.[32]

7. **Ohio:** For a continuance requested by a defendant that is for longer than 8 days, the defendant must give a bond to the plaintiff "with good and sufficient surety." The amount of the bond must be approved by the court and is conditioned for accrued rent if judgment is

[25] California, Idaho, Montana, Nebraska, Nevada, Ohio, Oregon, South Dakota, Virginia, West Virginia, and Wyoming.

[26] West's Annotated California Code of Civil Procedures 1170.5.

[27] In *re Marriage of Lorenzo*, 721 P.2d 155 (1986).

[28] Colorado Revised Statues Annotated 13-40-114.

[29] Idaho Code. 6-311.

[30] Montana Code Annotated 70-27-202.

[31] Nebraska Revised Statutes § 76-1443.

[32] Nevada Revised Statutes 118A.490.

against the defendant. If a plaintiff requests a continuance, the only requirement is that the plaintiff secure the consent of the defendant.[33]

8. **Oregon:** If a tenant-defendant requests a continuance that is to be longer than 2 days, the defendant must make an undertaking to the landlord "with good and sufficient surety." In certain actions, the defendant must pay rent as it comes due from commencement to entry of judgment.[34]

9. **South Dakota:** When seeking a continuance in an eviction action, the defendant must pay an undertaking with "good and sufficient surety" to the plaintiff of an amount to be approved by the court.[35]

10. **Virginia:** If the tenant-defendant moves for a continuance, the landlord can request that the tenant pay into escrow the amount equal to what is due in rent. The tenant must make the escrow payment within a week.[36]

11. **West Virginia:** To obtain a continuance, a tenant must pay any periodic rent coming due during the continuance.[37]

12. **Wyoming:** Should a tenant in an eviction action apply for a continuance that is longer than for 2 days, the tenant must pay "bond with good and sufficient surety."[38]

Time Limits or Other Form of Time Restriction

Eighteen states restrict in some way a court's discretion when determining the duration of a continuance. Such restrictions come in a number of forms. Seven states require that a continuance be no longer than a specified number of days. Others require either the defendant or the movant to pay a bond or other payment to the court or opposing party if the continuance exceeds a certain number of days. A few states have unique time-related provisions not susceptible to categorization.

A. Limit on Duration of Continuance

1. **Arizona:** Not more than 3 days in justice court or 5 days in superior court.[39]

2. **Minnesota:** Not more than 6 days unless all parties consent. If eviction is for a reason other than nonpayment of rent, then continuance can be for no longer than 3 months, and only if a material witness is not present (plus other factors).[40]

[33] Ohio Revised Code 1923.08.

[34] Oregon Revised Statutes 105.140.

[35] South Dakota Codified Law 21-16-7.

[36] Virginia Code Annotated 55.1-1242.

[37] West Virginia Code 55-3A-3.

[38] Wyoming Statutes 1977 1-21-1007.

[39] Arizona Revised Statutes 33-1377.

[40] Minnesota Statutes Annotated 504B.341.

3. **New Mexico:** Up to 7 days from the date of initial hearing.[41]

4. **South Dakota:** No more than 14 days.[42]

5. **Tennessee:** No more than 15 days unless agreement by the parties.[43]

6. **Texas:** No more than 7 days unless agreement by the parties.[44]

7. **Virginia:** Court can grant the tenant a continuance of no more than 1 week to make a continuance escrow payment into the court. If paid, then there is no stated time limit for continuance as long as the tenant continues to pay rent into the court.[45]

B. Payment required when continuance is beyond a set number of days

1. **Colorado:** If the continuance will be for longer than 5 days, the requesting party must again show good cause and pay a bond into court of an amount to be determined by the court based on how much the nonmoving party will be damaged.[46]

2. **Ohio:** For a continuance requested by a defendant that is for longer than 8 days, the defendant must give a bond to the plaintiff "with good and sufficient surety."[47]

3. **Oregon:** If a tenant-defendant requests a continuance that is to be longer than 2 days, the defendant must make an undertaking to the landlord "with good and sufficient surety." In certain actions, the defendant must pay rent as it comes due from commencement to entry of judgment.[48]

4. **Wyoming:** Should a tenant in an eviction action apply for a continuance that is longer than for 2 days, the tenant must pay "bond with good and sufficient surety."[49]

C. Unique provisions relating to time

1. **California:** If continuance pushes trial beyond 2 days of request for time of trial, then parties must agree to continuance, or the court holds a hearing to determine if there is a reasonable probability the plaintiff will win. If so, the court determines the damages the plaintiff will suffer because of the continuance. The defendant pays into the court the amount determined.[50]

[41] New Mexico Statutes Annotated. 47-8-43.

[42] South Dakota Codified Laws 21-16-7.

[43] Tennessee Code Annotated 29-18-118.

[44] Texas Rules of Civil Procedure, Rule 510.7.

[45] Virginia Code Annotated 55.1-1242.

[46] Colorado Revised Statutes Annotated 13-40-114.

[47] Ohio Revised Code 1923.08.

[48] Oregon Revised Statutes 105.140.

[49] Wyoming Statutes 1977 1-21-1007.

[50] West's Annotated California Code of Civil Procedure 1170.5.

2. **Mississippi:** A single adjournment not to exceed 10 days may be granted, unless by consent. No adjournment in an eviction hearing shall extend the hearing beyond 45 days from the date of filing of the action.[51]

3. **Montana:** A continuance may only be granted by party stipulation. If the parties stipulate, the defendant must pay undertaking with good and sufficient security to be approved by the court and must pay all damages and rent if judgment is against the tenant.[52]

4. **Nebraska:** If a subsequent continuance extends into the next rental period, the court may require the tenant-defendant pay rent into the court.[53]

5. **New Hampshire:** The landlord-plaintiff is permitted a continuance to provide time to remedy violation of health and safety standard if the tenant properly raises such violations as a defense to the eviction.[54]

6. **New York:** A continuance statute applies only if issues of fact are raised. The first request for a continuance is automatically granted, and it must be no less than 14 days.[55]

7. **North Carolina:** A continuance may be granted for a period of time if a party initiates discovery or files a motion to allow further pleadings or for summary judgment.[56]

Other Continuance-Related Provisions

Stay Pending Appeal

A few states also specifically provide in their landlord-tenant laws specific provisions for post-judgment stays for the purpose of challenging the judgment for possession. It is presumed that in most states not listed below that a judgment for restitution may be stayed in the same manner as any other civil judgment, but this was not researched or verified.

1. **Alabama:** Writ may be stayed upon payment of all rents accrued since the date of the filing of the action and that accrue during the pendency of the appeal.[57]

2. **Arkansas:** Eviction may be stayed upon payment of an appeal bond within 5 days after service of a notice of appeal, and the tenant must further sign an undertaking that the tenant will pay the landlord rent as it becomes due periodically after judgment was entered.[58]

[51] Mississippi Code Annotated 89-7-39.

[52] Montana Code Annotated 70-27-202.

[53] Nebraska Revised Statutes. 76-1443.

[54] New Hampshire Revised Statutes 540:13-d.

[55] McKinney's Real Property Actions and Proceedings Law 745.

[56] North Carolina General Statutes Annotated 42-34.

[57] Alabama Code § 6-6-351.

[58] Arkansas Code Annotated § 18-17-910; Ark. Code Ann. § 18-17-707.

3. **California:** A stay on appeal can be provided if a county court judge finds the tenant would suffer extreme hardship if no stay is given.[59]

4. **Connecticut:** All eviction judgments are automatically stayed for 5 days, and if an appeal is filed during that period, the matter may be stayed until the final determination if bond is paid.[60]

5. **Florida:** A stay is permitted upon posting of bond.[61]

6. **Idaho:** A stay is granted on appeal at the discretion of the court.[62]

7. **Michigan:** The filing of an appeal and payment of the bond or escrow will stay an eviction that has been issued but not executed.[63]

8. **Missouri:** Application by the defendant for trial de novo or an appeal will stay an execution if the defendant also provides bond. The bond must be given with sufficient security for the total cost of the judgment and additional fees.[64] If the defendant receives government rent reduction, then the bond may subsidize the amount of the rent reduction.[65]

9. **Nebraska:** If the defendant files an appeal and deposits the amount of the judgment and costs or gives an appeal bond with surety, it shall stay the execution of any writ of restitution.[66]

10. **Nevada:** Execution of judgment may be stayed upon the execution of an undertaking to pay a bond in an amount not less than twice the amount of judgment and costs.[67]

11. **New Mexico:** An appeal stays the execution of the writ of restitution if rent is paid during the pendency of appeal.[68]

12. **North Carolina:** An execution of a judgment for ejectment shall be stayed if the defendant-appellant pays any rent in arrears as determined by the magistrate.[69]

13. **Oklahoma:** The defendant has 2 days post-judgment to file a supersedeas bond. This 2-day limit may be extended at the discretion of the trial judge up to 7 days.[70]

14. **Rhode Island:** Automatic stay of 5 days to file appeal.[71] Thereafter, it appears the judgment would be stayed during the pendency of the appeal upon payment of rent as it comes due.[72]

[59] California Civic Procedure Code § 1176.

[60] Connecticut General Statutes Annotated § 47a-35.

[61] Florida Rules of Appellate Procedure. 9.310.

[62] Idaho Code Ann. § 6-319.

[63] Michigan Court Rules 4.201(N).

[64] Missouri Statutes Annotated §535.110.

[65] Missouri Statutes Annotated §534.580.

[66] Nebraska Revised Statutes 76-1447.

[67] Nevada Revised Statutes Annotated § J CTS RCP Rule 73A.

[68] New Mexico Statutes Annotated § 47-8-47.

[69] North Carolina General Statutes Annotated § 42-34.

[70] Oklahoma Statutes Annotated Title 12, § 1148.10A.

[71] 34 Rhode Island General Laws § 34-18-48.

[72] 34 Rhode Island General § 34-18-47; 34 R.I. Gen. Laws § 34-18-49.

15. **Texas:** A stay pending appeal may be granted by filing a Statement of Inability to Afford Payment of Court Costs, paying any amounts due in the notice issued, and paying rent as it accrues.[73]

16. **Washington:** The defendant may stay the judgment pending appeal by executing and filing a bond and paying all rents and damages accruing during the pendency of the appeal.[74]

17. **Wisconsin:** The defendant may stay an appeal if they file within 15 days of the judgment and give a surety for the amount of the judgment.[75]

Stay Due to a Finding of Hardship

Several states provide for the stay of the writ or warrant directing the transfer of possession to the landlord upon a showing of exigent circumstances or substantial hardship.

1. **Connecticut:** The court has authority to stay the execution if the tenant is unable to secure suitable replacement housing.[76]

2. **Minnesota:** If the court finds that there are extraordinary and exigent circumstances, a writ may be stayed more than 7 days.[77]

3. **Mississippi:** If a judge finds good cause, a stay of 3 days may be issued.[78]

4. **New Hampshire:** A stay may be issued for up to 3 months so long as the tenant continues to make payments to the landlord and justice so requires.[79]

5. **New Jersey:** There are several laws in New Jersey that give tenants extra time due to hardship.

    a. Extension for Moving Out: Tenants may seek up to 7 days of additional time to move out if they have a good reason.[80]

    b. Extension if unable to find new housing: The court may grant an additional 6 months if the tenant can show they are unable to find new housing.[81]

    c. Terminal Illness. If the tenant has lived in the residence for 2 years, is current on rent payments, and has a terminal illness, the court may issue a stay for up to 12 months.[82]

[73] Texas Rules of Civic Procedure 510.9.

[74] Washington Revised Code Annotated § 59.12.200.

[75] Wisconsin Statutes Annotated 799.445.

[76] Connecticut General Statutes Annotated § 47a-39.

[77] Minnesota Statutes Annotated § 504B.345. Subdivision 2.

[78] Mississippi Code Annotated §89-7-45.

[79] New Hampshire Revised Statutes 540:13-c.

[80] New Jersey Court Rules 6:6-6.

[81] New Jersey Statutes 2A:42-10.6.

[82] New Jersey Statutes Annotated § 2A:18-59.1.

6. **New York:** A stay for up to 1 year may be granted upon a showing that the tenant cannot reasonably find suitable replacement housing.[83]

7. **North Dakota:** The court may issue a stay, not longer than 5 days, if immediate restitution of the premises would place substantial hardship on the defendant or the defendant's family.[84]

8. **Wisconsin:** The court may issue a stay upon determination of hardship for up to 30 days if the tenant pays past-due rent and ongoing rent.[85]

Opportunity to Obtain Legal Counsel

At least two states provide an opportunity for the matter to be continued or stayed to provide the tenant an opportunity to obtain legal counsel.

1. **Iowa:** If the hearing is held fewer than 3 days after the defendant received notice of the hearing, then the court shall notify the defendant that they are entitled to a continuance to retain legal counsel.[86]

2. **Kansas:** If the eviction matter is brought in small claims court, and upon request by either party, the court shall grant one reasonable continuance to allow a party to secure representation of an attorney.[87]

In several of the states where the right to a continuance to retain counsel is not provided for statutorily, courts have considered the issue either directly or indirectly and appear to favor a right to an opportunity to obtain legal assistance.[88]

Right of Redemption

Some states have laws, in lieu of or in addition to a right to a continuance of the eviction proceeding, which permit an eviction matter to be stayed (and typically dismissed) if the rent is

[83] New York Real Property Actions Law § 753.

[84] North Dakota Century Code Annotated § 47-32-04.

[85] Wisconsin Statutes Annotated § 799.44.

[86] Iowa Code Annotated 648.5.

[87] Kansas Statutes Annotated 61-2714.

[88] *See e.g., Taylor v. Gill St. Investments*, 743 P.2d 345, 349 (Alaska 1987) (the superior court twice continued the trial of this case to allow the tenant to obtain substitute counsel); *Picasso Tower, Inc. v. Dairene Int'l*, 874 So. 2d 640, 642 (Fla. Dist. Ct. App. 2004) (there had been an initial hearing one business day after entry of the injunction but the hearing was postponed to allow the tenant to obtain counsel); *Nuruzzman v. Korotouov*, 2018 Mass. App. Div. 110 (Dist. Ct. 2018) (finding the trial judge made a clear error of judgment that fell outside the range of reasonable alternatives when he responded to the tenant's repeated requests for a continuance to obtain counsel under all of these circumstances, and finding it was an abuse of discretion to deny the tenant's request for continuance in these circumstances); *Branch Brook Gardens Tenants Ass'n v. Rent Leveling Bd. of Belleville*, 177 N.J. Super. 1, 7, 424 A.2d 840, 842 (App. Div. 1980) (the matter was scheduled originally for January 16, 1979, but was postponed until February 8, 1979, apparently so that the tenants could obtain counsel); *Carlton Associates v. Bayne*, 2002, 191 Misc.2d 54, 740 N.Y.S.2d 785 (Civil Court of the City of New York had inherent power to adjourn nonpayment proceeding beyond 10-day period mandated by statute, for the purpose of allowing the tenant to obtain counsel, since grant of continuance was an exercise of judicial discretion upon particular facts, with appropriate opportunity for counsel to be heard, and was exclusively a judicial act; the court's discretion to control its calendar could not be circumscribed by the Legislature).

paid during the pendency of the action or otherwise paid before possession is restored to the landlord. These laws are often viewed as "rights of redemption."

1. **Arizona:** The tenant may reinstate at any time before the filing of the eviction action by paying all rent due and a reasonable late fee; the tenant may reinstate at any time after the action has been filed, but before judgment, by paying all rent due, a reasonable late fee, and attorney's fees and costs.[89]

2. **Delaware:** The tenant may stay all proceedings by paying rent due within 10 days of the judgment if the default arose out of good faith dispute. Del. Code Ann. tit. 25 § 5716.

3. **Hawaii:** The proceedings are stayed if the tenant pays all rent due, interest of 8 percent per year, and all costs and charges of proceedings, including the plaintiff's attorney fees before the writ issues.[90]

4. **Minnesota:** If the tenant pays all due rent with interest and the landlord's attorney fees, not exceeding $5, then the tenant may redeem tenancy.[91]

5. **Mississippi:** If the tenant's eviction is solely for nonpayment of rent, and the tenant pays all rent due and late fees at or before the Magistrate issues the warrant, no warrant shall be issued.[92]

6. **Missouri:** If the tenant pays all rent due and costs before the order of the court issues, the proceedings are stayed.[93]

7. **New Hampshire:** The matter shall be dismissed if the tenant, at any time before the hearing on the merits, pays all lawful amounts due, plus $15 liquidated damages, plus filing and service costs.[94]

8. **New Jersey:** The tenants shall have until the end of the court day to pay the rent due to dismiss the proceedings.[95]

9. **New York:** Unless the right is waived by the lease, lessee may redeem the tenancy following default for nonpayment of rent if within 1 year after execution of the warrant; the lessee pays to the landlord or to the court all rent in arrears.[96]

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[89] Arizona Revised Statutes Annotated § 33-1368(B).

[90] Hawaii Revised Statutes Annotated § 666-14.

[91] Minnesota Statutes Annotated § 504B.291(1)(a).

[92] Mississippi Code Annotated § 89-7-45.

[93] Missouri Annotated Statutes § 535.160.

[94] New Hampshire Statutes § 540:9

[95] *See Cmty. Realty Mgmt., Inc. for Wrightstown Arms Apartments v. Harris*, 155 N.J. 212, 714 A.2d 282 (1998); *Hous. Auth. of Town of Morristown v. Little*, 135 N.J. 274 (1994).

[96] New York. Real Property Actions Law § 761.

