

Local land use regulations and new mobile home concentration

Casey J Dawkins 

University of Maryland, USA

Urban Studies

2026, Vol. 63(10) 2136–2153

© Urban Studies Journal Limited 2025

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/00420980251335564

journals.sagepub.com/home/usj



Abstract

Mobile homes can be produced in high volumes at a lower cost than traditional stick-built single-family dwellings but face regulatory, financial, and perceptual barriers to more widespread market penetration. This research relies on data from a sample of US cities and counties to examine the influence of local land use regulations on the concentration of new mobile homes among all new homes added over two 10-year time spans. In contrast to previous studies, this study relies on a nationwide sample of jurisdictions, employs more precise measures of mobile home placements and local land use regulations, and addresses the endogeneity of mobile home restrictions. I find that regulatory restrictions on mobile homes and urban containment boundaries both limit the concentration of new mobile homes. Furthermore, the impact of mobile home restrictions is much larger when accounting for the endogeneity of mobile home restrictions. These findings suggest that land use regulatory reform can play an important role in local affordable housing strategies geared towards expanding the supply of mobile homes.

Keywords

housing, manufactured housing, mobile homes, land use, zoning

摘要

与传统的木结构独栋住宅相比，移动房屋可以以更低的成本进行大批量生产，但在实现更广泛的市场渗透方面面临监管、财务和认知障碍。本文利用美国市县样本数据，考察当地土地使用法规对两个十年时间段内新增住房中新增移动房屋集中度的影响。与之前的研究相比，本研究依赖全国范围内的司法管辖区样本，采用了更精准的衡量指标来评估移动房屋安置和地方土地使用法规，并解决了移动房屋限制的内生性问题。我们发现对移动房屋的监管限制以及城市控制边界都限制了新增移动房屋的集中。而且，当考虑移动房屋限制的内生性时，移动房屋限制的影响要大得多。这些发现表明，土地使用监管改革可以在旨在扩大移动房屋供应的地方经济适用房策略中发挥重要作用。

关键词

住房、预制房屋、移动房屋、土地使用、分区

Received March 2024; accepted March 2025

Corresponding author:

Casey J Dawkins, Urban Studies and Planning, National Center for Smart Growth, School of Architecture, Planning & Preservation, University of Maryland, 3835 Campus Drive, College Park, MD 20742, USA.

Email: dawkins1@umd.edu

Introduction

Mobile homes that are built in factories and shipped to permanent home sites offer a low-cost housing alternative that is affordable and perceived by residents to be of comparable quality to homes that are constructed on-site (Boehm, 1995; Boehm and Schlottmann, 2008).¹ Studies have found that the cost to produce and place a mobile home is considerably lower than the cost to construct a traditional stick-built home (Herbert et al., 2023; Manufactured Housing Institute, 2006; US Department of Housing and Urban Development [HUD], 1998), and these cost savings are passed on to consumers in the form of lower housing prices (Vanderford et al., 2005). Although mobile homes offer a promising market-based solution to the US affordable housing crisis, local land use regulations often stand in the way of efforts to expand the supply of mobile homes (Dawkins and Koebel, 2010; Rumbach et al., 2022). Many local governments within the US discourage mobile home placement through regulations that prohibit mobile homes outright, subject mobile homes to stringent design standards, or relegate mobile homes to designated parks (Dawkins et al., 2011). Even though industry advocates have called attention to this problem for years, few empirical studies have examined the link between different types of land use restrictions and the concentration of mobile homes within communities.

This study relies on data from a longitudinal panel of US cities and counties to quantify the link between local land use policy and the concentration of new mobile homes among homes newly constructed over two 10-year time spans. I employ data from the Urban Institute's National Longitudinal Land Use Survey (NLLUS) that documents the prevalence of various types of land use policy instruments. These data are paired with US Census data to estimate regression

models that relate the share of new mobile homes, as a share of all new housing, to the local policy environment and other factors affecting the supply of new mobile homes. These analyses provide estimates of the marginal impact of mobile home restrictions and other types of local land use policy instruments on the concentration of new mobile homes within communities. The next section provides a review of relevant literature on mobile home supply and local land use policies, followed by a discussion of the research methods and empirical findings. I conclude with a discussion of the policy implications of the findings and limitations of the research.

Background

The contemporary mobile home is the product of more than a century of innovation in homebuilding. With the emergence of mass production technologies in the early 20th century, architects, planners and developers began to explore various ways to lower the cost of homebuilding and expand consumer options by taking advantage of assembly-line production methods. Early 'travel trailers' produced to satisfy the rising consumer demand for recreational travel eventually morphed into more permanent 'mobile homes'. By the 1950s, entire communities were being developed in the US with homes built in factories that were transported to permanent home sites. Architects such as Le Corbusier and Walter Gropius saw mass production as a way to expand housing choice, and several US presidents have launched mobile home-based model demonstration projects to promote innovation in the homebuilding industry (Dawkins, 2021). Despite these developments, the mobile home has often been (unfairly) viewed as a temporary or inferior housing option that is only viable in rural locations, despite substantial evidence that mobile homes are

commonly found throughout many major metropolitan areas (Dawkins and Koebel, 2010; Pierce et al., 2018; Sullivan et al., 2022). In 1974, Congress took action to change the perception of mobile homes when it passed the National Manufactured Housing Construction and Safety Standards Act of 1974. The regulation enabled by this law, commonly referred to as the 'HUD Code', is designed to elevate the quality of mobile homes, – now defined as 'manufactured housing' under the Act – while providing regulatory consistency through a nationwide code that preempts local and state building codes (Sullivan, 2022).

By taking advantage of economies of scale in production and regulatory uniformity under the HUD Code, manufactured mobile home producers are positioned to offer promising low-cost housing solutions to the affordable housing crisis. Mobile homes are constructed more quickly than stick-built homes, and secure temperature-controlled manufacturing facilities offer protection from harsh weather and theft. Due to these cost advantages, early studies found that the average cost of manufactured housing was approximately two-thirds the cost of traditional stick-built housing (HUD, 1998; Manufactured Housing Institute, 2006). A more recent study finds that single-section manufactured homes cost 35% of comparable site-built homes, while double-section manufactured homes cost 60% of comparable site-built homes (Herbert et al., 2023). Vanderford et al. (2005) find that these cost savings are passed on to consumers in the form of lower housing prices. Durst and Sullivan (2019) find that manufactured homes provide high levels of affordability compared to conventional housing options.

