

## Article

# Locating New Urbanism Developments in the U.S.: Which Cities Have New Urbanism and Why?

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**Abstract:** This article aims to examine the characteristics of cities where New Urbanism (NU) developments are located as of 2019. We first develop a set of hypotheses to explore why some cities are welcoming NU developments more than other cities and how the cities differ in terms of general real estate development determinants, fiscal capacity and regulatory authority, advocacy group support, and cultural diversity. We then employ a Negative Binomial Regression to test the relationship between concentrations of NU developments and a variety of city characteristics by using a data set of 6923 urban cities. The results suggest that NU developments are advocated by cities with a higher level of environmental awareness, better fiscal and regulatory status, and better cultural diversity. The research results highlight the importance of continuously gaining support from environmental groups and the general public for effective expansion of New Urbanist developments within the U.S. These findings also indicate that for noteworthy changes in growth patterns to arise at a large scale across the U.S., there must be changes in values and preferences, and institutional capacity in updating land-use regulations that allow for sustainable growth.

**Keywords:** location of new urbanism developments; community features; sustainable development



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## 1. Introduction

Urban Sprawl has been relevant in U.S. cities since the 1950s, rapidly spreading to other cities throughout the world. It has a major impact on the environment, public health, and the socio-economic evolution of cities [1]. The distortion in the process of capitalist urban renewal has also exacerbated the urban sprawl in recent years [2–7]. The past couple of decades have witnessed an intellectual backlash against urban sprawl in the United States (U.S.) as well as western countries [1,8–12]. Although the definition of sprawl varies between scholars and research groups, all definitions agree that sprawl is essentially a low-density and auto-oriented suburbanization phenomenon that goes beyond urban boundaries and, to some extent, lacks planning guidelines [13–19]. It has been asserted that suburban design has higher environmental, capital, and energy costs than high-density planning [20], and also attenuates our societal connections and increases people isolation [21,22]. Since the early 1980s, many scholars and practitioners have suggested New Urbanism (NU), a planning ideology, as a neighborhood design alternative to urban sprawl as well as a way out of the environmental and societal issues resulting from suburban development.

Arising from “Neo-traditional Urbanism” [23–25], NU incorporated “Traditional Neighborhood Design” (TND) [26], “Transit-Oriented Development” (TOD) [27–29], “Pedestrian Pockets” [29], and “Responsive Environments” [30]. In 1993, the proponents of these

approaches, mainly architects and urban planners, set up the Congress for the New Urbanism (CNU). Later in 1996, CNU ratified *Charter of the New Urbanism* as a means of integrating the planning guidelines and principles such as mixed-use and pedestrian-friendly neighborhoods, compact spatial patterns, and multiple forms of transportation [31]. Also in the same period, CNU partnered with the United States Environmental Protection Agency (EPA) to work out the first Smart Growth policies, and worked with the Department of Housing and Urban Development (HUD) to develop the HOPE (Housing Opportunities for People Everywhere) VI program, which aimed at revitalizing the worst public housing projects in the U.S. into mixed-income developments (*New Urban News*, January–February 2002). After the distribution of Smart Code (an integrated land development ordinance model that folds zoning, urban design, subdivision regulations, and basic architectural standards into one concise document) in 2003, the primary focus of the NU movement shifted from designing for architectural quality and a “sense of community” to a more holistic approach combined with the development of Transect (a zoning system that replaces traditional separated-use zoning with six transect zones to promote mixed land uses, diversity housing, walkable streets, and optional transportation) [32–36]. Collaborated with the United States Green Building Council (USGBC), CNU developed the standards for the LEED-ND rating program in 2007.