10. **Oklahoma:** If the tenant fails to pay rent based on a good faith claim, they have 72 hours to pay due rent and associated costs to stay a writ of execution.[97]

11. **Virginia:** The tenant is allowed a redemption if they pay all due rent and fees by their trial date or at least 10 days after service of summons.[98]

12. **Washington:** The tenant or any party interested in continuance of tenancy may redeem the tenancy by paying into the court within 5 days after entry of judgment all rent due and any court costs not exceeding $75.[99]

13. **Wisconsin:** The eviction shall be stayed if the tenant applies for emergency assistance for families with needy children before the writ is issued.[100]

Exhibit 1 sets forth the provisions of each state's laws governing continuances and stays. As noted in the summary, in some states, continuances of eviction proceedings are governed by the state's landlord-tenant laws or forcible entry and detainer statutes, whereas in other states, continuances are governed by the standard rules of civil procedure applicable to all civil matters. Even in states with specific landlord-tenant laws governing continuances, those laws are often supplemented by the rules of civil procedure or case law. For example, a state's landlord-tenant law may provide that a continuance may not be granted for more than a certain number of days or unless a bond is paid, but the standard used for determining whether to grant the continuance may be found in the state's rules of civil procedure or in case law interpreting those rules. The left column offers the location of the state's landlord-tenant and/or eviction laws, followed by the applicable provision(s) governing continuances. The right column sets forth each state's rules of civil procedure applicable to continuances, and any case law pertaining to continuances in landlord-tenant matters and as applied in other civil matters generally.

Exhibit 1

Survey of State Laws Governing Continuances and Stays in Eviction Proceedings (1 of 25)

State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Alabama	Alabama's landlord-tenant laws, found at § 35-9a-101 *et seq*., do not contain any specific guidance on continuances, but instead provide that eviction matters shall be governed by the rules of civil procedure. Ala. Code § 35-9A-461. Landlord's action for eviction, rent, monetary damages, or other relief. (a) A landlord's action for eviction, rent, monetary damages, or other relief relating to a tenancy subject to this chapter **shall be governed by the Alabama Rules of Civil Procedure** and the Alabama Rules of Appellate Procedure except as modified by this chapter.	Alabama caselaw dictates that a continuance is "within the sound discretion of the court." *State ex rel. Payne v. Empire Life Ins. Co.*, 351 So.2d 538 (Ala. 1977). "A trial court's denial of a motion for a continuance...will generally be affirmed as exercise of the trial court's broad discretion in such matters." *Peagler v. Skyline Shopping Ctr.*, 662 So. 2d 282, 283 (Ala. Civ. App. 1995).

[97] 12 Oklahoma Statutes Annotated 1148.10B.

[98] Virginia Code Annotated § 55.1-1250 B.

[99] Washington Revised Code Annotated § 59.18.410.

[100] Wisconsin Statutes Annotated § 799.40.

Exhibit 1

Survey of State Laws Governing Continuances and Stays in Eviction Proceedings (2 of 25)

State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Alaska	Alaska's landlord-tenant laws, found at § 34.03.010 *et seq*., provide that a continuance may be granted for good cause shown. Alaska Stat. § 34.03.285. Service of process upon tenant. In an action for possession under this chapter, the summons and complaint shall be served under the provisions of Rule No. 85 of the Rules of Civil Procedure. **A continuance may not be granted plaintiff or defendant except for good cause shown**.	No continuance shall be granted for a longer period than 2 days, unless the defendant applying therefor shall give an undertaking to the adverse party, with sureties approved by the court, conditioned to the payment of the rent that may accrue if judgment is rendered against defendant. Alaska R. Civ. P. 85(a)(3). "...the party seeking a continuance must also show good cause. The grant or denial of a continuance shall be overturned only if the trial court abused its discretion. This court has found an abuse of discretion when the trial court's ruling either substantially prejudices a party or denies the party a substantial right." *Vinson v. Hamilton,* 854 P.2d 733, 735 (Alaska 1993). "The decision whether to grant a continuance ultimately rests in the discretion of the trial court." *Taylor v. Gill St. Invs.*, 743 P.2d 345, 349 (Alaska 1987).
Arizona	Arizona's landlord-tenant laws, found at § 33-301 *et seq*., provide that a continuance may be granted for good cause shown. Ariz. Rev. Stat. Ann. § 33-1377. Special detainer actions; service; trial postponement. C. For **good cause shown** supported by an affidavit, the **trial may be postponed** for not more than three days in a justice court or five days in the superior court. Ariz. Rev. Stat. Ann. § 33-1485. Special detainer actions; trial postponement. (mobile home lots) C. For **good cause shown** supported by an affidavit, the **trial may be postponed** for not more than three days in a justice court or five days in the superior court. Ariz. Rev. Stat. Ann. § 33-1368(B). Providing for a right to redeem prior to the filing of the action, and a right to redeem prior to a judgment being entered. *See also* Ariz. Rev. Stat. Ann. § 33-1476(E) (right of redemption in mobile home lot tenancies).	(1) *Generally.* If a court has set an action for trial on a specified date, it may not postpone the trial unless: (A) good cause exists to do so, supported by affidavit or other evidence; (B) the parties' consent; or (C) postponement is required by operation of law. Trial also may be postponed as authorized or required by local rule. Ariz. R. Civ. P. 38.1. "... a motion for continuance is addressed to the sound judicial discretion of the trial court predicated on good cause." *Nordale v. Fisher*, 380 P.2d 1003 (Ariz. 1963).
Arkansas	Arkansas statute provides for three methods of eviction: Unlawful Detainer, Municipal Court procedure, and Civil Eviction under the Arkansas Residential Landlord Tenant Act of 2007. It appears that none of these statutory schemes govern continuances. Ark. Code Ann. § 18-60-301 et seq. Forcible Entry and Detainer—Unlawful Detainer Ark. Code Ann. § 18-60-304. Actions constituting unlawful detainer. Municipal Court Procedure: Ark. Code Ann. § 18-16-101 (this method results in a misdemeanor if a tenant does not pay rent on 10-days' notice. Arkansas is the only state that provides for criminal penalty on late rent). Ark. Code Ann. § 18-17-101 *et seq*. Arkansas Residential Landlord-Tenant Act of 2007.	Ark. R. Civ. P., Rule 40. Trial Settings and Continuances (b) Continuances. The court may, upon motion and for **good cause shown**, continue any case previously set for trial.

Exhibit 1

Survey of State Laws Governing Continuances and Stays in Eviction Proceedings (3 of 25)

State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
California	In California, the procedure for an unlawful detainer (eviction) is governed by Cal. Civ. Proc. Code § 1159 *et seq*. Cal. Civ. Proc. Code § 1170.5. Time of trial; extension; trial not within time; order of payment; amount of damages Comment: In general, an unlawful detainer lawsuit must take place within the 20th day that a request for the time of trial is made. Under 1170.5(b), the court may extend the 20-day period for trial (1) on agreement of all parties or (2) at the request of a party. If a party requests extension, the court holds a hearing to determine if there is a reasonable probability the plaintiff will ultimately win the action. On finding of that reasonable probability, the court determines the damages that will be suffered by the plaintiff because of the extension (because of lost rent). The defendant is required to pay into court the amount of damages determined. At the end of trial, the proceeds will be distributed based on the result. Cal. Civ. Proc. Code § 1173. Amendment of complaint to conform to proof; terms; continuance When, upon the trial of any proceeding under this chapter, it appears from the evidence that the defendant has been guilty of either a forcible entry or a forcible or unlawful detainer, and other than the offense charged in the complaint, the Judge must order that such complaint be forthwith amended to conform to such proofs; such amendment must be made without any imposition of terms. **No continuance shall be permitted upon account of such amendment unless the defendant, by affidavit filed, shows to the satisfaction of the Court good cause therefor**. *See also* Cal. Civ. Proc. Code § 1173 (stay pending appeal if court finds hardship). *See also* California LL/Tenant Guide.	Cal. Rules of Court Rule 3.1332. Motion or application for continuance of trial (c) Grounds for continuance Although continuances of trials are disfavored, each request for a continuance must be considered on its own merits. The court may grant a continuance only on an affirmative showing of good cause requiring the continuance. Circumstances that may indicate **good cause** include: [see full statute for itemized list] Outside of the rule above, postponements in California are generally governed by West's Ann. Cal. Civ. Proc. Code § 588 *et seq*. Issues—the Mode of Trial and Postponements, Cal. Civ. Proc. Code § 1179.01 *et seq*. COVID-19 Tenant Relief Act. Cal. Civ. Proc. Code § 1179.03.5: (a) **Before October 1, 2021, a court may not find a tenant guilty of an unlawful detainer** unless it finds that one of the following applies: (1) The tenant was guilty of the unlawful detainer before March 1, 2020. "The State Law... prohibits no-fault evictions and evictions for COVID-related rent delinquencies, without limiting landlords' ability to seek unpaid rent through other means." *Apartment Ass'n of Los Angeles Cty., Inc. v. City of Los Angeles*, 500 F. Supp. 3d 1088, 1102 (C.D. Cal. 2020), *aff'd*, No. 20-56251 (9th Cir. 2021). "Code of Civil Procedure section 1173 constrains the court's usual discretion to deny [a motion for continuance] in that it *requires* that the motion be granted **where the court has received evidence at variance with the complaint but sufficient to show an unlawful detainer.**" *4920 Corp. v. Reynolds Price Casas & Reily, LLP*, No. H026464 (Cal. Ct. App.2004). "The plain meaning of section 1173 limits the discretion of the court to deny amendment of the complaint or grant a continuance after evidence is admitted which establishes the unlawful detention of the property by the defendant." *N. 7th St. Assocs. v. Constante*, 92 Cal. App. 4th Supp. 7, 12, 111 Cal. Rptr. 2d 815, 819 (Cal. App. Dep't Super. Ct. 2001). "Extensions may be granted upon the agreement of the parties (§ 1170.5, subd. (b)), and no continuance of an unlawful detainer trial can exceed 10 days without the consent of the adverse party." *Garcia v. Cruz*, 221 Cal. App. 4th Supp. 1, 6, 164 Cal. Rptr. 3d 408, 411 (Cal. App. Dep't Super. Ct. 2013).

Exhibit 1

Survey of State Laws Governing Continuances and Stays in Eviction Proceedings (4 of 25)

State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Colorado	Colorado's landlord-tenant laws, found at § 38-12-101 *et seq*., do not contain any specific guidance on continuances. Colorado's Forcible Entry and Detainer laws are found at § 13-40-101. Colo. Rev. Stat. Ann. § 13-40-114. Delay in trial—undertaking If either party requests a delay in trial longer than five days, the court in its discretion may, **upon good cause shown, require either of the parties to give bond** or other security approved and fixed by the court in an amount for the payment to the opposite party of such sum as he may be damaged due to the delay. Colo. Rev. Stat. Ann. § 13-40-115. Judgment—writ of restitution (1) Upon the trial of any action under this article if service was had only by posting in accordance with section 13-40-112(2) and if the court finds that the defendant has committed an unlawful detainer, the court shall enter judgment for the plaintiff to have restitution of the premises and shall issue a writ of restitution. **The court may also continue the case for further hearing from time to time and may issue alias and pluries summonses until personal service upon the defendant is had**. -Effective only until Sept. 30, 2021. *See* 2A Colo. Prac., Methods of Practice 71:25.	"Because the granting of a default judgment is a harsh remedy, and because section 13–40–114 does not authorize such a remedy for failure to post a bond, the trial court abused its discretion in granting the default judgment." *Beeghly v. Mack*, 20 P.3d 610, 614 (Colo. 2001). "In determining whether to grant a continuance, the court should consider the circumstances of the particular case, weighing the right of the party requesting the continuance to a fair hearing against the prejudice that may result from delay." *Butler v. Farner*, 704 P.2d 853, 858 (Colo. 1985).
Connecticut	Connecticut's landlord-tenant laws, Conn. Gen. Stat. Ann. § 47a-23 to 47a-42a, do not contain any specific guidance on continuances. Presumably, a tenant could move to continue under Conn. Gen. Stat. Ann. § 52-196. However, Connecticut's URLTA provides for a number of methods to obtain a stay of the matter to provide more time for the tenant to move out, when the tenant is unable to find replacement housing, or to file an appeal. *See* Conn. Gen. Stat. Ann.§ 47a-37 (providing a tenant an opportunity to stay execution of the judgment if certain conditions are met); Conn. Gen. Stat. Ann. § 47a-39 (grants the court authority to stay the execution if the tenant is unable to secure suitable replacement housing); Conn. Gen. Stat. Ann. § 47a-35 (providing that all eviction judgments shall be automatically stayed for five days, and if an appeal is filed during that period, the matter may be stayed until the final determination if bond is paid).	Conn. Gen. Stat. Ann. § 52-196. Motion to continue or postpone Whenever in any action pending in the Superior Court a motion for a postponement or continuance is made by either party and such motion is granted, the court may require the party making the same to pay to the adverse party such sum by way of indemnity as it deems reasonable.

Exhibit 1

Survey of State Laws Governing Continuances and Stays in Eviction Proceedings (5 of 25)

State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Delaware	Delaware's landlord-tenant laws, § 5101 *et seq*., do not contain any specific guidance on continuances. However, its laws permit a tenant to stay the proceedings and redeem the tenancy if he or she pays all due rent and the costs of a proceeding or files an assurance that rent will be paid within 10 days: Del. Code Ann. tit. 25 § 5716. Stay of proceedings by tenant; good faith dispute When a final judgment is rendered in favor of the plaintiff in a proceeding brought against a tenant for failure to pay rent and the **default arose out of a good faith dispute**, the tenant may stay all proceedings on such judgment by paying all rent due at the date of the judgment and the costs of the proceeding or by filing with the court an undertaking to the plaintiff, with such assurances as the court shall require, to the effect that defendant will pay such rent and costs within 10 days of the final judgment being rendered for the plaintiff. At the expiration of said period, the court shall issue a warrant of possession unless satisfactory proof of payment is produced by the tenant.	"The appellants owed back rent. They paid all of the back rent and requested a stay. The Justices of Peace denied their stay because there was not a good faith dispute." *Coverdale v. Just. of Peace Ct. of State In & For Sussex Cty. No. 1*, No. CIV. A. 89M-DE1 (Del. Super. Ct. 1990).
Florida	Florida's landlord-tenant laws, Fla. Stat. Ann. § 83.40 *et seq*., do not contain any specific guidance on continuances.	Fla. Stat. Ann. §1.460. Continuances A motion for continuance shall be in writing unless made at a trial and, except for **good cause** shown, shall be signed by the party requesting the continuance. The motion shall state all of the facts that the movant contends entitle the movant to a continuance. If a continuance is sought on the ground of nonavailability of a witness, the motion must show when it is believed the witness will be available.
Georgia	Georgia's landlord-tenant laws, found at Ga. Code Ann. § 44-7-1 *et seq*., do not contain any specific guidance on continuances.	Ga. Code Ann. § 9-10-167. Countershowing and discretion of the court (a) All applications for continuances are addressed to the sound legal discretion of the court and, if not expressly provided for, shall be granted or refused as the ends of justice may require. (b) In all cases the presiding judge may, in his discretion, admit a countershowing to a motion for a continuance and, after a hearing, may decide whether the motion shall prevail. "A denial of a motion for continuance is within the sound legal discretion of the trial court and will not be disturbed absent manifest abuse." *Denny v. Croft*, 195 Ga. App. 871, 395 S.E.2d 72, 73 (Ga. Ct. App. 1990). "...[c]ontinuances because of the absence of counsel are not favored..." *Cap. Floors, LLC v. Furman*, 351 Ga. App. 589, 595, 831 S.E.2d 522, 528 (Ga. Ct. App. 2019). The court may consider prior continuances, counsel had not notified the court of any issues or delays, and the schedules of witnesses. *Mann v. State*, 307 Ga. 696, 703, 838 S.E.2d 305, 312 (Ga . Ct. App. 2020). *See also* § 3:2.Continuances, Trial Handbook for Ga. Lawyers § 3:2.

Exhibit 1

Survey of State Laws Governing Continuances and Stays in Eviction Proceedings (6 of 25)

State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Hawaii	Hawaii's landlord-tenant laws, found at Haw. Rev. Stat. Ann. § 521-1. Short title, *et seq*., does not contain a specific provision on continuances. However, Hawaii's statute governing eviction proceedings does allow for a tenant to stay a writ of possession after it has been issued and to redeem the tenancy. Haw. Rev. Stat. Ann. § 666-14. Writ stayed how, in proceedings for nonpayment of rent The **issuing of the writ of possession shall be stayed in the case of a proceeding for the nonpayment of rent**, if the person owing the rent, before the writ is actually issued, pays the rent due and interest thereon at the rate of eight per cent a year and all costs and charges of the proceedings, and all expenses incurred by plaintiff, including a reasonable fee for the plaintiff's attorney.	Haw. Cir. Ct. R. 7: Circuit Court Rule 7. Form of Motions: (c) Required Notice; Effect of Failure to Appear. A party who does not oppose or who intends to support a motion, or who desires a continuance, shall immediately give written notification to the court and opposing counsel. Failure to appear at the hearing may be deemed a waiver of objections to the granting of the motion. (d) Motions for Continuance. If a date has been assigned for trial of an action, a motion for continuance of the trial shall include on the first page of the notice of motion the trial date assigned and any previously assigned trial dates. (e) Consent of Party to Continuance of Trial. A motion for continuance of any assigned trial date, whether or not stipulated to by respective counsel, shall be granted only upon a showing of good cause, which shall include a showing that the client-party has consented to the continuance. Consent may be demonstrated by the client-party's signature on a motion for continuance or by the personal appearance in court of the client-party. Haw. Dist. Ct. R. 7: District Court Rule 7. Form of Motions: (c) Required Notice; Effect of Failure to Appear. A party who does not oppose or who intends to support a motion, or who desires a continuance, shall immediately notify the court and opposing counsel, or opposing party if the opposing party is not represented by counsel. Failure to appear at the hearing may be deemed a waiver of objections to the granting of the motion.
Idaho	Idaho's Forcible Entry and Detainer laws, found at § 6-301 *et seq*., provide that a continuance may be granted if the defendant gives good and sufficient security. There are no explicit landlord-tenant statutes. Idaho Code Ann. § 6-311. Continuance In an action exclusively for possession of a tract of land of five (5) acres or less for the nonpayment of rent or if a landlord has alleged that the landlord has reasonable grounds to believe that any person, is or has been, engaged in the unlawful delivery, production, or use of a controlled substance during the term for which the premises are let to the tenant, or if the person is in possession of the property and is a tenant at sufferance pursuant to subsection (11) of section 45-1506, Idaho Code, **no continuance shall be granted for a longer period than two (2) days unless the defendant applying therefor gives an undertaking to the adverse party with good and sufficient security**, to be approved by the court, conditioned for the payment of the rent that may accrue if judgment is rendered against the defendant.	Idaho R. Civ. P. 2.5. Stipulations not binding on the court—continuance of trial or hearing The parties to any action may present to the court a stipulation as to any procedural matter involved in any proceeding, including a stipulation to vacate or continue a hearing or trial, but the stipulation is to be considered as a joint motion by the parties to the court for its consideration, and is not binding on the court. The court may approve or disapprove the stipulation in the same manner as the court rules on a motion. The court may by oral or written notice to the parties limit the time within which a motion or stipulation to vacate or continue a hearing or trial must be made in order to be considered by the court.