Despite these affordability advantages, mobile homes still comprise a small share of the US housing stock and face several barriers to more widespread market penetration.

First, housing consumers often raise concerns about the perceived lower quality of mobile homes (Beamish et al., 2001), even though studies find that mobile home residents tend to view their homes as being of comparable quality to conventional site-built homes (Boehm, 1995; Boehm and Schlottmann, 2008).² Second, conventional mortgage financing can be more difficult to obtain, and even when it is available, it often comes with higher rates. Zhou (2013) finds that mobile home mortgages tend to have lower loan-to-value ratios, shorter terms and higher mortgage rates than mortgages secured by other housing types. One explanation for the higher mortgage rate is that mobile homes in many states are classified as personal property, or 'chattel', rather than real property (Sullivan, 2022). One study finds that chattel loans for manufactured homes carry interest rates that are 4.4% higher than conventional manufactured housing loans (Goodman and Ganesh, 2018).

Perhaps the most significant barrier to more rapid diffusion of mobile homes is the stringency and variability of local land use regulations that govern the placement and design of mobile homes. Although the HUD Code preempts state and local building codes, local zoning, subdivision regulations and other design requirements still dictate whether and where mobile homes are allowed. Many local zoning regulations permit stick-built housing that complies with local building codes but disallow mobile homes that comply with the HUD Code. Other communities unintentionally restrict mobile homes by requiring all forms of housing within certain residential zones to comply with stringent aesthetic requirements that mobile homes are unable to satisfy. For example, mobile homes often have shallow roof pitches to facilitate transport underneath low-lying bridges, but local design regulations may require roofs to have steeper

itches than is feasible for mobile homes that are transported from distant off-site locations (Mandelker, 2016). In many cases, local regulations restrict mobile homes to mobile home parks. In communities where developable land is scarce, it may be difficult and expensive to acquire parcels that are large enough and appropriately zoned for mobile home parks.

Despite widespread recognition among industry experts that local land use regulations often stand in the way of more widespread market penetration of mobile homes, surprisingly little empirical research has been done to quantify the influence of local land use policy instruments on the supply of mobile homes. A few studies have examined the impact of regulatory restrictions on the price and affordability of mobile homes. Several studies find that mobile home rent controls increase the price of mobile homes (Hirsch, 1988; Mason and Quigley, 2004) and reduce the number of manufactured housing units shipped to communities (Hirsch and Rufolo, 1999). Becker and Rickert (2019) find that in North Carolina, zoning permissiveness is negatively associated with manufactured housing park rents in peri urban and rural areas but positively associated with manufactured housing park rents in urban areas. Becker and Rickert attribute the unexpectedly positive impact of zoning permissiveness within urban areas to omitted variables bias caused by unobserved growth pressures in the least zoned portions of the Charlotte and Wilmington metropolitan areas. Wheeler and Jargowsky (2018) estimate regressions that relate measures of housing affordability to various regulatory restrictions, including mobile home regulations, for a large sample of households in the US Census Public Use Microdata Sample. The authors find that mobile home prohibitions are positively related to the ratio of households' housing owner costs to income.

Fewer studies have examined the impact of land use policies on the placement of mobile homes within communities. Studies such as Hirsch and Rufolo (1999) that examine the geographic destination of mobile home shipments are inadequate because mobile homes are typically shipped to dealers who sell their products within several surrounding jurisdictions (Dawkins and Koebel, 2010). Pierce et al. (2018) provide suggestive evidence from a sample of mobile home parks in Los Angeles County, California. In their geographic analysis, the authors characterise the zoning districts that govern the locations where mobile home parks are located and find that while most housing is located in areas governed by residential zoning, less than half of mobile home parks are located in such areas, and nearly a quarter of parks are located in areas zoned for industrial or manufacturing. Rumbach et al. (2022) rely on a sample of 400 manufactured housing parks and land-use regulation data from 134 jurisdictions in the Houston metropolitan area to characterise the prevalence of manufactured housing restrictions. The authors find that local governments use a variety of regulatory tools to restrict manufactured housing including zoning, floodplain ordinances and manufactured housing prohibitions. These and other regulations are shown to limit the number of areas where new mobile home parks can be sited while limiting the feasibility of redeveloping existing mobile home parks. Sullivan et al. (2022) also rely on data from the Houston metropolitan area to characterise the relationship between land use regulations and mobile home parks. The authors find that the permissiveness of regulations towards mobile homes is positively related to the number of mobile home parks, the size of mobile home parks and the share of the jurisdiction designated for mobile home parks. While informative, these studies focus on a single metropolitan area and do not

control for other factors that also affect the supply of mobile homes and mobile home parks.

A few studies rely on a nationwide sample of jurisdictions and linear regression methods to estimate the impact of state and/or local land use policies on the supply of mobile homes, controlling for local housing market conditions. Brooks and Mueller (2020) find, unexpectedly, that state-level legal protections for mobile home residents are negatively associated with the share of the local population that lives in mobile homes. Similar findings are reported by Herbert et al. (2024), who find that state requirements to treat manufactured homes equivalently to site-built homes are negatively associated with the number of new mobile home placements, as a share of all new homes built within a county. Aw et al. (n.d.), in one of the few nationwide studies to include controls for the local land use policy environment, find that more restrictive zoning is negatively associated with the share of mortgage originations that are classified as ‘manufactured housing loans’ in Home Mortgage Disclosure Act (HMDA) mortgage loan origination data. While an improvement upon studies that fail to control for the local land use policy environment, the study by Aw et al. (n.d.) has two important limitations. First, the measures of the local land use policy environment characterise local zoning practices but do not account for the presence or absence of regulatory restrictions targeted to manufactured homes. Second, the dependent variable in the study is an imperfect proxy for actual manufactured home placements, as it excludes manufactured homes purchased with conventional loans or cash, ignores manufactured housing loans issued by lenders not subject to HMDA reporting requirements, and cannot account for manufactured homes that are financed in one jurisdiction but placed within another jurisdiction.