Overall, the NU movement pledged to end urban sprawl, protect ecological resources, reduce energy consumption as well as carbon emissions, remold communities, and improve urban livability by redesigning buildings, neighborhoods, and regions [31,37–40]. Architects and planners hope to change the definition of a beautiful community in people’s minds through new concepts and designs. They hope that the community built with the concept of NU can become a model for American community planning and reformulate community development standards in the development process [41]. The communities planned and designed under NU principles emphasize the creation of suitable-scale streets and blocks, compact and mixed land functions, accessible subway, light rail, bus and other transportation stations, convenient service facilities, friendly communication space, and an integrated social atmosphere. The characteristics of this movement can be summarized into two aspects: Firstly, to rethink urban public space through the diversification of land use and the enhancement of neighborhood interaction to create stronger community consciousness; and secondly, to abandon the suburban community scale and single-level road network system, create a new living environment that is walk-friendly and road-graded, and minimize the negative impact on traffic and environment [42].

Although the movement is championed as a feasible choice to rectify negatively perceived characteristics of suburban development, it has also attracted many discussions and criticisms since its birth. Generally speaking, the criticism of NU can be divided into three levels: First, for the specific projects of new urbanism community, it failed to realize the commitment of affordable house prices, and the house prices exceeded the affordability of ordinary families [43]. Second, it has defects in theory and working methods. It tries to use technical means and return to the traditional design and planning as a method to solve complex social problems [44]. Third, from the perspective of the social environment, it has failed to reverse people’s travel habits in the automotive social environment, and the situation of class and racial segregation has not been improved [45]. As Filep and Thompson-Fawcett (2020) observe, the heterogeneity associated with the NU movement, which is in part born of the specifics of locations and histories, challenges any notions that New Urbanism is a singular, univocal paradigm [46]. To better understand these critiques and provide constant feedback on contemporary NU development, it is necessary to explore features of the cities where the NU developments are developed in the U.S.

In general, there is a scarcity of literature on the community characteristics of where NU developments are developed and located. Previous empirical studies supply perspectives that are essential to preliminary knowledge of NU. Nevertheless, most studies are characterized by several typical examples of NU projects [45,47,48]. It is essential to explore the experiences of NU in more comprehensive settings across the U.S., especially in

consideration of where the NU developments are and why. Song et al. have analyzed the spread of early NU developments (before 2004) at a county level and found a set of impact factors [36]. Our research extends their examination from two aspects. First, city instead of county is selected as the study unit. Counties in the United States are extremely diverse in their development patterns: Some are populated entirely at a high level of population density, some have major pockets of high density and little sprawl, some have minor pockets of density and major sprawl, and some are primarily just low-density. Thus, using county as the unit of measurement is inappropriate to a classification of the type of location that has New Urbanist development. The aggregation of NU developments to cities might minimize the geographical limitations, especially regarding revealing potentially essential variations across municipalities such as the wealth of the community, approaches to regulating land development, and levels of regulatory authority. Second, our analysis of NU developments is based on the latest data set as of 2019.

We address two research questions in the remainder of this article: (1) Which cities adopted NU developments by 2019 and (2) which factors explain variations in NU developments across cities? We first specify our hypotheses to be tested in this article regarding factors that might help to explain the community characteristics of where NU developments are developed and located. Next, we describe our samples, variables, and analytical techniques, and then proceed to report our findings. We conclude with an analysis of the results and their implications for NU developments as well as suggestions for future research.

## 2. Research Hypotheses

McDonald and McMillen have developed an empirical model on individual counties to evaluate the impact of general housing determinants on housing markets, and results generally show that faster population growth, higher population density, and less existing housing stock contribute to high-density compact growth [49]. Based on these conclusions, we propose General Real Estate Development Determinants including locations, natural features, and economic conditions which may be associated with new real estate developments, including NU developments.

Previous empirical studies have also explored the relationship between local interests and sustainable policies adoption [50–54]. Local interests have been quantified by several types of metrics, with the most commonly analyzed metrics being socioeconomic and demographic characteristics such as local activism, education, and homeownership [50,51,54]. The results of these studies indicate that cities with better fiscal health, higher level of environmental advocacy, more Democratic voters, and/or whose citizens are of higher socioeconomic status are more likely to accept sustainable policies [50,54,55]. It is reasonable that we apply these theories on the NU development which has been advocated as a more sustainable development form. The fiscal health argument, which we label the Fiscal and Regulatory Status Argument, correlates with the capacity of municipalities in regulating land use developments and adopting alternative residential developments. Following previous studies, local tax revenues, the employment rate, the Wharton Residential Land Use Regulation Index (WRLURI), and statewide land use planning adoption can be measured in the regression model for this argument [54,56–58]. The arguments of environmental advocacy, Democratic voters, and community socioeconomic status, which we collectively call the Advocacy Group Argument, are based on the inference that the distribution of resources affects the promotion of public interests, in our case, sustainability. The community socioeconomic status can be quantified by education, income, and the proportion of manufacturing employment in the industry.