Exhibit 1

Survey of State Laws Governing Continuances and Stays in Eviction Proceedings (7 of 25)

State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Illinois	Illinois' landlord-tenant laws, found at 765 Ill. Comp. Stat. Ann. 705/0.01 *et seq*., do not contain any specific guidance on continuances.	735 Ill. Comp. Stat. Ann. 5/2-1007. Extension of time and continuances. **On good cause shown**, in the discretion of the court and on just terms, additional time may be granted for the doing of any act or the taking of any step or proceeding prior to judgment…. "We review the trial court's denial of a motion for a continuance for abuse of discretion. A trial court abuses its discretion when its decision is arbitrary, unreasonable, or fanciful or where no reasonable person would take the view adopted by the court. Under this standard, the reviewing court cannot substitute its judgment for that of the trial court or determine whether the trial court acted wisely." *Webster House Assocs. v. Baines*, 2021 IL App (1st) 190273-U, ¶ 17.
Indiana	Indiana's landlord-tenant laws are found at Ind. Code Ann. § 32-31-1-1 *et seq*., but the *standard* eviction procedure is governed by its rules pertaining to Small Claims actions found at Ind. Small Cl. R. 1 thru 16. *et seq*. Indiana's landlord and tenant laws also provide for an "emergency proceeding for an emergency possessory order." *See* Ind. Code Ann. § 32-31-6-1 *et seq*. This process is available only for matters where the landlord can claim "waste"—it is not available for evictions for non-payment of rent, violation of the lease agreement, or non-renewal. Ind. Code Ann. § 32-31-6-8 (c) The court shall not grant a continuance of the emergency hearing except upon clear and convincing evidence that manifest injustice would result if a continuance were not granted.	Ind. Small Cl. R. 9, Rule 9. Continuances **(A)** Either party may be granted a continuance for good cause shown. Except in unusual circumstances no party shall be allowed more than one (1) continuance in any case, and all continuances must have the specific approval of the court. Continuances shall be for as short a period as possible, and where feasible the party not requesting the continuance shall be considered in scheduling a new hearing date. The court shall give notice of the continuance and the new date and time of trial to all parties.
Iowa	Iowa's landlord-tenant laws are found at § 562a.1 *et seq*., but the eviction process is governed by its forcible entry and detainer statutes at § 648.1 *et seq*., which provides a right to a continuance if notice has not been provided at least 3 days before trial. Additional continuances are not specifically prohibited, so presumably are governed by Iowa's standard rules of civil procedure. Iowa Code Ann. § 648.5. Venue—service of original notice—hearing 5. The notice requirements of this section shall be deemed to have been satisfied if the defendant or the defendant's attorney appears at the hearing. **If the hearing will be held fewer than three days after service of the original notice or if notice is deemed satisfied pursuant to this subsection, the court shall inform the defendant that the defendant has the right to a continuance and shall grant a continuance at the defendant's request** to allow the defendant to prepare for the hearing or to retain an attorney.	Iowa Code Ann. § 1.911. Causes for continuance (1) A continuance may be allowed for any cause not growing out of the fault or negligence of the movant, which satisfies the court that substantial justice will be more nearly obtained. It shall be allowed if all parties so agree and the court approves. (2) All such motions based on absence of evidence must be supported by affidavit of the party, the party's agent or attorney, and must show the following: … Iowa Code Ann. § 1.912. Objections; ruling; costs …Every continuance shall be at the cost of the movant unless otherwise ordered by the court. "The Code provides that continuances shall not be granted for any cause growing out of the fault or negligence of the party applying therefor. Subject to this rule, however, continuances may be allowed for any cause which satisfies the court that substantial justice will thereby be more nearly attained." *Brady v. Malone*, 4 Iowa 146, 148,149 (Iowa 1857).

Exhibit 1

Survey of State Laws Governing Continuances and Stays in Eviction Proceedings (8 of 25)

State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Iowa, *continued*	Iowa Code Ann. §648.16. Priority of assignment Such actions shall be accorded reasonable priority for assignment to assure their prompt disposition. No continuance shall be granted for the purpose of taking testimony in writing.	"The trial court is given guidelines to help exercise its discretion when presented with a motion for continuance, which we in turn use to measure the reasonableness of the trial court's decision…." Thus, when a motion for continuance is promptly filed, "alleging a cause not stemming from the movant's own fault or negligence, the court must determine whether substantial justice will be more nearly obtained by granting the request." *Ragan v. Petersen*, 569 N.W.2d 390, 393 (Iowa Ct. App. 1997) (quoting *State v. Birkestrand*, 239 N.W.2d 353, 360 (Iowa 1976)). "A motion for continuance addresses itself to the sound legal discretion of the trial court, and his ruling will not be interfered with on appeal unless the discretion has been abused and an injustice done the party denied the continuance. This discretion of the trial court is a judicial discretion to be governed and controlled by legal rules and must be exercised, not capriciously or oppressively, but for the prevention of injustice and oppression." *Luse v. Waco Cmty. Sch. Dist. of Henry Cty.*, 258 Iowa 1087, 1099,1100, 141 N.W.2d 607, 615 (Iowa 1966).
Kansas	Kansas' landlord-tenant laws, found at § 58-2501 *et seq*., do not include any provisions regulating continuances of an action for possession, but instead specifically provide that the code of civil procedure for limited action would apply. Kan. Stat. Ann. § 58-2542. Jurisdiction of courts; procedure The district court shall have jurisdiction over any landlord or tenant with respect to any conduct in this state governed by this act or with respect to any claim arising from a transaction subject to this act, and notwithstanding the provisions of subsection (b) of Kan. Stat. Ann. § 61-2802, and amendments thereto, such actions may be commenced pursuant to the code of civil procedure for limited actions. **Unless otherwise specifically provided in this act, the code of civil procedure for limited actions shall govern any action commenced pursuant to this act**.	Kan. Stat. Ann. § 60-240. Scheduling for trial; continuances (a) *Scheduling cases for trial*. Each district court must provide by rule for scheduling trials. The court must give priority to actions entitled to priority by law. (b) *Continuances*. **For good cause**, the court may continue an action at any stage of the proceedings on just terms. When a continuance is granted due to the absence of evidence, it must be at the cost of the party requesting the continuance, unless the court orders otherwise. (c) *Motion for continuance based on absence of material witness, document, thing or other evidence; affidavit or declaration*. (1) Affidavit or declaration in support of motions. The court need not entertain a motion for a continuance based on the absence of a material witness, document, thing or other evidence unless supported by an affidavit or a declaration pursuant to Kan. Stat. Ann. § 53-601, and amendments thereto. Kan. Stat. Ann. § 61-2714. Use of attorneys; certification by plaintiff of compliance with act; defense related to limit on number of claims (b) When appropriate, the court shall advise all parties of this right to hire counsel pursuant to this section and shall, if requested by any party, grant one reasonable continuance in such matter to afford a party an opportunity to secure representation of an attorney. The Small Claims Procedure Act may be utilized to resolve a claim arising under the Residential Landlord and Tenant Act, so long as the claim meets the statutory definition of a "small claim" as provided in Kan. Stat. Ann. § 61-2703. *Barton v. Miller*, 225 Kan. 624, 625, 592 P.2d 921, 923 (Kan. 1979).

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Kentucky	Kentucky's landlord-tenant laws, found at § 383.010 *et seq*., do not include any provisions regulating continuances of an action for possession.	Ky. R. Crim. P. 43.03 Postponement of trial; motion and affidavit "...A motion to postpone a trial on account of the absence of evidence may be made only upon affidavit showing the materiality of the evidence expected to be obtained, and that due diligence has been used to obtain it. If the motion is based on the absence of a witness, the affidavit must show what facts the affiant believes the witness will prove, and not merely the effect of such facts in evidence, and that the affiant believes them to be true. If the adverse party will consent that, on the trial, the affidavit may be read as the deposition of the absent witness, the trial shall not be postponed on account of his absence..."
Louisiana	La. Civ. Code Ann. art. 2668 *et seq*., comprises Louisiana's landlord-tenant laws generally; the eviction procedure is found at La. Civ. Code Ann. art. 4701 *et seq*. Neither provide any guidance on a continuance of an action for possession. In Louisiana, an eviction proceeding is initiated by filing a "Rule for Possession."	Louisiana statute provides for two kinds of continuances: Peremptory continuances and discretionary continuances. Peremptory continuances are governed by La. Civ. Code Ann. art. 1602. Discretionary continuances are governed by La. Civ. Code Ann. art. 1601 and may be granted for "**good grounds**," the definition of which is within the discretion of the court. *See New Hope Gardens, Ltd. v. Lattin*, 530 So. 2d 1207, 1212 (La. Ct. App. 1988) (describing 1601 and 1602 connections to eviction proceedings). *See also Stoker v. Johnson*, 96-28,168 (La. App. 2 Cir. 4/3/96), 671 So. 2d 1206, 1207 (court granted a continuance for insufficiency of citation for eviction).
Maine	Maine's landlord-tenant laws are found at Me. Rev. Stat. Ann. tit. 14, § 6021 to § 6050, but its eviction proceedings are governed by its entry and detainer statutes found at § 6000 to § 6017. Me. Rev. Stat. Ann. tit. 14 § 6003. Jurisdiction The District Court shall have jurisdiction of cases of forcible entry and detainer. The court shall schedule and hold the hearing as soon as practicable, but no later than 10 days after the return day except that **the court may grant a continuance for good cause shown**. Any defendant requesting a recorded hearing shall file a written answer enumerating all known defenses on or before the return day.	
Maryland	Maryland's landlord-tenant laws can be found at § 8-101 *et seq*., and provide that a continuance may be granted at the discretion of the court. Md. R. §§ 8-402 and 8-402.1 give the court discretionary authority to grant a continuance "**not less than 6 but no more than 10 days and notify the parties of the continuance**" if either of the parties fails to appear before the court on the day stated in the summons.	Maryland statute allows a district court (Md. R. 3-508) and a circuit court (Md. R. 2-508) to continue or postpone a trial or other proceeding as "justice may require" on motion or on its own initiative.

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Massachusetts	Massachusetts' landlord-tenant laws are found at Mass. Gen. Laws Ann. ch. 186, § § 1 to 29; ch. 186a, § § 1 to 6, but its laws governing the eviction process are found in court rule at Mass. Trial Ct. R. I: Uniform Summary Process Rules. A Massachusetts' eviction proceeding is called a summary process action. Rule 1 of the Uniform Summary Process Rules states that procedures not governed by these rules are governed by the Massachusetts Rules of Civil Procedure so long as the civil procedure rules are not inconsistent with the Uniform Summary Process Rules. Except as provided in the commentary for Rule 5, Massachusetts' laws pertaining to evictions provide no guidance on continuances. Commentary to Rule 5 of the Uniform Summary Process Rules. Counterclaims of the Uniform Summary Process Rules state that a court, in its discretion, **may grant a motion for a continuance in order to grant a party time to prepare a defense to a counterclaim**. *See also* Rule 2 of the Uniform Summary Process Rules for the expedited timing of the summary process.	Mass. R. Civ. P., 40. Assignment of Cases for Trial: Continuances (b) Continuances. Continuances shall be granted only for **good cause**, in accordance with general rules and orders which the court may from time to time adopt. "A judge should grant a continuance only when justice so requires, balancing the requesting party's need for additional time against concerns about inconvenience, cost, potential prejudice, and the burden of the delay on both the parties and the judicial system. A judge has committed an abuse of discretion when the basis of the judge's decision stems from 'a clear error of judgment in weighing' the factors relevant to the decision and, thus, the decision falls outside the range of reasonable alternatives." *Nuruzzman v. Korotouov*, 2018 Mass. App. Div. 110, (Mass. Dist. Ct. 2018) (citing cases) (quoting *L.L. v. Commonwealth*, 470 Mass. 169, 185 n.27 (Mass. 2014)). *Dolben Co. v. Friedmann*, 2008 Mass. App. Div. 1, (Mass. Dist. Ct. 2008) (suggesting that a defendant in a summary process action may request a continuance).
Michigan	Michigan's landlord-tenant laws can be found at Mich. Comp. Laws Ann. § 554.601 to 554.616. The procedure for eviction is governed by a separate set of statutes, Mich. Ct. R. 4.201 *et seq*., which provide reference to the trial court's power to grant a continuance. A separate court rule provides a mechanism for staying the judgment pending appeal. Mich. Ct. R. 4.201. Summary Proceedings to Recover Possession of Premises. (J) Trial. (1) Time. When the defendant appears, the court may try the action, **or, if good cause is shown, may adjourn trial up to 56 days. If the court adjourns trial for more than 7 days, an escrow order may be entered pursuant to subrule (H)(2)**. The parties may adjourn trial by stipulation in writing or on the record, subject to the approval of the court. …. (M) Post judgment Motions. Except as provided in MCR 2.612, any post judgment motion must be filed no later than 10 days after judgment enters. (1) If the motion challenges a judgment for possession, the court may not grant a stay unless (a) the motion is accompanied by an escrow deposit of 1 month's rent, or (b) the court is satisfied that there are grounds for relief under MCR 2.612(C), and issues an order that waives payment of the escrow; such an order may be ex parte. If a stay is granted, a hearing shall be held within 14 days after it is issued. There have been some changes to Mich. Ct. R. 4.201 as a result of the COVID-19 pandemic. *See* Mich. Admin. Code r. 2020-17. *See also* Mich. Ct. R. 4.201(N) (staying an eviction during pendency of appeal).	Mich. Ct. R. 2.503 Adjournments (B) Motion or Stipulation for Adjournment. (1) Unless the court allows otherwise, a request for an adjournment must be by motion or stipulation made in writing or orally in open court and is **based on good cause**. Mich. Comp. Laws Ann. § 600.5744 does not require tenant to file bond to stay proceedings within 10 days after the judgment for possession is entered to toll running of period during which writ of restitution could not have been issued. *See Sun Valley Foods Co. v. Ward*, 460 Mich. 230, 596 N.W.2d 119 (Mich. 1999).

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Minnesota	Minnesota's landlord-tenant laws can be found at § 504B.001 *et seq*., and have several provisions governing continuances and stays. Minn. Stat. Ann. § 504B.341. Continuance of trial Under section (a), **the court has discretion to grant a continuance for no more than six days unless all parties consent to longer continuance**. Section (b) applies to actions brought under § 504B.285, which governs eviction actions for reasons other than nonpayment of rent. **In this case, the court shall continue the trial as necessary but for no more than 3 months** if the defendant or defendant's attorney states under oath that the trial cannot proceed because a material witness is not present, along with other factors. As of the date of the initial publication of this Survey, 2021, there is a bill engrossed in the Minnesota legislature that would repeal M.S.A. 504B.341. NINETY-SECOND SESSION H. F. No. 1077. *See also* Minn. Stat. Ann. § 504B.421: Hearings (which governs continuance of hearings in actions brought by a *tenant* against a landlord). Minn. Stat. Ann. § 504B.291(1)(a), providing a right of redemption. Under this law, the tenant may, **at any time before possession has been delivered, redeem the tenancy and be restored to possession by paying to the landlord or bringing to court the amount of the rent that is in arrears, with interest, costs of the action and an attorney's fee not to exceed $5**, and by performing any other covenants of the lease. If the tenant is unable to pay the interest and costs, the court may provide **an additional seven days** by using its authority under § 504B.345. Minn. Stat. Ann. § 504B.345. Subdiv. 2. Expedited writ: If the court enters judgment for the plaintiff in an action brought under section 504B.291 as required by section 609.5317, subdivision 1, the court may not stay issuance of the writ of recovery of premises and order to vacate **unless the court makes written findings specifying the extraordinary and exigent circumstances that warrant staying the writ for a reasonable period, not to exceed seven days**.	Minn. Stat. Ann. § 546.08. Continuance A motion to postpone a trial for the absence of evidence can only be made upon affidavit, stating the evidence expected to be obtained, the reasons for its absence and for expecting that it can be procured, and showing its materiality and that due diligence has been used to procure it; and if the adverse party thereupon admits that such evidence would be given and that it be considered as actually given at the trial, or offered and rejected as improper, the trial shall not be postponed. Minn. Stat. Ann. § 546.08: stating any postponement of trial requested must be accompanied by an affidavit which states the evidence expected to be obtained. "Generally, whether to stay a proceeding is discretionary with the district court, its decision on the issue will not be altered on appeal absent an abuse of that discretion, and the test for whether an abuse of discretion occurs is 'whether a denial of a continuance would prejudice the outcome of the trial.'" *Real Est. Equity Strategies, LLC v. Jones*, 720 N.W.2d 352, 358 (Minn. Ct. App. 2006) (quoting *Lanzo v. F & D Motor Works*, 396 N.W.2d 631, 635 (Minn. Ct. App. 1986)). "The granting of a continuance is within the trial court's discretion, however, and will not be reversed absent a clear abuse of discretion. The test for abuse of discretion is whether a denial of a continuance would prejudice the outcome of the trial." *Lanzo v. F & D Motor Works*, 396 N.W.2d 631, 635 (Minn. Ct. App. 1986) (citing cases).