The most comprehensive investigations of the relationship between mobile homes and local land use policies are the studies by Dawkins and Koebel (2010) and Dawkins et al. (2011). Both studies use similar methods to estimate manufactured housing supply models for a nationwide sample of approximately 830 local jurisdictions. The authors examine both the number of manufactured housing shipments from manufacturers to local jurisdictions and the number of manufactured housing placements within jurisdictions. The authors find that while the treatment of manufactured housing as a by-right use within residential zones is not significantly associated with the number of homes shipped to communities, this regulatory condition is positively associated with the number of homes placed within communities. Moreover, consistent with the later study by Rumbach et al. (2022), a variety of land use policy instruments other than outright restrictions on manufactured housing impede the placement of manufactured homes.

The Dawkins and Koebel (2010) and Dawkins et al. (2011) studies are limited in two respects. First, the measure of manufactured housing placements in these studies is based on an ordinal scale developed from local government planning officials’ survey responses rather than counts of the actual number of manufactured or mobile homes placed within the community. Local officials’ estimates of the number of manufactured homes placed within the community are probably noisy estimates of the actual number of manufactured home placements. Second, the authors do not consider the possibility that local land use regulations are endogenous in models explaining manufactured housing supply. If omitted variables, such as local consumer preferences and perceptions of the quality of manufactured homes, also explain the likelihood of adopting a local policy restricting manufactured

homes, the estimated effect of regulatory restrictions on manufactured housing supply will be biased.

To recap, few studies have relied on a nationwide sample of jurisdictions and controls for a wide range of local market conditions to examine the relationship between local land use policies and mobile home supply. While Brooks and Mueller (2020) and Herbert et al. (2024) control for state manufactured housing statutes, only Dawkins and Koebel (2010), Dawkins et al. (2011) and Aw et al. (n.d.) include controls for local land use policies. These latter three studies, while informative, rely on dependent variables that are questionable proxies for actual mobile home placements. Although Becker and Rickert (2019) address the endogeneity of local land use regulations within a single state, no study addresses this issue for a nationwide sample of jurisdictions. Also, Becker and Rickert (2019) examine mobile home rents rather than mobile home supply. The next section outlines an empirical strategy that addresses each of these issues.

Research methods

The empirical analysis is based on estimates of the following regression model:

$$MH_{it} = \beta X_{i,t-10} + \gamma \Delta X_{i,t-10} + \delta R_{i,t-10} + u_{it} \quad (1)$$

where MH_{it} refers to new mobile home concentration in a given jurisdiction and time period, defined as the number of mobile homes in jurisdiction i at time t that were built between time $t-10$ and t divided by the total number of new homes of the same age ($t = 2010$ and 2020); β , γ and δ are coefficients to be estimated; $\Delta X_{i,t-10}$ is a vector of variables that measures percentage change in conditions between t and $t-10$; and $X_{i,t-10}$ is a vector of lagged independent variables at time $t-10$. The time-series,

cross-sectional panel data sample varies across jurisdictions and time periods. A typical jurisdiction in the sample will have two rows ('time periods') of data for the independent variables. The first row includes lagged jurisdictional characteristics observed in the year 2000 along with changes in characteristics between the years 2000 and 2010. The second row includes lagged jurisdictional characteristics observed in the year 2010 along with changes in characteristics between the years 2010 and 2020. The panel dataset is 'unbalanced', which simply means that some jurisdictions only have one 'row' of data, for either the 2000–2010 period or the 2010–2020 period.

I focus the analysis on the share, or *concentration*, of new mobile homes rather than the total number of new mobile homes. Normalising by the total number of new homes helps to ensure that the estimate of new mobile home supply does not simply proxy for the overall rate of new housing construction. Hence, the focus of the analysis is on the concentration of new mobile homes added over a 10-year time span, expressed as a share of all new homes added over the same period. MH_{it} is measured using the US Census 'built year' variable at time t rather than as the change in the number of existing mobile homes between t and $t-10$ because the former more closely approximates the number of new mobile home starts while ignoring the number of units lost over the same time period. Restrictions on new mobile home placements should theoretically affect mobile home starts rather than the number of units lost. Although this variable does not capture the number of new mobile home units that were added and subsequently removed during the same time period, this should not be a significant limitation, as mobile homes are rarely moved once placed on a permanent foundation.

Since the Census 'built year' variable includes boats, vans and RVs in the same

category as mobile homes, I deflate MH_{it} by the share of existing homes at time $t-10$ that are boats, vans, and RVs. It is also important to note that the US Census does not distinguish between HUD-Code manufactured homes and other types of mobile homes. Thus, this analysis focuses on the supply of all types of mobile homes, regardless of whether the homes comply with the HUD Code or not.

Although MH_{it} varies across two time periods, I choose not to estimate models with jurisdictional fixed effects because several control variables are constant across time. I control for geographic heterogeneity using dummy variables for US Census region, central city status and city/county status. Because the sample is restricted to metropolitan jurisdictions that responded to the National Longitudinal Land Use Survey (discussed below), I am unable to include rural (nonmetropolitan) jurisdictions in the analysis. Because ‘central city’ is defined on the basis of 2000 Metropolitan Statistical Areas, or MSAs, while the NLLUS sample is defined on the basis of 2003 Core-Based Statistical Areas, or CBSAs, I include in my definition of ‘metropolitan’ any jurisdiction that was located in both a 2000 MSA and a 2003 CBSA. Thus, the central city indicator captures the difference in mobile home concentrations between central city and suburban jurisdictions. Since the sample includes both cities and counties, which often regulate land use in distinctly different ways, I also include a county dummy variable in the model.

I include both lagged and change variables to distinguish between the effect of factors that are probably constant across time from those that change over time. I include three change variables: population growth rates between time $t-10$ and t , median mobile home price growth rates between time $t-10$ and t , and median housing price growth rate between time $t-10$ and t .