Inspired by studies that criticize the social environments of NU projects, we propose the third set of arguments marked as Cultural Diversity that could lead to deviations from social rational behavior in local development path choice [59–62]. Even NU developments may yield elite and socially homogeneous communities [47], however, most of these assertions are based on studies of several representative projects as we have mentioned above. On that account, it is reasonable for us to take more samples into account to

generalize NU. Based on expert knowledge of the dominant factors of cultural diversity and available data, the proportion of the white population is selected as the explanatory factor of this set of arguments.

### 3. Data and Methodology

#### 3.1. Study Area

We selected urbanized cities to study the geographical location of NU developments in the U.S. because the NU movement is generally an urban phenomenon. From all cities (up to 20,000 cities in this case), we rely on the 2010 U.S. Census to extract urbanized cities and filter out cities of which the data is incomplete. In total, 6923 cities are included for reporting the results. As we will show, the city-level features perform well in explaining the geographical distribution of NU developments.

#### 3.2. Variables

The variables are based on previous findings in the literature and our deduction. Data sources, definitions, and descriptive statistics about the variables for 6923 cities are listed in Table 1.

**Table 1.** Variables definitions and descriptive statistics.

Name	Description	Source	Mean	Std	Min	Max	<i>n</i>
<b>Dependent Variable</b>							
NU developments (2019)	Equal to the total number of NU developments in the city	New Urban News/CNU website	0.15	0.98	0	32	6923
<b>General Real Estate Development Determinants Argument</b>							
Population growth	Proportional change in city population from 2010 to 2020	US Census	0.32	1.89	(0.99)	132.12	6923
Gross population density	Gross population density of cities in 2010 in square miles, measured in hundreds	US Census	2428.45	2217.69	21.89	47,245.98	6923
Older housing units	Percentage of housing units built before 1940	US Census	0.20	0.18	0.00	0.89	6923
MSA	Equal to 1 if a city is located at least partially inside a metropolitan statistical area, equal to 0 if not	US Census	0.59 <sup>b</sup>	0.49	0	1.0	6923
Highway Access	Total length of the inter-state highway in miles	TIGER	1.97	6.93	0	220.75	6923
Transit in 2010	Percent of transit number of commuters using public transit in 1990	US Census	0.02	0.05	0	0.57	6923
West region	Equal to 1 if a city is in West region, equal to 0 if not	US Census	0.25 <sup>a</sup>			305 <sup>c</sup>	6923
Midwest region	Equal to 1 if a city is in Midwest region, equal to 0 if not	US Census	0.08 <sup>a</sup>			165 <sup>c</sup>	6923
Northeast region	Equal to 1 if a city is in Northeast region, equal to 0 if not	US Census	0.07 <sup>a</sup>			108 <sup>c</sup>	6923
South region	Used as the reference category in the regression model	US Census	0.21 <sup>a</sup>			521 <sup>c</sup>	6923

Table 1. Cont.