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Mississippi	Mississippi's landlord-tenant laws can be found at § 89-8-1 *et seq*., and contain provisions for adjournments. Miss. Code Ann. § 89-7-39. Adjournments, subpoenas and attachments; hearings for evictions The court may, at the request of either party, adjourn the hearing from time to time, a single adjournment not to exceed ten (10) days, except by consent, and may issue subpoenas and attachments to compel the attendance of witnesses. **However, in hearings for eviction, no adjournment shall extend the entire hearing beyond forty-five (45) days from the date the eviction action was filed**. As amended in 2019, Mississippi law permits a tenant to redeem the property after judgment but before the warrant is issued by paying in full all past due rent, late fees and costs. The law also permits the tenant to request the execution of the warrant be stayed for up to 3 days upon a showing of good cause. *See* Miss. Code. Ann. § 89-7-45. When warrant for removal may issue in cases of nonpayment of rent. **If a judgment of eviction is founded solely upon the nonpayment of rent and, at the time of the request for the warrant for removal the full and complete amount of rent due**, including any late fees as provided in the rental agreement that have accrued as of the date of judgment, and the costs of the proceedings, **have been paid to the person entitled to the rent, the magistrate shall not issue a warrant for removal**. If the rent, late fees and costs have not been paid in full at the time of the request for the warrant for removal, the magistrate must immediately issue the warrant for removal **unless the judge determines that, for good cause shown, a stay not to exceed three (3) days would best serve the interests of justice and equity**. If it is shown that a stay is likely to result in material injury to the property of the person entitled to the rent, no stay shall be granted.	

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Missouri	Missouri's landlord-tenant laws, found at Mo. Ann. Stat. § 535.010 *et seq*., do not contain any provisions regulating continuances in actions for possession.	Mo. Ann. Stat. § 517.071 Continuation of case, when—rescheduling Generally providing that a case may be continued to a certain date, not exceeding thirty days, when court makes motion, all parties can agree, or upon application of any party for **good cause** shown. *See Stough v. Bregg*, 506 S.W.3d 400, 404 (Mo. Ct. App. 2016) (in an action for possession, the court concluded "there is nothing in the statute that would have prohibited [the tenants] from requesting a continuance before the… trial date."). As of the date of the initial publication of this Survey, there was legislation pending to amend Mo. Ann. Stat. § 517.071 to § 517.091. *See* 2021 Missouri Senate Bill No. 281, Missouri One-Hundredth First General Assembly, First Regular Session. "'Where a request meets the requirements of section 517.071.1, the continuance is mandatory, and a circuit court's refusal to grant the continuance constitutes a misapplication of the law warranting reversal.'" *Darby v. Mason*, 568 S.W.3d 35, 37–38 (Mo. Ct. App. 2019) (quoting *Boehm v. Allen*, 524 S.W.3d 542, 544 (Mo. Ct. App. W.D. 2017)).
Montana	Montana's landlord-tenant laws are found at Mont. Code Ann. § 70-24-101 to § 70-24-442, but the eviction process is governed by its Forcible Entry and Detainer statutes, found at Mont. Code Ann. § 70-27-101 *et. seq*. Mont. Code Ann. § 70-27-202. Actions in justice's court to be tried within 10 days (1) Actions filed in justice's court under this chapter shall be tried within 10 days after the appearance or answer date stated in the summons **unless the defendant applying for a continuance shall give an undertaking to the adverse party with good and sufficient security to be approved by the court**, conditioned for the payment of all damages and rent that may accrue if judgment be rendered against the defendant. (2) The **plaintiff and defendant may stipulate to a continuance** of the trial beyond the limit of this section without the necessity of an undertaking. Mont. Code Ann. § 70-27-204. Amendment of complaint after trial begins. (2) No continuance shall be permitted on account of such amendment unless the defendant by affidavit filed shows to the **satisfaction of the court good cause** therefor.	Mont. Code Ann. § 25-4-501. Motion to postpone trial for absence of testimony A motion to postpone a trial on grounds of the absence of evidence shall only be made upon affidavit showing the materiality of the evidence expected to be obtained and that due diligence has been used to procure it.

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Nebraska	Nebraska's landlord-tenant laws, found at § 76-1401 *et seq*., provide that one continuance may be granted for good cause and subsequent continuances may be granted for extraordinary cause. Neb. Rev. Stat. § 76-1443. Continuance; when. The court may grant a continuance **for good cause shown by either party**, but no subsequent continuance shall be granted except by agreement or unless **extraordinary cause** be shown to the court. For any subsequent continuance extending the initial trial date into the next periodic rental period, the court may require a tenant to deposit with the clerk of the court such rental payments as accrue during the pendency of the suit.	In actions filed in District Court, an application for continuance must be in writing and supported by an affidavit that contains factual allegations demonstrating good cause or sufficient reason necessitating postponement of proceedings. *See* Neb. Rev. Stat. § 25-1148. *See also* Neb. Rev. Stat. § 25-2701 (providing that certain rules applicable in district court would also apply in county court, where most eviction matters are filed). *But see State v. Brooks*, 285 Neb. 640, 644-45 (2013) (finding that a court can grant a motion to continue even if the written motion was not filed, so long as the motion is set forth in the record). *See Kelly v. Frederickson*, No. CI00-59, at *1 (Neb. Dist. Ct. Feb. 17, 2001) ("...the court overruled the motion for continuance because there was "**no showing of good cause** or appearance by the [d]efendant....").
Nevada	Nevada's landlord-tenant laws, found at Nev. Rev. Stat. § 118A.010 *et seq*., do not contain any general provisions specifically related to continuances of an eviction proceeding. Although, Nev. Rev. Stat. § 118A.490 **requires tenant to deposit rent** to court if "judgment is delayed for any reason"—implying continuances would be permitted. Nevada law does provide seniors and people with disabilities a right, in "no cause" evictions (non-renewals), to request an additional 30 days to move. Also, Nevada appears to provide tenants a right to delay the execution of the writ by up to 10 days. *See* Nev. Rev. Stat. § 70.010. *See also* Nev. Rev. Stat. Ann. § J CTS RCP Rule 73A (right to state judgment upon appeal by paying bond).	Nev. Rev. Stat. § 16.010. Motion to postpone trial on ground of absence of evidence Generally, the statute provides that a trial may be postponed for an absence of evidence. However, it appears each court may adopt its own rule on continuances. *See* Dist. Ct. R. Civ. P. Rule 13. Continuances, which allows a continuance to be granted for good cause. *See also* Justice Ct. R. Civ. P. 12. Motions for Continuance: Contents, Service of Affidavits; Counter-Affidavits; Argument. **(a)** No continuance of a trial in a case shall be granted **except for good cause**. A motion or stipulation for continuance shall state the reason therefor and whether or not any previous request for continuance had been either sought or granted. The motion or stipulation must certify that the party or parties have been advised that a motion or stipulation for continuance is to be submitted on their behalf and must state any objection the parties may have thereto. **(b)** If a continuance of any trial is granted, the parties must appear before the clerk of the court within 5 business days and reset the case, unless the court waives this requirement. Failure to follow this rule may result in the court setting the trial date.

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
New Hampshire	New Hampshire does not appear to have a landlord-tenant act. In New Hampshire, eviction actions are governed by N.H. Rev. Stat. § 540:1 *et seq*., and provide no specific guidance on continuances in eviction proceedings. However, it does provide for a right to request a stay of the execution of the judgment for up to three months, so long as the tenant pays rent into the court during this period. N.H. Rev. Stat. § 540:13-c Discretionary Stay Dependent on Payment of Rent I. If the defendant defaults, or confesses judgment, or if on trial the court rules that the landlord has sustained his complaint, judgment shall be rendered that the landlord recover possession of the premises and costs. A writ of possession shall be issued, provided that, **the court may order the tenant shall not be dispossessed until a date not later than 3 months from such default, confession of judgment, or ruling of the court**, provided the court decides that under all the circumstances justice requires such stay, based on the reasonableness and good faith of the parties in their respective reports, complaints, demands, and evidence. In the event of any such stay of dispossession, the tenant shall pay the landlord weekly in advance the weekly former rent, or the proportional weekly part of the former rent if rent was payable less often than weekly, and on default of any such advance weekly payment a writ of possession shall be issued and the sheriff shall evict the tenant as soon as possible. New Hampshire also recently enacted law providing for a right to redeem the tenancy at any time prior to the hearing on the merits. N.H. Stat. § 540:9.	This statute (N.H. Rev. Stat. § 540: 13-c) expressly excludes a discretionary stay where the landlord establishes nonpayment of rent. *Nashua Hous. Auth. v. Tassie*, 121 N.H. 449, 450, 431 A.2d 134, 134 (1981).
New Jersey	New Jersey's landlord-tenant laws, found at § 2A:18-51 *et seq*., do not govern continuances of the trial for possession. However, there are three laws that permit the delay of the execution of the eviction order: N.J. Ct. R. 6:6-6. (extra time to move) **Permits a tenant to seek more time to move out, up to 7 days, upon a showing of good reason** why they cannot be out in time. N.J. Stat. § 2A:42-10.6. (Hardship Stay) – the court can grant an **additional 6 months if the tenant can show they are unable to find another place to live**. Then tenant must agree to pay the rent during the time the hardship stay is granted. *See also Hous. Auth. of City of Newark v. West*, 69 N.J. 293, 301, 354 A.2d 65, 69 (1976). N.J. Stat. Ann. § 2A:18-59.1. (Terminal Illness Stay) A court can grant an additional 12 months if the tenant can prove they have a terminal illness, have lived in the unit for at least 2 years prior, and is current in rent payments.	Evictions take place in Superior Court. Below is the Superior Court rule on a obtaining a continuance, referred to in New Jersey as an adjournment. N.J. Ct. R. 4:36-3. Trial Calendar (b) Adjournments, Generally. An initial request for an adjournment for a reasonable period of time to accommodate a scheduling conflict or the unavailability of an attorney, a party, or a witness **shall be granted if made timely in accordance with this rule**. The request shall be made in writing stating the reason for the request and that all parties have consented thereto. The written adjournment request, which shall be submitted to the civil division manager, shall also include a proposed trial date, agreed upon by all parties, to occur as soon as possible after the problem requiring the adjournment is resolved. If consent cannot be obtained or if a second request is made, the court shall determine the matter by conference call with all parties. **Requests for**

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
New Jersey, *continued*	New Jersey law also provides a right to redeem the property by paying all amounts past due prior to the entry of final judgment. *See* N.J. Stat. § 2A:18-55. *See also* 23A N.J. Prac., Landlord And Tenant Law § 43.11 (5th ed.).	**adjournment should be made as soon as the need is known but in no event, absent exceptional circumstances, shall such request be made later than the close of business on the Wednesday preceding the Monday of the trial week**. No adjournments shall be granted to accommodate dispositive motions returnable on or after the scheduled trial date. For cases interpreting N.J. Stat. § 2A:18-55 (right of redemption), *See Cmty. Realty Mgmt., Inc. for Wrightstown Arms Apartments v. Harris*, 155 N.J. 212 (1998); *Hous. Auth. of Town of Morristown v. Little*, 135 N.J. 274 (1994); *Hous. Auth. of City of Wildwood v. Hayward*, 81 N.J. 311, 316 (1979) (holding that even upon default, the tenants would have had until the close of the court day to pay the rent arrearages into court and have the proceedings dismissed. N.J.S. 2A:18-55.).
New Mexico	New Mexico's landlord-tenant laws are titled Owner-Resident Relations, and can be found at § 47-8-1 *et seq*., and provide that continuance may be granted for good cause. N.M. Stat. Ann. § 47-8-43. Issuance of summons B. Upon finding of **good cause**, the court may continue the date of hearing on the action for possession for up to seven days from the date of the initial hearing. As of the date of the initial publication of this Survey, there was proposed legislation that would remove the 7-day cap. It would add a section (c) that would require the court to provide the plaintiff with a list of non-profits who help with rental assistance. See 2021 New Mexico House Bill No. 111, New Mexico Fifty-Fifth Legislative Session - First Session 2021.	
New York	New York's landlord-tenant laws can be found at § 220 *et seq*., but eviction proceedings are governed by the rules for Summary Proceedings to Recover Possession of Real Property found at § 701 *et seq*. N.Y. Real Prop. Acts. Law § 745 (McKinney) 1. Where triable issues of fact are raised, they shall be tried by the court unless, at the time the petition is noticed to be heard, a party demands a trial by jury, in which case trial shall be by jury. **At the time when issue is joined the court, at the request of either party shall adjourn the trial of the issue, not less than fourteen days, except by consent of all parties. A party's second or subsequent request for adjournment shall be granted in the court's sole discretion**. As of the date of initial publication of this Survey, this law was under review in a current congressional session. 2021 New York Assembly Bill No. 7570, New York Two Hundred Forty-Fourth Legislative Session. *See also* N.Y. Real Prop. Acts. Law § 751 (stay upon payment of rent or giving undertaking – equivalent to a right of redemption); N.Y. Real Prop. Acts. Law § 753 (stay for up to 1 year upon a showing that the tenant cannot reasonably find suitable replacement housing).	"…it is well settled that the grant or denial of a motion for an adjournment for any purpose is a matter resting within the sound discretion of the trial court." *Matter of Cassini*, 182 A.D.3d 1, 9, 118 N.Y.S.3d 702, 707 (N.Y. App. Div. 2 2020) (citations omitted, see case for additional factors). "[If] a party serves motions with little or no notice as permitted by CPLR 406, it is only fair and reasonable for the court to provide an adequate adjournment to allow for a response to those motions which cannot be disposed of summarily on their return date." *Goldman v. McCord*, 120 Misc. 2d 754, 756, 466 N.Y.S.2d 584, 586 (N.Y. Civ. Ct. 1983). *See also* CPLR 406: Motions at Special Proceedings.

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
North Carolina	North Carolina's landlord-tenant laws, found at § 42-1 *et seq.*, do not include any provisions governing continuances of eviction matters tried before a magistrate. However, it appears that on appeal of a ruling by a magistrate, the matter is retried in the district court, wherein certain rules governing continuances apply: N.C. Gen. Stat. Ann. § 42-34. Generally: (a) implies that a party may request an extension under Rule 40: "if the case has not been previously continued in district court, the court shall continue the case for an appropriate period of time if any party initiates discovery or files a motion…". Also, subsections (b)-(f) govern the undertaking of an appeal and a stay on execution of a judgment for ejection pending an appeal. Specifically, (b) provides that a tenant may secure a stay on execution of the order issued by the magistrate if he or she pays the clerk any rent that accumulates after the judgment and any undisputed amount of rent in arrears. Additionally, if the action was for unpaid rent, the tenant must pay prorated rent for the days between the day that the judgment was entered and the next day when rent will be due under the lease. To avoid paying rent in arrears (but must still pay as it becomes periodically due), a tenant can appeal as an indigent under (c). Certain factors automatically qualify a tenant as indigent. If the tenant does not meet those factors, he or she can file an Affidavit of Indigency Form. Under (f), if the defendant fails to make payment within 5 business days of the due date, execution on the judgment for possession will be entered.	N.C. Gen. Stat. Ann. R. Civ. P. § 1A-1, Rule 40. Assignment of cases for trial; continuances (b) No continuance shall be granted except upon application to the court. **A continuance may be granted only for good cause shown** and upon such terms and conditions as justice may require…. *See also Morguard Lodge Apartments, LLC v. Follum*, 268 N.C. App. 466, 834 S.E.2d 455 (2019), *appeal dismissed, review denied*, 839 S.E.2d 349 (N.C. 2020), and *review dismissed*, 839 S.E.2d 843 (N.C. 2020) (citing Rule 40). In order to stay execution of judgment for landlord in summary ejectment proceeding entered 2 days before rent was due, tenant was not required to either make additional undertaking to pay prorated rent for days between day that judgment was entered and next day when rent was due or to file in forma pauperis affidavit, where tenant obtained stay of execution by signing undertaking that she would pay to clerk of superior court amount of contract rent as it became due periodically after judgment was entered. *Fairchild Properties v. Hall*, 122 N.C. App. 286, 468 S.E.2d 605 (1996).
North Dakota	North Dakota's landlord-tenant laws, found at § 47-16-01 *et seq*., do not contain any provisions specifically related to continuances. However, North Dakota law does provide a mechanism for requesting a stay of the execution of the order upon a showing of substantial hardship. N.D. Cent. Code Ann., § 47-32-04. Eviction actions not joinable with other actions—Exception—When counterclaims only interposable. …Upon a showing by the defendant that immediate restitution of the premises would work a **substantial hardship** on the defendant or the defendant's family, except in cases in which the eviction judgment is based in whole or in part on a disturbance of the peace, the court may stay the special execution for a reasonable period, not to exceed five days.	N. D. R. Ct. 6.1 Continuances (a) Attorney Engaged. A party is entitled to a continuance on the ground that his attorney is actually engaged in another trial or hearing, but only for the duration of the particular trial or hearing in which the attorney is then engaged. (b) Other Continuances. Motions for continuance shall be promptly filed as soon as the grounds therefor are known and will be granted only for **good cause shown**, either by affidavit or otherwise. Stipulations for continuance will not be recognized except for good cause shown. Every continuance granted upon motion must be to a future date consistent with the docket currency standards for district courts, except for good cause shown.