Population growth rates are included in the model to account for land scarcity due to population in-migration, which elevates land prices. Since new mobile home supply probably responds differently to shocks in mobile home prices than to changes in the price of other types of housing,³ I include percentage changes in the prices of both.

The lagged variables included in $X_{i,t-10}$ control for several supply- and demand-shifting factors identified in previous studies (see, e.g. Brooks and Mueller, 2020; Dawkins et al., 2011; Dawkins and Koebel, 2010; Hirsch and Rufolo, 1999) that influence the concentration of new mobile homes. Population density proxies for the higher cost of land in more urban locations. I include several socio-demographic controls to capture the demand for mobile homes, including the percent of the population that is non-Hispanic white, the percent of the population that has earned a bachelor’s degree or higher, and median household income. I also control for two characteristics of the existing mobile home stock at time $t-10$: mobile home vacancy rate and the share of existing housing units that are mobile homes. Each of these variables is obtained from the US Census. Variables measured in the year 2000 are obtained from the Decennial Census, while variables measured in the years 2010 and 2020 are obtained from the five-year American Community Survey.

The primary variable of interest is $R_{i,t-10}$, a dummy variable equal to one if the jurisdiction allows the placement of mobile homes within the jurisdiction and zero otherwise. The source for this information is the 2003 National Longitudinal Land Use Survey (NLLUS) prepared by Lo et al. (2019), which asks respondents, ‘Does your jurisdiction permit the placement of new mobile homes, either on a single lot or in a mobile home park?’ I assume that the regulatory conditions represented by the 2003

survey remain constant throughout the analysis period.⁴ I also estimate models that include controls for several other types of land use policy instruments, including the presence of an urban containment boundary (a greenbelt, urban growth boundary or urban service area), a moratorium on new permits and/or subdivision plots, and the presence of an impact fee programme.⁵

There are two econometric challenges associated with obtaining unbiased and efficient estimates of the coefficients in equation (1). First, MH_{it} is a percentage that is bounded by zero and one. The bounded nature of the dependent variable implies that the effect of any given X variable on the dependent variable is likely to vary throughout the range of X . Many address this problem by log-transforming the dependent variable, but this method has limitations as well, given that the log of zero is undefined (Papke and Wooldridge, 1996). In this paper, I address this limitation using the probit model for fractional response variables suggested by Papke and Wooldridge (1996) and applied in Papke and Wooldridge (2008).

A second issue, explained in the previous section, is that $R_{i,t-10}$ is probably endogenous, given that omitted variables that influence the presence or absence of mobile home restrictions also probably influence consumer demand for mobile homes. To address the endogeneity issue, I estimate two-stage least squares (2SLS) models that include, as an instrumental variable, an index that captures the strength of state laws that require local jurisdictions to treat mobile homes fairly in local regulatory practices.⁶ The index relies on data from a previous content analysis of state manufactured housing laws conducted in 2006 by Dawkins et al. (2011). In this study, attributes of each state's law governing local manufactured housing placement were assigned scores to the following variables:⁷

- $Q_0 = 1$ if state addresses manufactured housing in state statute; 0 otherwise.
- $Q_1 = 1$ if state statute pertains to any manufactured home which also meets other requirements (minimum size, siding material, and so forth); 2 if state statute pertains to any manufactured home; 0 otherwise.
- $Q_2 = 1$ if state statute requires local governments to allow manufactured housing within the jurisdiction; 2 if state statute requires local governments to allow manufactured housing in all residential zoning districts; 0 otherwise.
- $Q_3 = -1$ if state statute specifies quantitative standards which apply only to manufactured housing; 1 if state statute enables local standards, primarily to ensure consistency with other single-family units, but encourages fair treatment of manufactured housing; 0 otherwise.

Using these variables, I define the state mobile home index instrumental variable as follows:

$$Q_0 * [Q_1 + Q_2 + Q_3]$$

Importantly, the laws captured by Q_0 to Q_3 should only affect the supply of manufactured housing to the extent that local governments comply with the law. Thus, these requirements only impact manufactured housing supply through their impact on locally adopted regulations. In other words, the state mobile home index should influence the extent of local regulatory restrictions on mobile homes but not influence the supply of mobile homes directly, satisfying the most important condition that must be met by an instrumental variable.

Findings

I begin with a discussion of the descriptive statistics for the variables included in the

regression analysis, displayed in Table 1. The total time-series, cross-sectional sample size is equal to 2000 observations, which includes an unbalanced panel of 1035 jurisdictions in the first time period and 965 jurisdictions in the second time period. The average population density for the sampled jurisdictions is high (approximately 2970 persons per square mile), due to the fact that the sample is restricted to metropolitan cities and counties. As in the studies by Dawkins and Koebel (2010) and Dawkins et al. (2011), the sample is representative of metropolitan jurisdictions that lie in Census regions outside of the Northeast.⁸ The jurisdictions in the sample account for about 20% of the nation's share of new mobile homes added during the 2000–2020 period.

In terms of demographics, the average jurisdiction in the sample is 71% white, with just under 30% of adults having earned bachelor's degrees or higher. Compared to the US population in 2020, the racial composition of the sample is identical to that of the US, but educational attainment is slightly lower than the US, given that 36% of US adults had earned bachelor's degrees or higher. The average median household income of \$56,753.55 is substantially less than the 2020 US median household income of \$67,521. In terms of the mobile home stock, about 4% of existing units are mobile homes, while about 5% of newly constructed units are mobile homes. About 10% of existing mobile homes are vacant. The average jurisdiction in the sample experiences a population growth rate of about 13% and high (>20%) rates of home price and mobile home price growth.

In terms of local land use policies, a large percentage (64%) of jurisdictions allow mobile homes, while only 14% have urban containment boundaries. A majority have impact fees, while few (6%) had enacted moratoria at the time of the NLLUS. The average state mobile home index is fairly high (mean = 3.41), given that the index

varies from zero to five, but it exhibits considerable variability across jurisdictions (standard deviation = 1.7).