Name	Description	Source	Mean	Std	Min	Max	<i>n</i>
Coastal	Equal to 1 if a city is in a coastal county	TIGER	0.34	0.47	0	1	6923
Temperature	A one to nine scales with 1 equating to the annual mean daily average temperature less than 32 degrees Fahrenheit and 9 indicating the annual mean daily average temperature greater than 70 degrees Fahrenheit	National Oceanic and Atmospheric Administration (NOAA)	5.53	1.64	2.0	9.0	6923
Changes in GDP per capita	Percentage of changes in average household income between 2010 and 2020	US Census	0.80	0.27	(1.00)	4.31	6923
Changes in home values	Percentage of changes in median home values between 2010 and 2020	US Census	1.34	0.58	(1.00)	9.89	6923
<b>Fiscal and Regulatory Status Argument</b>							
Employment Rate	Employment rate for the civilian population in labor force 16 years and over	US Census	0.90	0.04	0.58	1.00	6923
State	Equal to 1 if a city in the state with statewide land use planning, equal to 0 if not	Statewide Planning: A National Overview	0.47	0.50	0	1	6923
<b>Advocacy Group Argument</b>							
Environmental organizations	Total number of non-profit environmental organizations in cities	The National Center for Charitable Statistics, Core Files 2003	0.79	3.84	0	157	6923
Democratic voters in 2020	Percentage of Democratic voters in 2020	Voter Registration Statistics	0.46	0.12	0.13	0.90	6923
Income	Median household income in 2020, measured in thousands	US Census	50,457	16,897	15,323	150,001	6923
Education	Proportion of city residents 25 years and older with bachelor's degree or higher in 2010	US Census	0.21	0.14	0.02	0.91	6923
Household type	Proportion of city households with at least one child under 18 years of age living in the household in 2010	US Census	0.33	0.09	0.00	0.84	6923
Industrial composition	Percentage of workers in the manufacturing sector in 2010	US Census	0.21	0.10	0	0.61	6923
<b>Cultural Diversity Argument</b>							
Race	Percentage of non-white in 2010	US Census	0.15	0.17	0.01	0.97	6923

<sup>a</sup>. Mean values for West, Midwest, Northeast, and South regions are equal to the average number of NU developments per city in each region. For example, a mean value of 0.25 for the West region indicates that the average number of NU developments in the West region cities is 0.25. <sup>b</sup>. The mean value for the MSA variable indicates the proportion of all cities in the sample are located in metropolitan statistical areas. <sup>c</sup>. Maximum values for West, Midwest, Northeast, and South regions are equal to the total number of NU Developments in each region. For example, a max value of 300 for the West region indicates that there are 300 NU developments in West region cities.

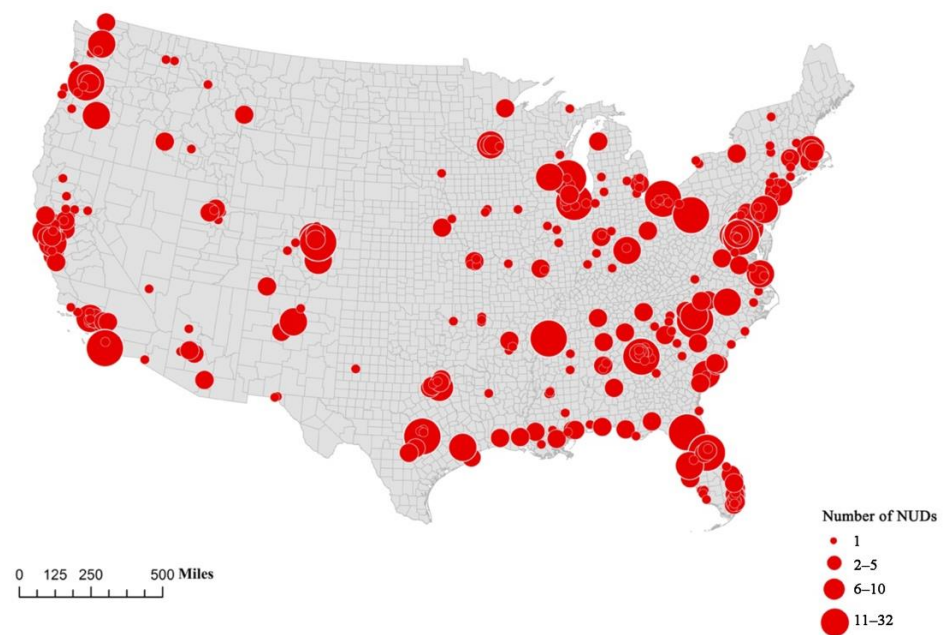
### 3.2.1. Dependent Variable

The dependent variable is a discrete variable that equals to the total number of NU developments in a city. A total of 1098 NU developments completed by December 2019 are

gathered across 476 of 6923 cities in the contiguous United States. As shown in Figure 1, sizable concentrations in the South region and comparatively unfilled space in the central part can be observed. Table 2 provides more details about where the bulk of the NU developments are located.