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Ohio	Ohio's landlord-tenant laws, found at § 5321.01 *et seq*., do not contain any provisions specifically related to continuances. Ohio Rev. Code Ann. § 1923.08 Continuance; bond **No continuance in an action under this chapter shall be granted for a period longer than eight days**, unless the plaintiff applies for the continuance and the defendant consents to it, or unless the defendant applies for the continuance and gives a bond to the plaintiff, with good and sufficient surety, that is approved by the court and conditioned for the payment of rent that may accrue, if judgment is rendered against the defendant.	A continuance is granted at the discretion of the court; the court considers six factors when determining if a continuance should be granted. *Mentor Economic Assistance Corp. v. Eichels*, 61 N.E.3d 670 (Ct. App. Ohio, 11th Dist. 2016). "The statutes in R.C. Chapter 1923 permit expedited service of process, as little as seven days before trial (R.C. 1923.06(A)) and limit the defendant to requesting a continuance of no more than eight days, unless a bond is provided (R.C. 1923.08). Each of these provisions serves to speed the ultimate resolution of a forcible entry and detainer action. However, the law also allows either party to demand a jury trial, which is not consistent with creating a summary or expedited trial procedure." R.C. 1923.10. *T&R Properties, Inc. v. Wimberly*, 2020-Ohio-4279, ¶ 29, 158 N.E.3d 137, 150.
Oklahoma	Oklahoma's version of the URLTA, 41 Okl. Stat. Ann. §§ 101 to 201, does not govern continuances (nor eviction proceedings, for that matter). Rather, Oklahoma's Forcible Entry and Detainer statutes set forth the process for proceeding in an action for possession. *See* Okla. Stat. Civ. Proc. § 12-1148.1. Oklahoma's FED statutes do not specifically govern the continuance of a trial for possession. However, the law does provide for an opportunity to stay the writ pending appeal: 12 Okl. St. Ann. § 1148.10A. F. The plaintiff's, the agent of the plaintiff's, or the officer's return shall be as upon other executions. **Within two (2) days of the date of the judgment, the defendant may post supersedeas bond conditioned as provided by law. This time limit may be enlarged by a trial judge's order to not more than seven (7) days after the date of judgment**. 12 Okl. St. Ann. §1148.10B. Curing of default—Good faith claim of failure to provide minimum services A. A tenant shall be allowed to cure a default in a forcible entry and detainer action in the following instance: The default of the tenant was due to unpaid rent which was unpaid due to the good faith claim of a tenant that the landlord failed to provide the minimum services required by subsection C of Section 121 of Title 41 of the Oklahoma Statutes; provided that written notice of said claim or actual notice to the landlord's agent for collecting rent is **provided within ten (10) days of the date that rent became due**. B. In such instance, the order of the court must recite that the tenant by paying the judgment including court costs and attorney fees, by cash or cashier's check, **within seventy-two (72) hours can avoid a writ of execution, cure the breach and remain in the premises**.	12 Okl. St. Ann. §§ 667 and 668 are Oklahoma's continuance statutes. Section 667 allows a continuance for **good cause shown**, but only applies if a party or his attorney of record is a state legislator. Section 668 applies to a continuance needed due to the absence of evidence or a witness. Most Oklahoma cases on continuances apply to criminal cases or a continuance by a party opposing a motion for summary judgment. However, outside of those contexts the Oklahoma Supreme Court has ruled that "The granting of continuance is within sound discretion of [the] trial court and refusal to grant continuance does not constitute reversible error unless abuse of discretion is shown." *Herbert v. Chicago, R.I. & P.R. Co.*, 544 P.2d 898, 900 (1975).

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Oregon	Oregon's version of the URLTA, Or. Rev. Stat. Ann. §§ 90.100 to 90.450, does not govern continuances. Rather, Oregon's Forcible Entry and Wrongful Detainer governs trial proceedings for an eviction. Oregon's FED statutes provide: Or. Rev. Stat. Ann. § 105.140. Continuance No continuance shall be granted to a defendant for a longer period than two days unless: (1) The defendant gives an undertaking to the adverse party **with good and sufficient security**, to be approved by the court, conditioned for the payment of the rent that may accrue if judgment is rendered against the defendant; or (2) In an action for the recovery of the possession of a dwelling unit to **which ORS chapter 90 applies, the court orders a defendant to pay rent into court as it becomes due from the commencement of the action until entry of a general judgment in the action**. If a defendant fails to pay rent into court as ordered under this subsection, the action shall be tried forthwith. As of the date of the initial publication of this Survey, there is a bill pending that makes provisions to Or. Rev. Stat. Ann. §§ 90.100-90.450. 2021 Oregon House Bill No. 3306, Oregon Eighty-First Legislative Assembly.	Or. R. Civ. P.52. Postponement of cases **A. Postponement**. When a cause is set and called for trial, it shall be tried or dismissed, **unless good cause is shown for a postponement**. At its discretion, the court may grant a postponement, with or without terms, including requiring any party whose conduct made the postponement necessary to pay expenses incurred by an opposing party. Or. Rev. Stat. Ann. § 105.111: State service member 2) In an action pursuant to ORS 105.110, the court may stay the eviction of the defendant for up to 90 days if: (a) The defendant is a state service member; (b) The agreed-upon rent does not exceed $1,200 per month; and (c) The premises are occupied chiefly for dwelling purposes by the spouse, children or other dependents of the defendant. "Generally, the court may grant continuances at its discretion, with or without terms. ORCP 52A. ...The statute, however, does not forbid the court from granting a continuance on different terms with the agreement of the parties." *First Interstate Bank of Oregon, N.A. v. Broadway Mall, Inc.*, 68 Or. App. 587, 590, 682 P.2d 821, 822 (1984). "The allusion in the statute to the period during which "rent * * * may accrue" refers to the time between the granting of a continuance on a defendant's application therefor and the date judgment is rendered." *Owen J. Jones & Son, Inc. v. Gospodinovic*, 46 Or. App. 101, 106, 610 P.2d 1238, 1241 (1980).
Pennsylvania	In Pennsylvania, eviction proceedings occur in Magisterial District Court, which has its own court rules governing continuances and stays.	*See* Pa. R. Civ. No. 209 Continuances and Stays. In general, Rule 209 states that continuances may be **granted for cause or by agreement and shall be to a specific time and date**. Except for good cause shown, not more than one continuance shall be granted to each party and shall not extend the date beyond 90 days for proceedings commenced pursuant to Rule 303 or beyond 30 days for proceedings commenced pursuant to Rule 502. *See also* Pa. R. Civ. P. No. 216: Grounds for continuance *See also Philadelphia v. Snitow & Snitow Profit PA*, No. 51 C.D. 2020, 2021 WL 2832918, at *5 (Pa. Commw. Ct. July 8, 2021) (*citing Gillespie v. Com., Dep't of Transp., Bureau of Driver Licensing*, 886 A.2d 317, 320 (Pa. Commw. Ct. 2005)). ("...a trial court abused its discretion in denying a continuance request based solely on the application of an established policy requiring agreement

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Pennsylvania *continued*		between parties regarding continuations without considering the merits of a specific request or whether the non-requesting party would be prejudiced by a continuance."). *City of Philadelphia v. Snitow & Snitow Profit PA*, No. 51 C.D. 2020, 2021 WL 2832918, at *4 (Pa. Commw. Ct. July 8, 2021) (general explanation of judicial discretion). *Zarrin v. Jeffries-Baxter*, 2007 PA Super 354, ¶ 11, 937 A.2d 1126, 1129 (2007) (tenant forgetting court date unsatisfactory excuse for a continuance). *Online Auctions v. Brimar Enterprises, LLC*, No. 391 WDA 2014, 2015 WL 7573414, at *4 (Pa. Super. Ct. Jan. 20, 2015) (party illness where they informed opposing counsel, satisfactory for a continuance).
Rhode Island	Rhode Island's landlord-tenant laws can be found at § 34-18-1 *et seq*., and provide that a continuance may be granted if the tenant files an answer and begins discovery before the hearing. 34 R.I. Gen. Laws § 34-18-35. Eviction for nonpayment of rent (d) **If the defendant files his or her answer and commences discovery prior to the hearing, and it appears, for good cause shown**, that the defendant will not be able to conduct his or her defense without the benefit of discovery, the court may continue the hearing to allow a reasonable time for the completion of discovery.... *See also* 34 R.I. Gen. Laws § 34-18-47 to 52 (providing automatic 5-day stay, and may stay execution during pendency of appeal if pays rent as accrues).	
South Carolina	South Carolina's landlord-tenant laws are found at S.C. Code §§ 27-40-10 to 27-40-940, but eviction proceedings are governed by its ejectment statutes. South Carolina's ejection statutes do not include any provisions pertaining to the continuance of an ejectment proceeding. However, they provide for an opportunity for the tenant to stay the execution during the pendency of an appeal upon payment of a bond. S.C. Code § 27-37-130. Bond required to stay ejectment on appeal. **An appeal in an ejectment case will not stay ejectment unless at the time of appealing the tenant shall give an appeal bond** as in other civil cases for an amount to be fixed by the magistrate and conditioned for the payment of all costs and damages which the landlord may sustain thereby. In the event the tenant shall fail to file the bond herein required within five days after service of the notice of appeal such appeal shall be dismissed by the trial magistrate.	SCRCP 40. General Docket, Trial Rosters, and Call of Cases for Trial (i) Continuance (1) For Cause. As actions are called, counsel may request that the action be continued. **If good and sufficient cause for continuance is shown, the continuance may be granted by the court**. Ordinarily such continuances shall be only until the next term of court. Each scheduled calendar week of circuit court shall constitute a separate term of court.

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
South Dakota	South Dakota's landlord-tenant act is titled Lease of Real Property and can be found at S.D. Codified Laws § 43-32-1 *et seq*., but the eviction process is conducted pursuant to its Forcible Entry and Detainer Statutes found at S.D. Codified Laws § 21-16-1 *et seq*., which permits continuances of up to fourteen days. S.D. Codified Laws § 21-16-7. Time for appearance by defendant The time for appearance and pleading shall be four days from the time of service on the defendant or thirty days after the publication of service under § 21-16-6.1, whichever occurs sooner. **No adjournment or continuance shall be made for more than fourteen days, unless** the defendant applying therefor shall give an undertaking to the plaintiff with **good and sufficient surety** to be approved by the court, conditioned for the payment of the rent that may accrue, together with costs if judgment be rendered against the defendant.	S.D. Codified Laws § 15-11-4: Postponement of trial or hearing: "When an action or proceeding is called for trial or hearing, or at any time previous thereto, the court or judge may, **upon good cause shown**, direct the trial or hearing to be postponed to another day of the same or next term, or to such time as shall be just in view of all the circumstances." In determining good cause, the court considers four factors. *Meadowland Apartments v. Schumacher*, 813 N.W.2d 618, (S.D. 2012). "A continuance of up to five days could have been granted to Mr. Soltesz only if he posted surety to cover the rent due..." *Soltesz v. Rushmore Plaza Civic Ctr.*, 863 F. Supp. 2d 861, 882 (D.S.D. 2012).
Tennessee	Tennessee's landlord-tenant laws are found at Tenn. Code Ann. §§ 66-28-101 to 66-28-521, but the eviction process is conducted pursuant to its Forcible Entry and Detainer statutes, which permit a continuance for up to 15 days upon a showing of good reason. Forcible entry and detainer Tenn. Code Ann. § 29-18-118. Trial; postponement The general sessions judge may, at the request of either party, **and on good reason being assigned, postpone the trial to any time not exceeding fifteen (15) days**. The postponement shall not be for a longer period of time unless agreed upon by the parties, no civil court is being conducted, or upon request of the plaintiff, the party making the application for postponement paying the costs.	
Texas	Texas' Forcible Entry and Detainer statutes, found at Property Code, Title 4. Actions and Remedies, Chapter 24, Forcible Entry and Detainer, govern the process for proceeding in an action for possession, but do not include any provision specifically governing continuances.	Eviction proceedings for Forcible Entry and Detainer in Texas take place in Texas Justice Court. Texas Justice Courts have their own rules of civil procedure and have specific rules of procedure for evictions. Tex. R. Civ. P. 503.3. Settings and Notice; Postponing Trial. (b) Postponing Trial. A party may file a motion requesting that the trial be postponed. **The motion must state why a postponement is necessary. The judge, for good cause, may postpone any trial for a reasonable time.** Tex. R. Civ. P. 510.7. Trial. (c) Limit on Postponement. Trial in an eviction case **must not be postponed for more than 7 days total** unless both parties agree in writing. Due to COVID-19, Texas has created a Texas Eviction Diversion Program that the judge has to inform tenants about at a 510.7 trial. *See Forty-Second Emergency Ord. Regarding COVID-19 State of Disaster*, No. 21-9118, 2021 WL 4436908, at *2 (Tex. Sept. 21, 2021).

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Utah	Utah Code Ann. §§ 78b-6- 801 to 78b-6-816 Forcible Entry and Detainer, governs eviction hearings in Utah. It does not include any provisions governing a continuance of a trial on an action for possession. In Utah, unlike in many states, the trial date is not immediately set (except in cases involving alleged criminal activity. *See* § 78-B-6-810(3)). Instead, the tenant is required to file an answer within 3 days of being served. If they fail to file an answer within 3 days, a default judgment will be entered in favor of the landlord and the landlord can immediately request an Order of Restitution. If they answer, a hearing will be held within 10 days to determine whether further hearing is required, and if so, whether the tenant should be permitted to remain in the premises in the interim; the matter can also be tried on the merits at that initial hearing. Enforcement of an order of restitution may be stayed if the tenant requests a hearing to contest the manner of the enforcement of the order and deposits a bond with the court. *See* Utah Code Ann. § 78B-6-812.	Utah R. Civ. P. 40. Scheduling and Postponing a Trial (b) Postponement. The court may postpone a trial **for good cause** upon such terms as are just, including the payment of costs. *See Brown v. Glover*, 16 P.3d 540, 548-49 (2000) ("'Trial courts have substantial discretion in deciding whether to grant continuances,' (and their decision will not be overturned unless that discretion has been clearly abused.") (*quoting Christenson v. Jewkes*, 761 P.2d 1375, 1377 (Utah 1988), citing *State v. Cabututan*, 861 P.2d 408, 413 (Utah 1993)).
Vermont	Vermont's landlord-tenant laws are found at 9 Vt. Stat. Ann. Part 7, but its eviction proceedings are governed by either 12 Vt. Stat. Ann. § 4851 *et seq*. (Superior Court Ejectment), or 12 Vt. Stat. Ann. § 4911 *et seq*. (Entry or Detainer). Neither provide any provisions governing the continuance of an eviction proceeding.	Vt. R. Civ. P. 40: RULE 40. CALENDAR; ASSIGNMENT; CONTINUANCES; DISQUALIFICATION (c) Continuances. (1) An action that is among the first twenty cases assigned for trial on a trial list issued under paragraph (a)(2) of this rule, or an action that has been specially assigned for trial, may be continued by agreement of the parties only (A) upon notice to the clerk 24 hours before the time set for trial and (B) if the assigned trial date is less than one year from the date of entry of the action. If so continued, an action shall thereafter be placed on a trial list or specially assigned only upon motion and a showing that the parties are, or reasonably can be, ready for trial. An action listed on a trial list that is not among the first twenty cases assigned for trial may be continued at any time by agreement of the parties, subject to the provisions of Rule 41(b)(1). (2) A motion for continuance of an action shall be made not later than the opening of the court on the second day of the term in which the action is in order for trial; but if the cause or ground of the motion is not then known, the motion may be made as soon as practicable after the cause or ground becomes known. Ordinarily, the only grounds for continuance after the second day of the term will be the sickness of counsel or parties, the unavoidable absence of a material witness or evidence, or the rulings of the Administrative Judge as to conflicting appointments of trial attorneys. (3) The entry "continued" shall carry with it an enlargement of all former orders not complied with, executed, or expressly discharged. The court may continue the action on such conditions as to costs and other matters as may be fair and equitable.

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Vermont *continued*		*See also Kokoletsos v. Frank Babcock & Son, Inc.*, 149 Vt. 33, 35, 538 A.2d 178, 179 (1987). ("It is well settled that the 'granting of a continuance by the trial court is a matter of discretion.'" (*quoting In re* R.S., 143 Vt. 565, 570, 469 A.2d 751, 754 (1983)). "Further, the trial court's 'ruling must be upheld unless that discretion is exercised upon grounds clearly untenable, or to an extent clearly unreasonable.'") (*quoting Cartin v. Continental Homes*, 134 Vt. 362, 365, 360 A.2d 96, 99 (1976)).
Virginia	Virginia's landlord-tenant laws can be found at § 55.1-1200 *et seq*., and provide that a continuance may be granted if the tenant pays rent into the court or asserts a good faith defense to the claim. Va. Code Ann. § 55.1-1242. Rent escrow required for continuance in tenant's case A. Where a landlord has filed an unlawful detainer action seeking possession of the premises as provided by this chapter and the tenant seeks to obtain a continuance of the action or to set it for a contested trial, **the court shall, upon request of the landlord, order the tenant to pay an amount equal to the rent that is due as of the initial court date into the court escrow account prior to granting the tenant's request for a delayed court date. However, if the tenant asserts a good faith defense, and the court so finds, the court shall not require the rent to be escrowed. If the landlord requests a continuance or to set the case for a contested trial, the court shall not require the rent to be escrowed**. B. If the court finds that the tenant has not asserted a good faith defense, the tenant shall be required to pay an amount determined by the court to be proper into the court escrow account in order for the case to be continued or set for contested trial. **The court may grant the tenant a continuance of no more than one week to make full payment of the court-ordered amount into the court escrow account**. If the tenant fails to pay the entire amount ordered, the court shall, upon request of the landlord, enter judgment for the landlord and enter an order of possession of the premises. In addition, Virginia provides a redemption period, permitting the tenant to pay the past due rent in full, or present a "redemption tender" on or before the "return date" (the date the parties are ordered to return to the court, which must be at least 10 days after service of summons), and have the matter dismissed. Upon request, and presentment of a "redemption tender," the court can postpone the case for ten days to allow the tenant to return with the full amount due. *See* Va. Code Ann. § 55.1-1250 B.	Va. Code Ann. § 44-209: Closure of United States government; civil relief for furloughed employees and contractors B. Notwithstanding any provision of law to the contrary, any tenant as defined in § 55.1-1200 who is a defendant in an unlawful detainer for nonpayment of rent pursuant to § 55.1-1245 for rent due after the commencement of a closure of the United States government seeking a judgment for the payment of money or possession of the premises shall be granted a 60-day continuance of such unlawful detainer action from the initial court date if the tenant appears on such court date and provides written proof that he was furloughed or otherwise was or is not currently receiving wages or payments as a result of a closure of the United States government, and is (i) an employee of the United States government, (ii) an independent contractor for the United States government, or (iii) an employee of a company under contract with the United States government. The provisions of this subsection shall not apply if the landlord has filed a material noncompliance notice for a non-rent violation of the rental agreement or of the Code of Virginia. "The decision to grant a motion for a continuance is within the sound discretion of the circuit court and must be considered in view of the circumstances unique to each case. The circuit court's ruling on a motion for a continuance will be rejected on appeal only upon a showing of abuse of discretion *and* resulting prejudice to the movant…. [W]hen a circuit court's refusal to grant a continuance 'seriously imperil[s] the just determination of the cause,' the judgment must be reversed." *Haugen v. Shenandoah Valley Dept. of Social Services*, 274 Va. 27, 34, 645 S.E.2d 261, 265 (2007).