The far-right columns in Table 1 provide a comparison between jurisdictions that allow mobile homes with those that do not. Consistent with the research hypothesis, the concentration of new mobile homes is higher in jurisdictions that allow mobile homes than in jurisdictions that prohibit mobile homes. Those jurisdictions that prohibit mobile homes are also home to a more highly educated population that earns higher incomes. Population density is higher in jurisdictions that prohibit mobile homes, but population growth rates are slower than in jurisdictions that allow mobile homes. During the analysis period, the price of mobile homes and all homes increased more rapidly in jurisdictions that allowed mobile homes. Jurisdictions that allow mobile homes are most prevalent in the West, while jurisdictions that prohibit mobile homes are most prevalent in the Midwest.

Table 2 displays the results from two specifications of equation (1). The first model includes only the mobile home allowance, while the second includes controls for all land use policy instruments described previously. Table 2 provides the coefficient estimates, standard errors and statistical significance of the coefficients. Since the raw coefficients from a fractional probit model do not have straightforward interpretations and vary along the distribution of X , I also display marginal effects, which give the increase in new mobile home concentration with respect to a 1% increase in a given X variable.

Most of the Model 1 coefficients displayed in Table 2 display expected signs and significance levels. New mobile home concentrations are lower in jurisdictions with a more highly educated population. Jurisdictions with a higher existing concentration of mobile homes also attract a higher share of new

Table 1. Descriptive statistics for variables included in regression analysis.

Variable	Data source	Full sample			Allows mobile homes			Prohibits mobile homes		
		N	Mean	St. dev.	N	Mean	St. dev.	N	Mean	St. dev.
New mobile homes (% of all new housing)	2000 Census SF3; 2010, 2020 5-year ACS	2000	0.05	0.13	1274	0.06	0.13	726	0.03	0.11
% Non-Hispanic white	2000 Census SF3; 2010 5-year ACS	2000	70.79	22.39	1274	70.91	20.87	726	70.58	24.84
% Bachelor's degree	2000 Census SF3; 2010 5-year ACS	2000	29.69	15.01	1274	28.20	13.67	726	32.31	16.81
Median HH Income (\$)	2000 Census SF3; 2010 5-year ACS	2000	56,753.55	19,276.62	1274	55,345.08	16,982.07	726	59,225.14	22,551.73
Population density (pop/sq. mi)	2000 Census SF3; 2010 5-year ACS	2000	2969.57	2882.94	1274	2440.72	2427.32	726	3897.61	3349.19
Population growth rate (%)	2000 Census SF3; 2010, 2020 5-year ACS	2000	12.74	21.36	1274	14.86	22.74	726	9.01	18.10
Median mobile home price growth rate (%)	2000 Census SF3; 2010, 2020 5-year ACS	2000	20.20	229.35	1274	27.78	174.03	726	6.89	302.61
Median housing price growth rate (%)	2000 Census SF3; 2010, 2020 5-year ACS	2000	44.49	39.69	1274	45.68	38.65	726	42.42	41.39
% of mobile homes vacant	2000 Census SF3; 2010 5-year ACS	2000	9.61	14.10	1274	10.65	12.06	726	7.78	16.97
Existing mobile homes (% of existing housing)	2000 Census SF3; 2010 5-year ACS	2000	3.95	6.51	1274	5.37	7.25	726	1.47	3.85
Northeast region	2000 Census SF3	2000	0.09	0.28	1274	0.05	0.21	726	0.16	0.37
Midwest region	2000 Census SF3	2000	0.34	0.47	1274	0.27	0.44	726	0.46	0.50
West region	2000 Census SF3	2000	0.28	0.45	1274	0.36	0.48	726	0.14	0.34
County	2000 Census SF3	2000	0.08	0.27	1274	0.10	0.30	726	0.03	0.18
Central city	2000 Census SF3	2000	0.14	0.35	1274	0.14	0.35	726	0.13	0.34
Year 2010	2000 Census SF3	2000	0.48	0.50	1274	0.49	0.50	726	0.47	0.50
Allows mobile homes	2003 NLLUS	2000	0.64	0.48	1274	1.00	0.00	726	0.00	0.00
Urban containment boundary present	2003 NLLUS	1868	0.14	0.34	1201	0.18	0.39	667	0.06	0.23
Moratorium on new permits	2003 NLLUS	1984	0.06	0.24	1271	0.06	0.23	713	0.07	0.25
Has impact fees	2003 NLLUS	1956	0.56	0.50	1251	0.60	0.49	705	0.49	0.50
State mobile home index	2003 NLLUS	2000	3.41	1.70	1274	3.44	1.70	726	3.35	1.70

Table 2. Fractional probit regression results.

Variable	Model 1				Model 2			
	Coef	St. error	Sig.	Elasticity	Coef	St. error	Sig.	Elasticity
Constant	-1.676	0.193	***		-1.683	0.202	***	
% Non-Hispanic white	-0.002	0.002		-0.0118	-0.002	0.002		-0.011
% Bachelor's degree	-0.007	0.003	***	-0.0142	-0.008	0.003	***	-0.016
Median HH income (\$)	0.000	0.000		-0.0121	0.000	0.000		-0.010
Population density (pop/sq. mi)	0.000	0.000	***	0.0105	0.000	0.000	***	0.010
Population growth rate (%)	-0.011	0.002	***	-0.0084	-0.011	0.003	***	-0.009
Median mobile home price growth rate (%)	0.000	0.000	***	0.0008	0.000	0.000	***	0.001
Median housing price growth rate (%)	-0.002	0.001	**	-0.0074	-0.002	0.001	**	-0.008
% of mobile homes vacant	0.000	0.002		0.0003	0.000	0.002		0.000
Existing mobile homes (% of existing housing)	0.047	0.004	***	0.0300	0.046	0.004	***	0.030
Northeast region	0.108	0.146		0.0009	0.082	0.157		0.001
Midwest region	0.058	0.081		0.0014	0.049	0.085		0.001
West region	0.170	0.066	**	0.0052	0.138	0.075	*	0.004
County	-0.111	0.048	**	-0.0005	-0.111	0.050	**	-0.001
Central city	-0.042	0.072		-0.0005	-0.034	0.078		0.000
Year 2010	0.015	0.079		0.0007	0.014	0.083		0.001
Allows mobile homes	0.299	0.080	***	0.0199	0.295	0.085	***	0.020
Urban containment boundary present					-0.139	0.067	**	-0.001
Moratorium on new permits					0.067	0.106		0.000
Has impact fees					0.112	0.074		0.006
Pseudo R-squared	0.15				0.15			
N	2000				1830			

