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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