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Washington	Washington's landlord-tenant act, found at § 59.18.010 *et seq*., does not contain a provision regulating the continuance of a trial on an action for possession. However, Washington law does provide tenants a right to redemption. *See* Wash. Rev. Code Ann. § 59.18.410. Forcible Entry or detainer actions—Notice of default—Writ of restitution—Judgment—Execution (2) ... Before entry of a judgment or until five court days have expired after entry of the judgment, the tenant or any subtenant, or any mortgagee of the term, or other party interested in the continuance of the tenancy, may pay into court or to the landlord the amount of the rent due, any court costs incurred at the time of payment, late fees if such fees are due under the lease and do not exceed seventy-five dollars in total, and attorneys' fees if awarded, in which event any judgment entered shall be satisfied and the tenant restored to his or her tenancy.... In actions where the rent does not exceed $40 per month, which likely never occurs in present day, Washington law has a separate set of statutes that regulate actions for possession, including a statute that governs continuances. *See* Wash. Rev. Code Ann. § 59.08.050: Continuance (No continuance shall be granted for a longer period than two days unless the defendant applying therefor shall give good and sufficient security, to be approved by the court, conditioned upon the payment of rent accrued and to accrue, if judgment be rendered against the defendant.).	Comments related to the intent of § 59-18-410 can be found within the comments to § 59.12.030: Unlawful detainer defined: It is the long-standing practice of the state to make rental assistance available in many such urgent situations, and it is the intent of the legislature to provide a payment on the tenant's behalf to the landlord in certain eviction proceedings to give the tenant additional time to access resources that allow the tenants to stay in their home. Although a motion for continuance is addressed to the discretion of the trial court, it nevertheless must comply with applicable rules. *Makoviney v. Svinth*, 21 Wash. App. 16, 584 P.2d 948 (Div. 2 1978).
West Virginia	West Virginia's landlord-tenant laws can be found at § 37-6-1 *et seq.*, but its eviction process is governed by its Unlawful Entry and Detainer laws found at § 55-3-1 *et seq*. which provide a right to a continuance for cause. W. Va. Code Ann. § 55-3A-3. Proceedings in court; final order; disposition of abandoned personal property (d) **Continuances of the hearing provided for in this section shall be for cause only and the judge or magistrate shall not grant a continuance to either party as a matter of right**. If a continuance is granted upon request by a tenant, the tenant shall be required to pay into court any periodic rent becoming due during the period of such continuance.	"The granting of a continuance is a matter within the sound discretion of the trial court, although subject to review, and the refusal thereof is not ground for reversal unless it is made to appear that the court abused its discretion, and that its refusal has worked injury and prejudice to the rights of the party in whose behalf the motion was made." *State v. Jones*, 84 W.Va. 85, 99 S.E. 271 (1919).

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State	Residential Landlord-Tenant Act or Related Act Governing Eviction Proceedings	Rules of Civil Procedure or Case Law
Wisconsin	Wisconsin's landlord-tenant laws are found at Wis. Stat. Ann. § 704.01 *et seq*., but the procedure for an action for possession is found at Wis. Stat. Ann. §§ 799.40 to 799-.45. Small Claims Court - Eviction Actions. Wis. Stat. Ann. § 799.40, subsection (4) provides that the **court shall stay an eviction proceeding if the tenant applies for emergency assistance for families with needy children, but only if a writ has not been issued**. The stay remains in effect until the tenant's eligibility for assistance is determined. Wis. Stat. Ann. § 799.44 provides that a writ of restitution may be stayed for up to 30 days if the court determines hardship exists. To obtain the stay, the tenant must pay all rent past due, as well as ongoing rent. Wis. Stat. Ann. § 799.445 provides a means for the writ to be stayed pending appeal.	*See* Jay Grenig and Nathan Fishbach, 4 Wis. Prac., Civil Procedure Forms 5:12 and 5:13 (3d ed.) (Courts have inherent power to grant continuances, and are within a court's discretion.). In any event, in balancing the needs of the tenant against those of the landlord, we are satisfied that implicit in the Wis. Stat. § 799.40(4) stay is the requirement that the stay will remain in effect for only a reasonable period of time as determined by the judge under the circumstances in each individual case. *McQuestion v. Crawford*, 2009 WI App 35, ¶ 14, 316 Wis. 2d 494, 505, 765 N.W.2d 822, 827.
Wyoming	All eviction proceedings in Wyoming proceed pursuant to its Forcible Entry and Detainer statutes at § 1-21-1001 *et seq*. 1977 Wyo. Stat. Ann. § 1-21-1002 *et seq*. governs Forcible Entry and Detainer and W.S. 1977 § 1-21-1201 *et seq*. governs Residential Real Property. 1977 Wyo. Stat. Ann. § 1-21-1007. Bond on granting continuance **No continuance shall be granted the defendant for longer than two (2) days unless he gives a bond to the adverse party**, with good and sufficient surety approved by the circuit court, conditioned for the payment of the rent that may accrue and costs if judgment is rendered against him.	1977 Wyo. Stat. § 1-9-102. Continuance for good cause Any court, for good cause shown may continue any action at any stage of the proceedings at the cost of the applicant, to be paid as the court shall direct. "A trial court may not grant a continuance based upon the mere whim, request or convenience of counsel in the absence of substantial factual or legal reason for doing so." *Tomash v. Evans*, 704 P.2d 1296, 1298 (Wyo. 1985).

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Survey of State Laws Governing Fees Associated With Late Payment of Rent

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Introduction

The survey contains both a cumulative and detailed account of the laws of each state governing late fees and penalties associated with late payment of rent involving residential tenancies. States that impose late fee maximums vary greatly on the amount and form of the limitation. The survey begins with a detailed summary categorizing the laws of each state that set forth limitations or requirements related to late fees, followed by exhibit 1 with a state-by-state listing of the relevant laws of each of the 50 states.

The survey was developed to serve as a resource for policymakers and housing advocates exploring opportunities to improve the laws in their state by having easy access to the comparable laws enacted elsewhere. It is also intended as a resource for attorneys, legal services organizations, housing counseling agencies, or others practicing in the field of landlord-tenant law or policy.

The information used in developing this survey was obtained through an exhaustive review of each state's relevant statute and court rules, as well as a thorough review of appellate court opinions interpreting a relevant statute or providing guidance in the absence of statutory directive. The survey encompasses a review of each state's laws current through December 31, 2021.

Overview

In an effort to curb excessive fees associated with the late payment of rent, many states have enacted legislation placing maximums on the amount that can be charged, along with other restrictions and limitations. Such laws recognize that landlords and tenants are not on equal footing in negotiating lease terms. In most instances, tenants are provided the lease on a

take-it-or-leave-it basis with no opportunity to negotiate any of its terms, including provisions related to late fees.[1]

States that impose late fee maximums vary greatly on the amount and form of the limitation. Some states limit the late fee to a certain percentage of the rental amount, a few states impose a maximum dollar amount, and several states impose both. Rather than limiting the late fee to a certain amount, some states only require that the late fee be "reasonable." In addition, a handful of states mandate that late fees can only accrue after a certain grace period, and some states require that any late fee policy be in writing and within the lease agreement. During the COVID-19 pandemic, some states instituted temporary moratoriums on late fees.

Type of Limitation

No Statutory Maximum

Approximately one-half of the states have no specific statute limiting the amount of late fees that can be charged.[2] However, many of these states have legislation or case law requiring the late fee to be *reasonable*, often requiring the late fee to be reasonably related to the damage resulting from the late payment of rent. Several states have virtually no limitation on the amount that can be charged for late fees.[3] Some of these states,[4] however, do have a general statute providing that a court may refuse to enforce terms of a rental agreement found to be *unconscionable*.[5]

Percentage Maximum

Several states have opted to cap fees based on a percentage of the monthly rent. Among the 10 states that employ this limitation, the limits range from 4 percent to 10.5 percent of the rent due, for an average of 7.7 percent. These states include:

- **Alaska:** Capped at 5 percent above the Federal Reserve discount rate, or, if no rate is specified, 10.5 percent.

[1] *See* Lonegrass (2013), who states that "Residential leases are overwhelmingly standard form contracts of adhesion, presented to tenants by landlords on a take-it-or-leave-it basis." The article goes on to describe how tenants are "virtually powerless to negotiate their leases with their landlords," and opining that "(p)erhaps the most significant source of unfairness faced by residential tenants in the United States is their lack of bargaining power relative to landlords;" and Barnhizer (2005) observes that disparities in bargaining power can arise because a transaction involves a necessity, citing housing as an example, and noting that many courts have found "tenants have no bargaining power in dealing with prospective landlords and must meekly accept whatever terms the landlord seeks to impose through standard form lease contracts."

[2] Alabama, Arkansas, California, Connecticut, Florida, Georgia, Idaho, Indiana, Kansas, Louisiana, Massachusetts, Michigan, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Vermont, Wisconsin, and Wyoming.

[3] Alabama, Arkansas, Florida, Georgia, Idaho, Indiana, Kansas, Louisiana, Massachusetts (but requires a 30-day grace period), Michigan, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, Rhode Island, South Carolina, South Dakota, Wisconsin, and Wyoming.

[4] Alabama, Arizona, Florida, Kansas, Nebraska, North Dakota, Ohio, Rhode Island, and South Carolina.

[5] After a diligent search, no case law could be found in these jurisdictions that would provide insight into what amount of late fee would be deemed unconscionable.

- **Delaware:** Where the rental agreement provides for a late charge, such late charge shall not exceed 5 percent of the monthly rent.
- **Hawaii:** Where the rental agreement provides for a late charge, the late charge shall not exceed 8 percent of the rent due.
- **Maine:** A landlord may not assess a penalty for the late payment of rent which exceeds 4 percent of the monthly rent.
- **Minnesota:** In no case may the late fee exceed 8 percent of the overdue rent payment.
- **Nevada:** A landlord may charge a reasonable late fee for the late payment of rent as set forth in the rental agreement, but such a late fee must not exceed 5 percent of the amount of the periodic rent.
- **New Mexico:** If the rental agreement provides for the charging of a late fee, the owner may charge the resident a late fee in an amount not to exceed 10 percent of the total rent payment.
- **Oregon:** Charge may not exceed a per day charge of more than 6 percent of the late fee permitted per rental period, or 5 percent of the periodic rent.
- **Tennessee:** Any fee charged by the landlord for the late payment of rent shall not exceed 10 percent of the amount of rent past due.
- **Virginia:** No such late charge shall exceed the lesser of 10 percent of the periodic rent or 10 percent of the remaining balance due and owed by the tenant.

Dollar Amount Maximum

Iowa is the only state to have established a pure dollar amount maximum in its residential landlord-tenant act: $12 a day or $60 a month if rent is $700 or lower; $20 a day or $100 a month if rent is more than $700. Arizona also imposes a dollar amount ($5 per day), but the limitation is applicable only in tenancies involving the rental of a mobile home lot.

Combination of Percentage and Dollar Amount Maximums

Five states have enacted legislation that imposes late fee limits that combine both percentage and dollar amount maximums:

- **Colorado:** $50 or 5 percent of remaining rent obligation, whichever is greater.
- **Maryland:** A late fee cannot exceed 5 percent of the rent. For leases with weekly rental installments, the fee cannot exceed $3 a week.
- **New York:** $50 or 5 percent of monthly rent, whichever is less.
- **North Carolina:** If due monthly, no more than $15 or 5 percent of monthly rent, whichever is greater. If due weekly, $4 or 5 percent of weekly rent, whichever is greater.
- **Utah:** Cannot exceed the greater of 10 percent of rent agreed to in rental agreement or $75.

Reasonableness Requirement

Some states have no specified maximum that can be assessed as a late fee but instead require only that the fee is reasonable or reasonably related to the damage the landlord incurred as a result of the tenant paying late. In most of these states, the reasonableness requirement is established by courts rather than through legislation.

- **Arizona:** For residential tenancies, it is implied within its eviction statutes that late fees must be reasonable.
- **California:** Must be reasonably related to costs the landlord faces as a result of rent being late.
- **Connecticut:** Fees must bear a reasonable relationship to the actual damage that the landlord sustains, and the court may void if excessive.
- **Illinois:** Must be a reasonable forecast of damage caused by the breach.
- **Kentucky:** Must be reasonable; $20 or 20 percent of the rental fee for each month is deemed reasonable.
- **Ohio:** Must be reasonable in proportion to the rental rate and have a rational basis supporting the imposition of the charge.
- **Oklahoma:** Must be reasonably related to actual costs incurred.
- **Pennsylvania:** Late fees must be reasonable.
- **Texas:** Must be reasonable; presumed reasonable if not more than 12 percent of the amount of rent for a dwelling located in a structure that contains no more than four units or 10 percent for a structure that contains more than four units.
- **Vermont:** Late fee allowed if reasonably related to costs incurred.
- **Washington:** Presumably must be reasonable.
- **West Virginia:** Presumably must be reasonable.

Other Limitations and Requirements

Grace Period

Some states require that before a late fee may be assessed, a certain amount of time must have lapsed beyond the date the rental payment was due. The statutorily imposed grace periods range from 3 to 30 days.

- 3 days (Nevada, Texas).
- 5 days (Delaware, Kentucky, New York, North Carolina, Oregon, Tennessee, Virginia, Washington).

- 7 days (Colorado).
- 9 days (Connecticut).
- 15 days (Maine).
- 30 days (Massachusetts).

In-Writing Requirement

Several states, even some with no stated late fee maximum, require that any late fee policy be in writing and in the lease agreement.[6]

COVID-19 Moratoriums

Due to the pandemic and the resulting widespread unemployment, several states declared a moratorium on late fees during the pandemic. Most of these moratoriums were expired as of the date of the initial publication of this survey.

- **California:** Renters who have submitted a declaration of COVID-19-related financial distress cannot be charged a late fee for the late payment of rental payments (no expiration date).
- **Colorado:** Executive order prohibited landlords and lenders from charging late fees for any rent incurred between May 1, 2020, and April 27, 2021, due to the pandemic (expired).
- **Connecticut:** Executive order 7X granted tenants an automatic 60-day grace period for April 2020 rent and made a 60-day grace period for May 2020 rent available upon request. Landlords could not charge late fees during these grace periods (expired).
- **Delaware:** Suspended late fees during COVID state of emergency in 2020. (expired)
- **Massachusetts:** Suspended late fees during COVID state of emergency in 2020 (expired).
- **Montana:** Governor suspended late fees in 2020 because of COVID-19 (expired).
- **New York:** Late fees were suspended until March 24, 2021 (expired).
- **Oregon:** No late charges on rent due between April 1, 2020, and June 30, 2021, unless that rent is still unpaid on February 28, 2022 (expired).
- **Pennsylvania:** Although the State of Pennsylvania took no action to limit the imposition of late fees during the pandemic, the Mayor of Philadelphia signed a pandemic eviction moratorium which prohibits landlords from collecting late fees or interest on unpaid rent between March 1, 2020, and September 30, 2021, from tenants who have provided a hardship certificate (expired).
- **Washington:** Suspended late fees between March 1, 2020, and June 30, 2021 (expired).

[6] Arizona, California, Colorado, Connecticut, Delaware, Georgia, Hawaii, Illinois, Iowa, Kentucky, Louisiana, Maine, Minnesota, Nevada, New Mexico, North Carolina, North Dakota, Oregon, Texas, Vermont, Virginia, and Washington.

- **Wisconsin:** The Department of Agriculture, Trade, and Consumer Protection adopted a temporary emergency rule due to the pandemic. During an emergency and for the 90 days following the expiration of the emergency, no landlord may charge any tenant a fee or a penalty for nonpayment of rent or late payment of rent (expired).

The following sets forth the provisions of each state's laws governing residential rental late fees. Many state laws include maximums on how much can be charged in late fees, govern when late fees may be imposed, or require that any policy related to late fees be in writing. In some instances, the state's laws are set forth in statute, and in others, they are established by the courts. The left column lists the state and the specific statute that imposes a maximum amount that can be charged for late payment of rent, if any. The right column sets forth the statutory authority for any other restrictions or limitations relating to late fees, relevant case law, and information on any temporarily imposed restrictions on late fees in force during the COVID-19 pandemic.