*** $p < 0.01$. ** $p < 0.05$. * $p < 0.10$.

mobile homes, as might be expected, given that existing mobile home shares probably proxy for consumer preferences for this housing type. Existing mobile home shares may also proxy for the share of land devoted to mobile home parks, given that many communities prohibit mobile homes outside of designated parks. As hypothesised, new mobile home concentrations are higher when mobile home prices increase but lower when overall home prices increase. Mobile home concentrations are lower in more rapidly growing jurisdictions, probably due to the upward pressure on land prices that makes mobile homes less profitable than other housing types.

There are two unexpected findings. New mobile home concentrations are lower in counties than in cities. This is somewhat unexpected, given that counties, which often do not regulate land use, are presumably more accepting of mobile homes than cities. This finding also potentially reflects the influence of other omitted factors correlated with city/county status. Also, population density is positively associated with mobile home concentrations. This latter finding is possibly due to the fact that the majority of jurisdictions included in the sample are within suburban areas, where population density possibly proxies for a higher acceptance of diverse housing types, including mobile homes.

In Model 1, the presence of a mobile home permission is associated with a 0.02 increase in the concentration of mobile homes. This may seem small, but this marginal effect is the second largest among all statistically significant coefficients, behind only the marginal effect of existing mobile home shares. To put the 0.02 estimate into context, the average jurisdiction in the sample adds approximately 3577 new housing units over a 10-year span. Holding the number of new housing units constant, the 0.02 estimate equates with an increase in the

number of new mobile homes of approximately 71 units.

Model 2 in Table 2 adds the other land use policy measures described previously. Of the other policy instruments included in the regression, only the presence of an urban containment boundary is statistically significant. Based on the marginal effect for this variable, the presence of an urban containment boundary is associated with a small (0.0014) reduction in new mobile home concentration. Controlling for other forms of land use regulation does not reduce the size of the effect of mobile home restrictions. In fact, the marginal effect is slightly larger when other forms of land use regulation are held constant.

Table 3 presents 2SLS estimates of Model 1 in Table 2, with the state mobile home index added to the first stage regression as an excluded instrumental variable. I present both the first stage results explaining the presence of a mobile home allowance and the second stage results explaining new mobile home concentrations with the predicted value of the mobile home allowance from stage one added as a regressor. As indicated by the results from the first stage model, the state mobile home index is positive and significantly associated with the local regulatory mobile home allowance. Furthermore, the Wald test of exogeneity rejects the null hypothesis of exogeneity. Taken together, these two findings suggest that the state mobile home index is positively and significantly associated with the local mobile home allowance, and a regression that ignores the endogeneity between the mobile home allowance and new mobile home concentrations is probably biased. The differences between the final column of Table 3 and Model 1 of Table 2 suggest that failing to account for endogeneity results in a substantial underestimate of the effect of the mobile home allowance on new mobile home concentrations. According to the

Table 3. Fractional probit 2SLS regression results.

Variable	First stage (DV = MH PERMITTED)			Second stage (DV = MH % OF NEW HOUSING)		
	Coef.	St. error	Sig.	Coef.	St. error	Elasticity
Constant	0.679	0.065	***	-2.302	0.228	***
% Non-Hispanic white	0.001	0.001	*	-0.003	0.002	**
% Bachelor's degree	-0.001	0.001		-0.002	0.003	
Median HH income (\$)	0.000	0.000	***	0.000	0.000	***
Population density (pop/sq. mi)	0.000	0.000	***	0.000	0.000	**
Population growth rate (%)	0.000	0.000		-0.006	0.003	
Median mobile home price growth rate (%)	0.000	0.000		0.000	0.000	
Median housing price growth rate (%)	0.000	0.000		-0.001	0.001	
% of mobile homes vacant	0.001	0.001		-0.002	0.002	
Existing mobile homes (% of existing housing)	0.012	0.002	***	0.000	0.014	
Northeast region	-0.206	0.043	***	0.477	0.122	***
Midwest region	-0.165	0.032	***	0.312	0.078	***
West region	0.199	0.028	***	-0.373	0.122	***
County	0.160	0.032	***	-0.368	0.073	***
Central city	0.088	0.030	***	-0.199	0.075	***
Year 2010	0.061	0.028	**	-0.119	0.073	***
Allows mobile homes (predicted value)				2.192	0.229	***
State mobile home index						
Wald test of exogeneity						
Log pseudolikelihood						
N	-1,443					
	2000					

****p* < 0.01. ***p* < 0.05. **p* < 0.10.

Table 4. OLS regression results, DV = Natural Log(New Mobile Homes).

Variable	Model 1			
	Coef.	St. error	Sig.	Elasticity
Constant	0.251	0.291		
% Non-Hispanic white	−0.003	0.002		−0.206
% Bachelor's degree	−0.004	0.004		−0.100
Median HH income (\$)	0.000	0.000	***	−0.531
Population density (pop/sq. mi)	0.000	0.000	*	−0.063
Population growth rate (%)	−0.013	0.002	***	−0.201
Median mobile home price growth rate (%)	0.000	0.000		−0.004
Median housing price growth rate (%)	−0.001	0.001		−0.030
% of mobile homes vacant	−0.001	0.004		−0.009
Existing mobile homes (% of existing housing)	0.055	0.006	***	0.337
Northeast region	0.015	0.150		0.001
Midwest region	−0.098	0.086		−0.025
West region	0.340	0.082	***	0.117
County	0.184	0.100	*	0.024
Central city	−0.047	0.092		−0.008
Year 2010	−0.079	0.094		−0.032
Natural log(new housing units)	0.562	0.022	***	4.188
Allows mobile homes	0.484	0.086	***	0.390
R-squared	0.56			
N	1073			

*** $p < 0.01$. ** $p < 0.05$. * $p < 0.10$.

2SLS results, the presence of a mobile home allowance is associated with a 0.289 increase in the concentration of new mobile homes among new homes constructed, by far the largest marginal effect among all independent variables included in the model. Recall that this marginal effect was 0.02 in the model that ignored the endogeneity of the mobile home allowance. For the average jurisdiction in the sample, a 0.289 increase in the concentration of new mobile homes equates to a roughly additional 1033 mobile home units over a 10-year span, holding the number of new housing units constant.