Exhibit 1

Survey of State Laws Governing Fees Associated with Late Payment of Rent (1 of 6)

State & Statute	Statutory Maximum?	Required In Writing?	Additional Information and Limitations
Alabama	No statute	No	*See* Ala. Code § 35-9A-143 (providing that a court can refuse to enforce a lease term deemed unconscionable).
Alaska Alaska Stat. § 45.45.010	Yes. Max of 5% points above the Federal Reserve discount rate, or, if no precise rate is specified, 10.5%.	No	
Arizona Ariz. Rev. Stat. § 33-1414(C)	Yes, but for mobile home lot tenancies only; late fees cannot exceed $5 a day.	Yes	Ariz. Rev. Stat. § 33-1312 (providing that a court can refuse to enforce a lease term deemed unconscionable). Ariz. Rev. Stat. § 33-1368 (implies late fee policy must be in the written rental agreement and must be reasonable). Ariz. Rev. Stat. § 33-1414(A)(4) (for mobile homes, landlords cannot charge late fees until at least 5 days after rent is due).
Arkansas	No statute		
California	No statute; but case law provides the fee must be reasonably related to costs the landlord faces as a result of rent being late.	Yes	*Orozco v. Casimiro*,121 Cal.App.4th Supp. 7 (2004) (concluding that late fees, in the form of liquidated damages, must be reasonably related to the costs sustained). *Harbor Island Holdings, LLC v. Kim*, 107 Cal.App.4th 790 (2003) (holding that any provision for the forfeiture of money without regard to the actual damages suffered constitutes an unenforceable penalty). Cal. Civ. Code § 1942.9 (if tenant has COVID-related rental debt, landlord cannot charge late fees on that rent).

Exhibit 1

Survey of State Laws Governing Fees Associated with Late Payment of Rent (2 of 6)

State & Statute	Statutory Maximum?	Required In Writing?	Additional Information and Limitations
Colorado Colo. Rev. Stat. § 38-12-105(b)	Yes. Cannot exceed the greater of $50 or 5% of the amount of rent past due.	Yes	Colo. Rev. Stat. § 38-12-105(1)(a) (provides a landlord cannot charge a late fee until 7 days after rent is due). Colo. Rev. Stat. § 38-12-105(1)(c) (provides that a landlord cannot charge a late fee unless it was disclosed in the rental agreement). Colo. Rev. Stat. § 38-12-213 (for mobile home lots; requiring all lease terms must be in writing). Recently proposed legislation: https://leg.colorado.gov/bills/hb20-1141 An executive order prohibited landlords and lenders from charging late fees for any rent incurred between May 1, 2020, and April 27, 2021, due to the pandemic. No new executive orders related to late fees have been released since then.
Connecticut	No statute; but case law provides the fee must bear a reasonable relationship to actual damage landlord sustains.	Yes	*Food Studio v. Fabiola's*, 1998 WL 32193 (June 16, 1998) (holding a landlord may only impose late fees if the lease agreement contains terms imposing a late fee). *Begin v. Reissman*, 1995 WL 348043 (1995) (holding late fees must bear a reasonable relationship to the actual damages the landlord sustains, and a court may void them if it finds they are excessive). *See also* Leg Research Report, at https://www.cga.ct.gov/2018/rpt/pdf/2018-R-0232.pdf (interpreting the late payment notice period in Conn. Gen. Stat. § 47a-15a, as creating a statutorily imposed grace period before a late fee may be accessed). Conn. Gen. Stat. § 47a-15a (a late fee cannot be charged until 9 days after it is due when rent is due monthly or 4 days for weekly tenancies). The state temporarily suspended late fees during the COVID state of emergency. https://portal.ct.gov/-/media/Office-of-the-Governor/Executive-Orders/Lamont-Executive-Orders/Executive-Order-No-7X.pdf Executive order 7X automatically granted tenants a 60-day grace period for April 2020 rent, and a 60-day grace period was available for May 2020 rent upon request. Landlords could not charge late fees during the grace period.
Delaware Del. Code tit. 25, § 5501	Yes. 5% of the monthly rent.	Yes	Del. Code tit. 25, § 5501 (late fee cannot be imposed until the rent is more than 5 days late; if the landlord does not have an office in the county where the rental unit is located, they must provide an additional 3 days). The state suspended late fees during the COVID state of emergency in the spring. https://governor.delaware.gov/health-soe/twenty-seventh-modification-state-of-emergency-declaration/ The state of emergency declaration and its modifications provided that no late fees could be charged or accrued during the COVID-19 state of emergency, which is still in effect.
Florida	No statute	No	Fla. Stat. § 83.45 (providing that a court can refuse to enforce a lease term deemed unconscionable).
Georgia	No statute	Yes	
Hawaii Haw. Rev. Stat. § 521-21(f)	Yes. 8% of the amount of rent due.	Yes	
Idaho	No statute		

Exhibit 1

Survey of State Laws Governing Fees Associated with Late Payment of Rent (3 of 6)

State & Statute	Statutory Maximum?	Required In Writing?	Additional Information and Limitations
Illinois	No stated maximum; but case law indicates it must be reasonable.	Yes	*Collins v. Hurst*, 736 N.E.2d 600, 604 (2000) (in a matter unrelated to residential tenancies, the court held that "a reasonable late charge provision in a contract should be enforced"). *Hidden Grove Condo. Ass'n v. Crooks*, 744 N.E.2d 305, 307 (2001) (in a matter involving late fees imposed by a condo association, the court analyzed late fees as liquidated damages provisions and provided that a late fee may be assessed if it is a reasonable forecast of damage caused by breach and the harm is difficult to estimate).
Indiana	No statute		
Iowa Iowa Code § 562A.9	Yes. $12 a day or $60 a month if rent is $700 or lower. $20 a day or $100 a month if rent is more than $700.	Yes	Iowa Code § 562A.9 (implying late fees must be in the rental agreement).
Kansas	No statute		Kan. Stat. § 58-2544 (providing that a court can refuse to enforce a lease term deemed unconscionable).
Kentucky Ky. Rev. Stat. § 359.215	Yes. Must be reasonable. $20 or 20% of the rental fee for each month is deemed reasonable.	Yes	Ky. Rev. Stat. § 359.215 (a landlord cannot charge a late fee until 5 days after rent is due).
Louisiana	No statute	Yes	*See* Louisiana Attorney General Guide to Louisiana Landlord and Tenant Laws, available at https://ldh.la.gov/assets/oph/Center-PHCH/Center-CH/infectious-epi/EpiManual/MoldComplaints/AGguideToLandlordTenantLaw.pdf (opining that a late fee cannot be charged if not in the written rental agreement).
Maine Me. Rev. Stat. tit. 14, § 6028(2)	Yes. 4% of the amount due for 1 month.	Yes	Me. Rev. Stat. tit. 14, § 6028(1) (rent is not considered late unless it is 15 days past due). Me. Rev. Stat. tit. 14, § 6028(3) (must have written notice of the late fee policy at the time entered into the rental agreement).
Maryland Md. Code Real Prop. § 8-208	Yes. Cannot exceed 5% of the amount of rent due for the rental period. For leases with weekly rental installments, no more than $3 a week or a total of no more than $12 a month.	No	Certain counties prohibited landlords from charging late fees during the state of emergency due to COVID-19 and/or for some period after the state of emergency ended. https://www.peoples-law.org/evictions-and-failure-pay-rent-cases-covid-19-court-closure
Massachusetts	No statute	No	Mass. Gen. Laws ch. 186, § 15B (no lease or other rental agreement shall impose any interest or penalty for failure to pay rent until 30 days after such rent shall have been due). State suspended late fees during COVID state of emergency. https://www.mass.gov/doc/covid-19-landlord-tenant-guidance/download
Michigan	No statute		
Minnesota Minn. Stat. § 504B.177(a)	Yes. 8% of the overdue rent payment.	Yes	Minn. Stat. § 504B.177(a) (late fee policy must be agreed to in writing).
Mississippi	No statute		

Exhibit 1

Survey of State Laws Governing Fees Associated with Late Payment of Rent (4 of 6)

State & Statute	Statutory Maximum?	Required In Writing?	Additional Information and Limitations
Missouri	No statute		
Montana	No statute		Governor temporarily suspended late fees because of COVID-19: https://covid19.mt.gov/_docs/Evictions%20Foreclosures%20and%20Utilities.pdf
Nebraska	No statute		Neb. Rev. Stat. § 76-1412 (providing that a court can refuse to enforce a lease term deemed unconscionable).
Nevada Nev. Rev. Stat. § 118A.210	Yes. 5% of the amount of periodic rent.	Yes	Nev. Rev. Stat. § 118A.210 (a landlord cannot charge a late fee for any tenancy that is longer than week-to-week until 3 days after rent is due).
New Hampshire	No statute		
New Jersey	No statute	No	*Associates v. Miranda*, 115 N.J. 522 (1989) (holding that landlords cannot evict based on nonpayment of late fees unless agreement states late charges are to be considered part of rent).
New Mexico N.M. Stat. § 47-8-15	Yes. 10% of total rent payment for each rental period the tenant is in default.	Yes	
New York N.Y. Real Prop. Law § 238-a	Yes. $50 or 5% of monthly rent, whichever is less.	No	N.Y. Real Prop. Law § 238-a (a landlord may not demand a late fee unless payment of rent has not been made within 5 days of the date it was due). Late fees were prohibited through March 24, 2021.https://hcr.ny.gov/covid-19-helpful-links-and-faqs
North Carolina N.C. Gen. Stat. § 42-46	Yes. If due monthly, no more than $15 or 5% of monthly rent, whichever is greater. If due weekly, $4 or 5% of weekly rent, whichever is greater.	Yes	N.C. Gen. Stat. § 42-46 (a landlord cannot charge a late fee until rent is 5 days late).
North Dakota	No statute	Yes	N.D. Cent. Code § 47-16-13.3 (providing that a court can refuse to enforce a lease term deemed unconscionable). *See also* Tenant Rights, https://attorneygeneral.nd.gov/consumer-resources/tenant-rights (stating that the rental agreement must state if there is a late fee, the amount of the fee, and when it is charged).
Ohio	No statute, but case law indicates it must be reasonable in proportion to the rental rate.		*Calabria v. Green*, 1995 Ohio App. LEXIS 3903 (September 8, 1995), Trumbull Co. App. No. 95-T-5181 (the Eleventh Appellate District Court held that while late charges of $10.00 per day (for 38 days) was not enforceable, "an agreed upon, one-time late fee, that is reasonable in proportion to the rental rate, and that has a rational basis supporting the imposition of the charge, is proper"). Ohio Rev. Code § 5321.14 (providing that a court can refuse to enforce a lease term deemed unconscionable).
Oklahoma	No statute, but case law indicates it must be reasonably related to costs incurred.		*Sun Ridge Investors, Ltd. v. Parker*, 956 P.2d 876 (1998) (Court found that a $5.00 per day imposed for late-payment or nonpayment of rent is a penalty, in the absence of any evidence to the contrary showing actual costs incurred by the landlord).

Exhibit 1

Survey of State Laws Governing Fees Associated with Late Payment of Rent (5 of 6)

State & Statute	Statutory Maximum?	Required In Writing?	Additional Information and Limitations
Oregon Or. Rev. Stat. § 90.260(2)	Yes. Must be reasonable and is capped based on a percentage of an amount that is dependent on the late fee option selected. *See statute*.	Yes	Or. Rev. Stat. § 90.260(1)(a) (a landlord cannot charge a late fee until rent is 5 days late). Or. Rev. Stat. § 90.260(1)(b) (late fee policy must be in writing). No late fees could be charged for rent due between April 1, 2020, and June 30, 2021, unless that rent is still unpaid on February 28, 2022. https://www.portland.gov/phb/rental-services/helpdesk/oregon-eviction-moratorium-faq#toc-can-late-fees-be-charged-on-the-past-due-rent-
Pennsylvania	No statute, but case law indicates it must be reasonable.		Courts have referenced 68 Pa. Stat. § 250.301 (allowing interest on past due rent if it is equitable under the circumstances) in finding that late fees must be reasonable. *See Cohick v. Mazza*, No. CV-17-0693, 2017 WL 11656917 (Pa. Com. Pl. August 10, 2017) (holding that $3/day was not per se unreasonable); *Enx Enters. V. Humphries*, 2017 Pa. Dist. & Cnty. Dec. LEXIS 1830 (holding that $5/day was unreasonable). Mayor of Philadelphia suspended late fees for tenants between March 1, 2020, and September 30, 2021, who provided a hardship certificate. https://www.phila.gov/departments/fair-housing-commission/tenant-protections/covid-19-emergency-tenant-protections/#:~:text=Tenants%20who%20are%20unable%20to,or%20interest%20on%20back%20rent
Rhode Island	No statute		R.I. Gen. L. § 34-18-35 (landlord cannot serve a demand for payment of rent until it is at least 15 days in arrears, which can be interpreted to prohibit late fees from being assessed during this period). 34 R.I. Gen. Laws § 34-18-13 (providing that a court can refuse to enforce a lease term deemed unconscionable).
South Carolina	No statute		S.C. Code § 27-40-230 (providing that a court can refuse to enforce a lease term deemed unconscionable).
South Dakota	No statute		
Tennessee Tenn. Code § 66-28-201(d)	Yes. 10 % of the amount of rent past due.	No	Tenn. Code § 66-28-201(d) ("There shall be a 5-day grace period between the day the rent was due and the day a fee for the late payment of rent may be charged.").
Texas Tex. Prop. Code § 92.019	No stated maximum, but must be reasonable. Presumed reasonable if not more than 10-12% of the amount of rent, depending on the type of dwelling unit.	Yes	Tex. Prop. Code § 92.019(a)(1) (notice of the late fee must be in the written lease). Tex. Prop. Code § 92.019(a)(3) (a landlord may not charge late fees unless rent has remained unpaid for 2 full days after it was due).
Utah Utah Code § 57-22-4	Yes. Late fee cannot exceed the greater of 10% of rent agreed to in the rental agreement or $75.	No	
Vermont	No statute, but case law indicates it must be reasonably related to damages incurred.	Yes	*Highgate Associates, Ltd. v. Lorna Merryfield*, Supreme Court Docket No. 90-032 (1991) (upholding the lower court's finding the late fees were invalid penalties, where "the amount charged has no relation to the damages the landlord would sustain if the lease agreement were breached.") (citing cases). The case offers a detailed analysis on the validity of a liquidated damages provision, such as late fees.

Exhibit 1

Survey of State Laws Governing Fees Associated with Late Payment of Rent (6 of 6)

State & Statute	Statutory Maximum?	Required In Writing?	Additional Information and Limitations
Virginia Va. Code § 55.1-1204(E)	Yes. Cannot exceed the lesser of 10% of periodic rent or 10% of the remaining balance due and owed by tenant.	Yes	Va. Code § 55.1-1204(c)(5) (can charge a late fee if rent is paid after the fifth day of any given month). Va. Code § 55.1-1204(E) (cannot charge a tenant for late payment unless it was provided for in the written rental agreement).
Washington Wash. Rev. Code § 59.18.140	No statutory maximum, but presumably, it must be reasonable (per § 59.18.140 that tenants shall comply with all reasonable obligations).	Yes	Wash. Rev. Code § 59.18.170(2) (landlord may not charge a late fee until rent is more than 5 days past due). Wash. Rev. Code § 59.18.285 (any nonrefundable fees must be stated in a written rental agreement). Wash. Rev. Code § 59.18.625 (no late fees could be charged between March 1, 2020, and the 6 months following the expiration of the eviction moratorium) (expired June 30, 2021).
West Virginia W. Va. Code § 37-6A-2(b)(1)	No statutory maximum, but presumably must be reasonable.	No	W. Va. Code § 37-6A-2(b)(1) (provides that a late fee may only be deducted from a security deposit if the charges were reasonable and specified in the rental agreement).
Wisconsin	No statute	No	ATCP 134.09(8)(a) (may not charge a late fee except as specifically provided under the rental agreement). The department of agriculture, trade, and consumer protection adopted a temporary emergency rule due to the pandemic: "During an emergency declared pursuant to Wis. Stat. s. 323.10 and for the 90 days following the expiration of the emergency, no landlord may charge any tenant a fee or a penalty for nonpayment of rent or late payment of rent." https://www.natlawreview.com/article/wisconsin-prohibits-residential-landlords-charging-fees-and-penalties-late-rent
Wyoming	No statute		
URLTA 1972	No provision pertaining to late fees		Does not contain any specific provision on late fees, but it includes language at section 1.303, providing that a court can refuse to enforce a lease term deemed unconscionable.
URLTA 2015	No provision pertaining to late fees		Does not contain specific provisions on late fees, but it includes language at section 106 providing that a court can refuse to enforce a lease term deemed unconscionable.

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Gentrification and Opportunity Zones: A Study of 100 Most Populous Cities with D.C. as a Case Study

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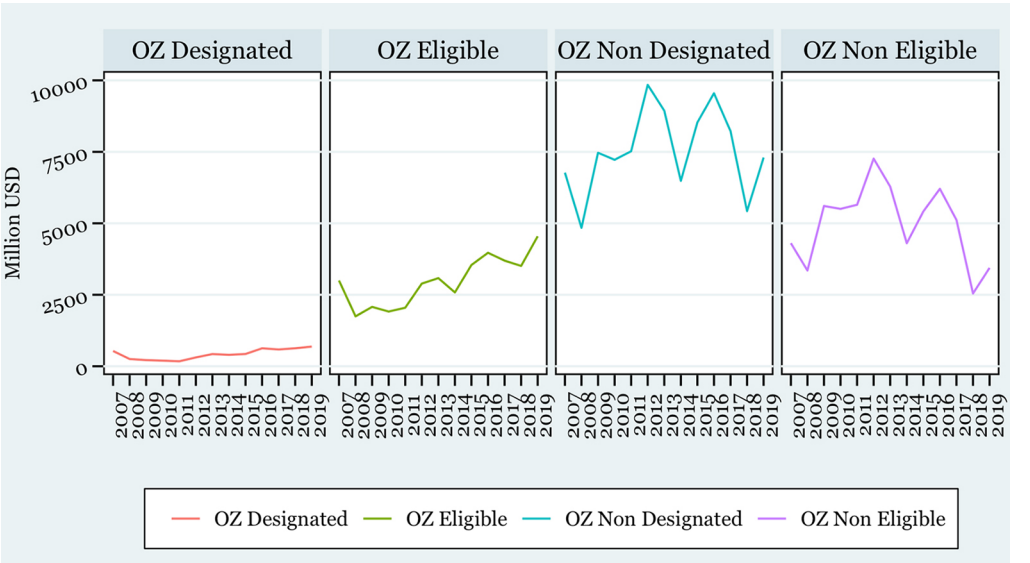
Correction

The volume 24, number 1 issue of *Cityscape* contained a duplication error for appendix exhibits A1–A10 on pages 174–178. The corrected versions of those exhibits follow.