One concern with the specification of the dependent variable is that the share of new mobile homes in a jurisdiction is a function of the amount of new site-built housing constructed. Thus, a high share of mobile homes could be driven by either by a strong market for new mobile homes or a comparatively

weak market for site-built housing construction.⁹ The simple bivariate correlation between the dependent variable and the total number of new homes is equal to -0.036 , which confirms this suspicion, although the correlation is quite weak. As an additional robustness check, I also estimate an ordinary least squares (OLS) regression model where the dependent variable is the natural log of new mobile homes (the numerator in the previous regressions) and the natural log of new housing units (the denominator in the previous regressions) is added as an independent variable. Given that the natural log of zero is undefined, the sample size for this regression is somewhat smaller than in the regression summarised in Model 1 of Table 2. As Table 4 suggests, the new model specification does not alter the sign or significance level of the coefficient on the mobile home allowance variable.

Conclusion

This study analysed the determinants of new mobile home concentrations for a sample of US cities and counties and found that local land use policies significantly influence the share of new mobile homes added to a community's housing stock. Communities that allow mobile homes can expect to add approximately 71 new mobile homes over a 10-year span, holding the number of new housing units constant. In models that account for the endogeneity of the mobile home allowance, this number increases to 1033 units over a 10-year span. I also find that the presence of an urban containment boundary reduces the number of new mobile homes added over a 10-year span. The impacts of permit moratoria and impact fees are not statistically significant in the estimated models. These findings suggest that land use policy reform, particularly the removal of policies that disallow mobile homes, can be a useful tool for increasing the share of mobile homes. Given that such homes tend to be more affordable than conventional stick-built homes, expanding the share of mobile homes can be an important part of a community's overall affordable housing policy strategy.

These findings should be interpreted with the following caveats in mind. First, the sample of jurisdictions included in the analysis is limited to those who responded to the Urban Institute's NLLUS, so it does not include rural jurisdictions. Furthermore, the sample represents only about 20% of all new mobile homes placed during the 2000–2020 period. However, as also found in the research by Dawkins and Koebel (2010) and Dawkins et al. (2011), the findings hold promise for metropolitan areas, where mobile homes are often not considered to be viable affordable housing options. Second, the study only includes a limited number of controls for the

land use policy landscape. Several of the variables included in the Dawkins and Koebel (2010) and Dawkins et al. (2011) studies, for example, such as local aesthetic controls and wind or snow load standards, were not available in the NLLUS. Third, the number of new mobile homes added within the previous 10 years that are still standing at the end of the 10-year span does not capture the number of new mobile home units that were added and removed during the same time period. Finally, mobile homes are often placed in mobile home parks, but information on the supply of land appropriately zoned for mobile home parks was not available and thus not considered in this study.

Declaration of conflicting interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Casey J Dawkins  <https://orcid.org/0000-0002-2627-8137>

Notes

1. The National Manufactured Housing Construction and Safety Standards Act of 1974 and the subsequent regulation enabled by this law, commonly referred to as the 'HUD Code', changed the terminology of this form of housing from 'mobile home' to 'manufactured home'. Since then, it has been customary to refer to homes built in accordance with HUD Code standards as 'manufactured homes' rather than 'mobile homes'. This paper uses the more inclusive term – mobile home – which refers to all homes built in

- factories and transported in single, double, or triple sections to individual home sites, whether the home is compliant with the HUD Code or not. The primary reason for using this term is to be consistent with the definition of the model's key dependent and independent variables. Also, the term 'mobile home' is still widely used in public discourse and is arguably more recognisable among the lay public than the industry-specific term, 'manufactured housing'. This qualification aside, it is reasonable to assume that most new mobile homes placed during the study period (2000–2020) were constructed in accordance with HUD Code standards and are thus appropriately termed manufactured housing units.
2. It is possible that the higher stated, as compared to revealed, preferences for mobile homes cited in the studies by Boehm (1995) and Boehm and Schlottmann (2008) reflect the presence of mobile home supply restrictions that constrain revealed preferences.
 3. Becker and Rickert (2019) provide evidence to support this conjecture.
 4. A more recent version (2019) of the NLLUS is now available, but not enough time had passed at the time of this research to collect information on the number of new mobile homes placed in the 10 years since this survey. Although the 2019 NLLUS is not used in the analysis, the availability of this repeat survey allows one to test the assumption that regulatory conditions remain stable over the analysis period. For those jurisdictions that responded to the mobile home regulation question in both the 2003 and 2019 survey waves, I find that 81% of jurisdictions that had restrictions on manufactured homes in 2003 continued to restrict manufactured homes in 2019. Thus, for the vast majority of jurisdictions, restrictions on manufactured homes remained stable. Although a small proportion of these jurisdictions eventually removed their mobile home restrictions, the presence of a regulatory restriction for at least a portion of the analysis period is still likely to have influenced the flow of new mobile homes during the period.
 5. Although the NLLUS includes information on a much wider range of regulatory conditions, I only include those that should logically have an impact on mobile homes. For example, one variable that is available in the NLLUS – the maximum number of dwelling units allowed per net acre in the highest density residential zone – should not constrain the number of mobile homes, which tend to be placed in low-density zones that allow larger lot sizes. The NLLUS response rate also differs by type of regulatory condition, so I choose to use regulatory variables with sufficiently large response rates.
 6. The fractional probit model is estimated using the *fracreg* programme in Stata. The 2SLS fractional probit is estimated using the *ivfprobit* Stata programme. Both regressions use robust standard errors, as suggested by Papke and Wooldridge (1996 and 2008).
 7. The Dawkins et al. (2011) study also includes one other variable measuring whether the state treats manufactured homes as personal or real property, but I do not include this variable for reasons explained below.
 8. In the Dawkins and Koebel (2010) and Dawkins et al. (2011) studies, 36% of jurisdictions are in the South, 28% are in the Northwest, 25% are in the West, and 11% are in the Northeast.
 9. I am thankful to one of the anonymous reviewers for calling attention to this important point.