Appendix

Exhibit A-1

Total Amount of Loans Originated in D.C.

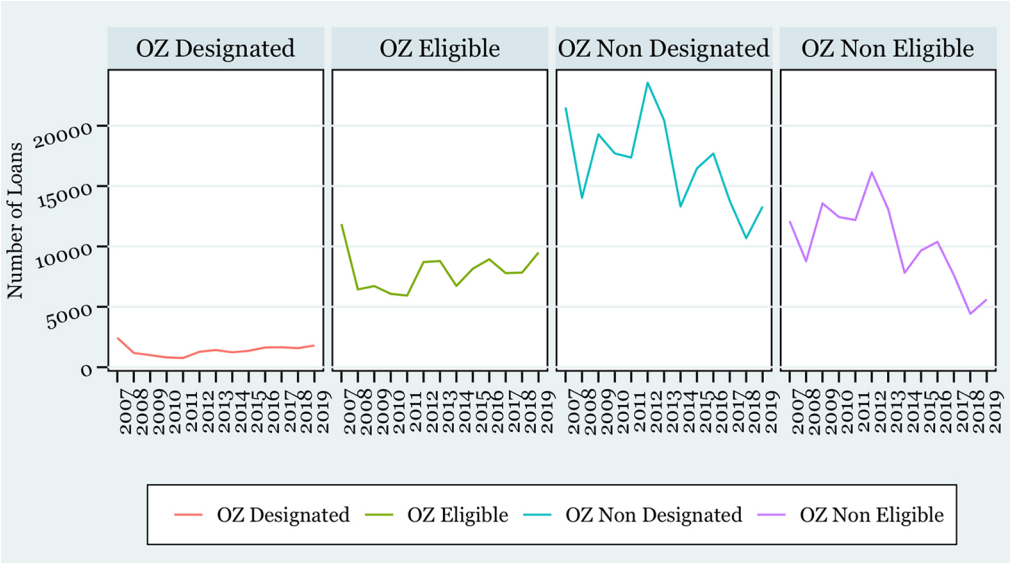


D.C. = District of Columbia. OZ = Opportunity Zone. USD = U.S. dollars.

Sources: Consumer Finance Protection Bureau; Federal Financial Institution Examination Council

Exhibit A-2

Total Number of Loans Originated in D.C.

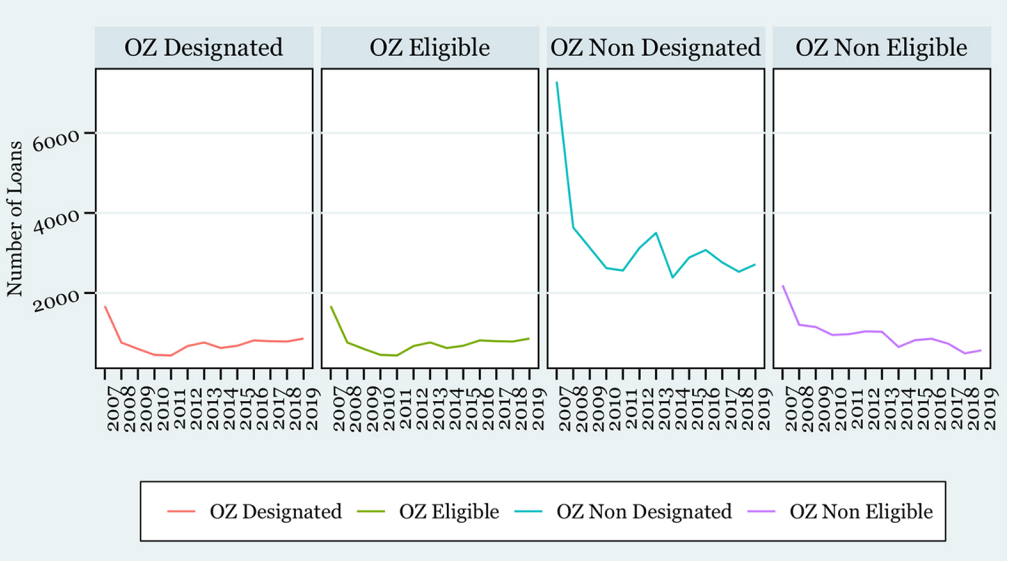


D.C. = District of Columbia. OZ = Opportunity Zone. USD = U.S. dollars.

Sources: Consumer Finance Protection Bureau; Federal Financial Institution Examination Council

Exhibit A-3

Number of Loans Originated to African-American Population in D.C.

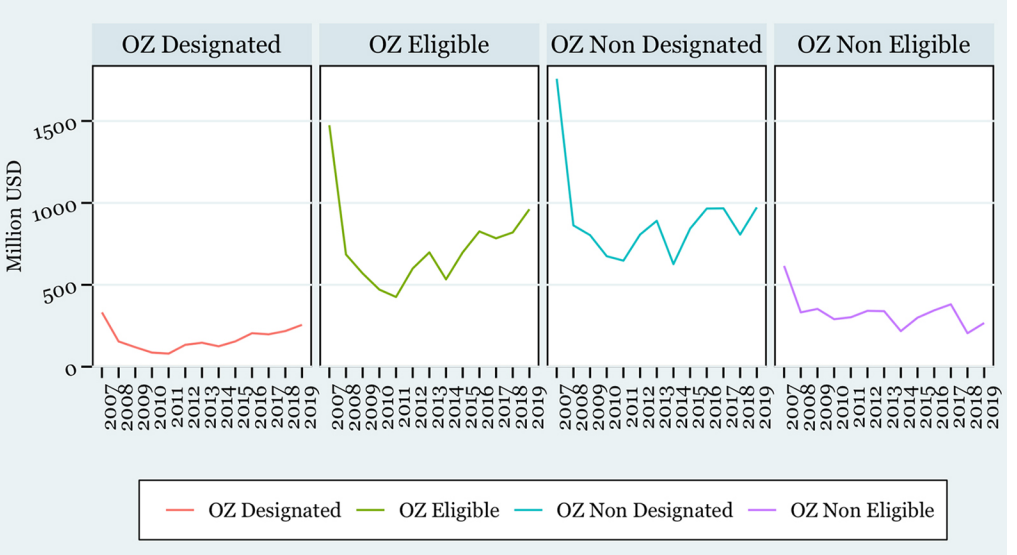


D.C. = District of Columbia. OZ = Opportunity Zone. USD = U.S. dollars.

Sources: Consumer Finance Protection Bureau; Federal Financial Institution Examination Council

Exhibit A-4

Total Amount of Loans Originated to African-American Population in D.C.

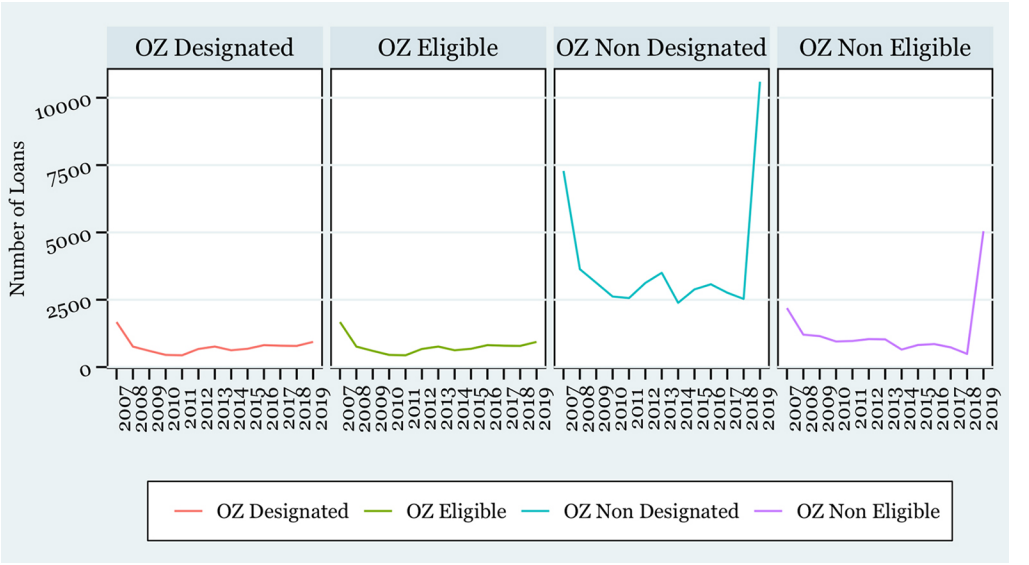


D.C. = District of Columbia. OZ = Opportunity Zone. USD = U.S. dollars.

Sources: Consumer Finance Protection Bureau; Federal Financial Institution Examination Council

Exhibit A-5

Number of Loans Originated to Non-African-American Population in D.C.

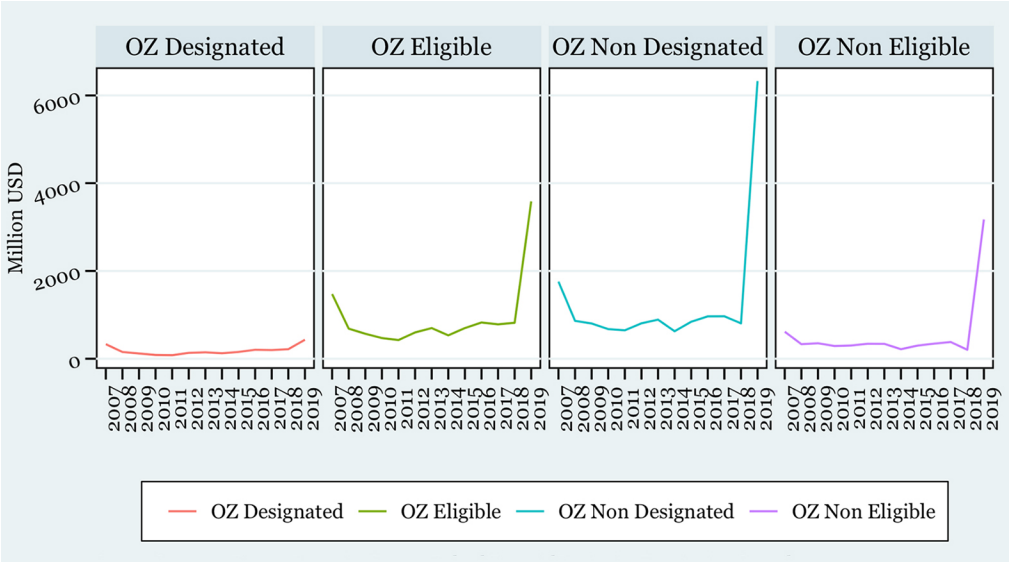


D.C. = District of Columbia. OZ = Opportunity Zone. USD = U.S. dollars.

Sources: Consumer Finance Protection Bureau; Federal Financial Institution Examination Council

Exhibit A-6

Total Amount of Loans Originated to Non-African-American Population in D.C.

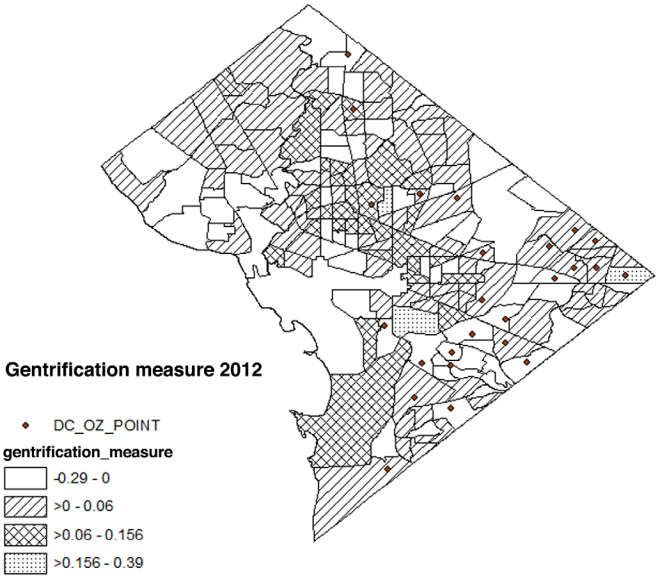


D.C. = District of Columbia. OZ = Opportunity Zone. USD = U.S. dollars.

Sources: Consumer Finance Protection Bureau; Federal Financial Institution Examination Council

Exhibit A-7

Gentrification Scale and Designated OZ in D.C., 2012

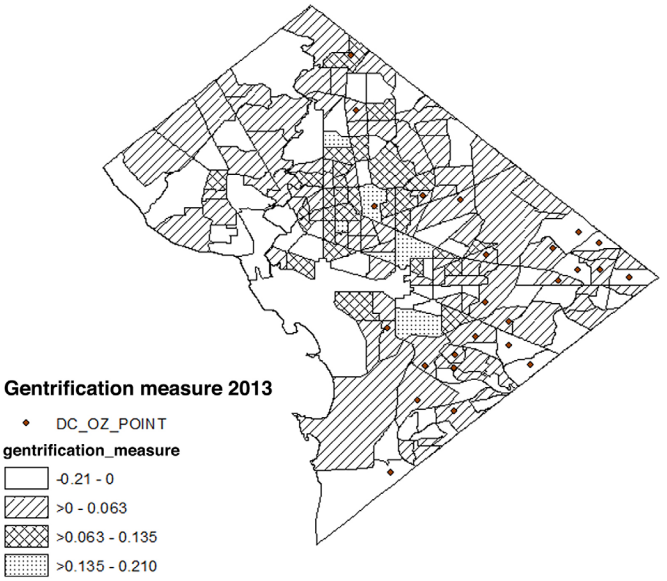


D.C. = District of Columbia. OZ = Opportunity Zone.

Source: Author's calculation from American Community Survey data

Exhibit A-8

Gentrification Scale and Designated OZ in D.C., 2013

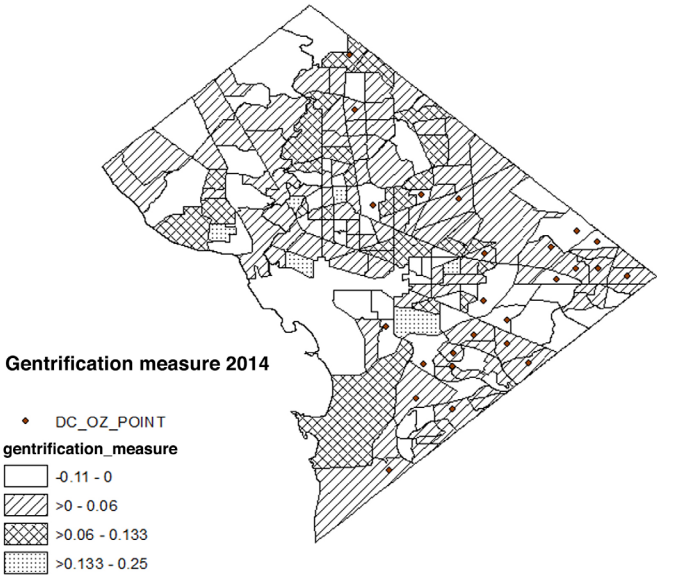


D.C. = District of Columbia. OZ = Opportunity Zone.

Source: Author's calculation from American Community Survey data

Exhibit A-9

Gentrification Scale and Designated OZ in D.C., 2014

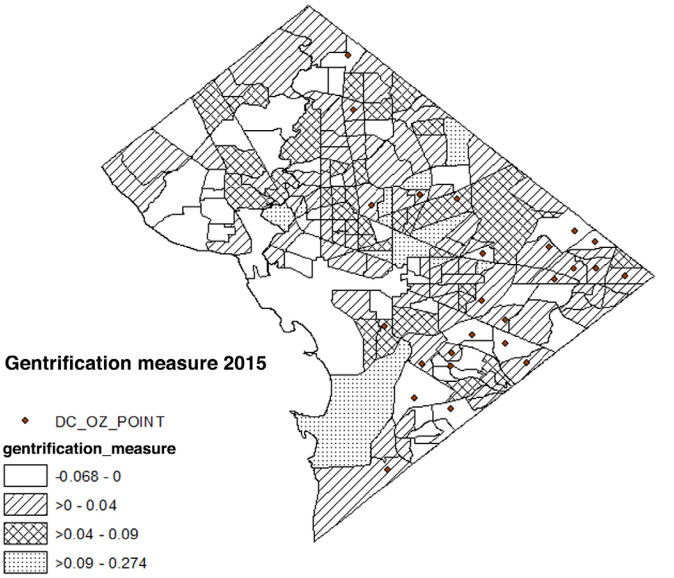


D.C. = District of Columbia. OZ = Opportunity Zone.

Source: Author's calculation from American Community Survey data

Exhibit A-10

Gentrification Scale and Designated OZ in D.C., 2015



D.C. = District of Columbia. OZ = Opportunity Zone.

Source: Author's calculation from American Community Survey data

Referees 2021–22

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