References

- Aw A, Brown L and Yea A (n.d.) *Identifying the Opportunities to Expand Manufactured Housing*. Washington, DC: Freddie Mac.
- Beamish JO, Goss RC, Atilas JH, et al. (2001) Not a trailer anymore: Perceptions of manufactured housing. *Housing Policy Debate* 12(2):373–392.
- Becker C and Rickert T (2019) Zoned out? The determinants of manufactured housing rents: Evidence from North Carolina. *Journal of Housing Economics* 46: 101626–101717.
- Boehm TP (1995) A comparison of the determinants of structural quality between manufactured housing and conventional tenure choices:

- Evidence from the American Housing Survey. *Journal of Housing Economics* 4(4):373–391.
- Boehm TP and Schlottmann A (2008) Is manufactured owned housing a good alternative for low-income households? Evidence from the American housing survey. *Cityscape: A Journal of Policy Development and Research* 10(2):159–224.
- Brooks MM and Mueller JT (2020) Factors affecting mobile home prevalence in the United States: Poverty, natural amenities, and employment in natural resources. *Population Space and Place* 26(4):1–13.
- Dawkins CJ (2021) *Just Housing: The Moral Foundations of American Housing Policy*. Cambridge, MA: MIT Press.
- Dawkins CJ and Koebel CT (2010) Overcoming barriers to placing manufactured housing in metropolitan communities. *Journal of the American Planning Association* 76(1):73–88.
- Dawkins CJ, Koebel T, Cavell M, et al. (2011) *Regulatory Barriers to Manufactured Housing Placement in Urban Communities*. Washington, DC: US Department of Housing and Urban Development.
- Durst NJ and Sullivan E (2019) The contribution of manufactured housing to affordable housing in the United States: Assessing variation among manufactured housing tenures and community types. *Housing Policy Debate* 29(6):880–898.
- Goodman L and Ganesh B (2018) *Challenges to Obtaining Manufactured Home Financing*. Washington, DC: Urban Institute Brief. Available at: <https://www.urban.org/research/publication/challenges-obtaining-manufactured-home-financing> (accessed 21 November 2024).
- Herbert C, Hermann A, McCue D, et al. (2024) *A Review of Barriers to Greater Use of Manufactured Housing for Entry-Level Homeownership*. Cambridge, MA: Joint Center for Housing Studies, Harvard University.
- Herbert C, Reed C and Shen J (2023) *Comparison of the Costs of Manufactured and Site-Built Housing*. Cambridge, MA: Joint Center for Housing Studies, Harvard University.
- Hirsch WZ (1988) An inquiry into the effects of mobile home park rent control. *Journal of Urban Economics* 24(2):212–226.
- Hirsch WZ and Rufolo AM (1999) The regulation of immobile housing assets under divided ownership. *International Review of Law and Economics* 19(3):383–397.
- Lo L, Gallagher M, Pendall R, et al. (2019) National Longitudinal Land Use Survey. Washington, DC: The Urban Institute. Available at: <https://datacatalog.urban.org/dataset/national-longitudinal-land-use-survey-nllus> (accessed 8 November 2023). Data developed at the Urban Institute and made available under the ODC-BY 1.0 Attribution License.
- Mandelker DR (2016) Zoning barriers to manufactured housing. *The Urban Lawyer* 48(2): 233–278.
- Manufactured Housing Institute (2006) *Understanding Today's Manufactured Housing*. Arlington, VA: Manufactured Housing Institute.
- Mason C and Quigley JM (2004) *The curious institution of mobile home rent control: A case study of mobile home parks in California*. Program on Housing and Urban Policy Working Paper No. W04-007. Berkeley, CA: University of California, Berkeley.
- Papke LE and Wooldridge JM (1996) Econometric methods for fractional response variables with an application to 401(k) plan participation rates. *Journal of Applied Econometrics* 11: 619–632.
- Papke LE and Wooldridge JM (2008) Panel data methods for fractional response variables with an application to test pass rates. *Journal of Econometrics* 145: 121–133.
- Pierce G, Gabbe CJ and Gonzalez SR (2018) Improperly-zoned, spatially-marginalized, and poorly-served? An analysis of mobile home parks in Los Angeles County. *Land Use Policy* 76: 178–185.
- Rumbach A, Sullivan E, McMullen S, et al. (2022) You don't need zoning to be exclusionary: Manufactured home parks, land-use regulations and housing segregation in the Houston metropolitan area. *Land Use Policy* 123: 106422.
- Sullivan E (2022) Personal, not real: Manufactured housing insecurity, real property, and the law. *Annual Review of Law and Social Science* 18: 119–138.
- Sullivan E, Makarewicz C and Rumbach A (2022) Affordable but marginalized: A socio-spatial and regulatory analysis of mobile home parks in the Houston metropolitan area.

- Journal of the American Planning Association* 88(2):232–244.
- US Department of Housing and Urban Development [HUD] (1998) *Factory and site-built housing: A comparative analysis*. NAHB Research Center Report for the US Department of Housing and Urban Development, October. Washington, DC: US Department of Housing and Urban Development, Office of Policy Development and Research.
- Vanderford S, Mimura Y and Sweaney A (2005) A hedonic price comparison of manufactured and site-built homes in the non-MSA U.S. *Journal of Real Estate Research* 27(1):83–104.
- Wheeler CA and Jargowsky PA (2018) Race, land use regulation, and housing affordability. Working Paper, Rutgers University. Available at: <http://dx.doi.org/10.2139/ssrn.3199298> (accessed 11 December 2023).
- Zhou Y (2013) The decision to purchase a manufactured home: A nested logit model of determinants. *International Journal of Housing Policy* 13(3):268–287.