**Table 2.** Cities with five or more NU developments till 2019.

City	State	U.S. Region	Number of NU Developments
Atlanta	GA	South	32
District of Columbia	DC	South	24
District of Columbia	NC	South	21
Austin	TX	South	21
Denver	CO	West	18
Baltimore City	MD	South	16
Cleveland	OH	Midwest	16
Milwaukee	WI	Midwest	14
Memphis	TN	South	11
Orlando	FL	South	11
Gainesville	FL	South	11
San Diego City	CA	West	11
Chicago	IL	Midwest	11
Portland	OR	West	11
Pittsburgh	PA	Northeast	11
Dallas	TX	South	10
Boulder City	CO	West	9
Arlington City	VA	South	9
Ashburn	VA	South	9
Tampa	FL	West	9
San Francisco	CA	West	9
Alexandria City	VA	South	8
Seattle	WA	West	7
Colorado Springs	CO	West	7
Rockville City	MD	South	7
Los Angeles City	CA	West	7
San Jose	CA	West	7
Cambridge	MA	Northeast	7
Raleigh	NC	South	7
Philadelphia	PA	Northeast	7
Sun Prairie	WI	Midwest	6
Norfolk City	VA	South	6
San Jose	CA	West	6
Santa Fe City	NM	West	6
Cincinnati	OH	Midwest	6
Huntersville	NC	South	6
Minneapolis	MN	Midwest	6
Houston	TX	South	6
Bend	OR	West	6
Beaufort City	SC	South	5
Tucson	AZ	South	5
St. Louis City	MO	Midwest	5
Gaithersburg	MD	South	5
Baton Rouge	LA	South	5
New Orleans	LA	South	5
Pasadena	CA	West	5
Hayward	CA	West	5
San Bernardino City	CA	West	5
Salinas	CA	West	5
Columbus	OH	Midwest	5



**Figure 1.** Distribution of the NU developments by city in 2019.

Two sources of the data are drawn on: (1) The Directories of NU that *New Urban News Publications* have maintained since 1996 and (2) a database that CNU maintains and makes available on its website [47]. Both provide information about site characteristics, project cycle as well as location, and allow us to filter out the developments that exist as plans or are still in the construction phase. Google search and Google map are also used to examine the accuracy of the project cycle and the extent of project quality. More specifically, developments included in our list of NU developments should be completed by the end of 2019 and show features including mixed land uses and diverse housing options, a town center, interconnected street networks, formal public space and civic squares, and pedestrian-oriented design.

It should be noted that there are at least two limitations of this dataset. First, the dataset provided by *New Urban News* and CNU may not contain all developments that can be considered NU developments in the U.S. In particular, smaller-scale projects may have been excluded because such projects are often unreported or unnoticed by those entities who track NU developments [47]. Furthermore, there is no certification system for identifying and qualifying NU developments, so we are uncertain of the typical and representative extent of the database. Recognizing the limitations of the dataset, the records kept by *New Urban News* and CNU are believed to be the most exhaustive lists available at present.

### 3.2.2. Independent Variables

The independent variables rest on the following categories of prediction of NU developments: (1) General real estate development determinants argument; (2) fiscal capacity and regulatory authority argument (3) advocacy group argument; and (4) cultural diversity argument. We explain what these hypotheses entail and how they are measured below. Most of these variables are measured using data from 2010 because conditions of cities in 2010 are mostly associated with 2019 NU developments (we have performed a sensitivity analysis by employing data from 1990, 2000, and 2010 to construct the independent variables. The 2010 conditions explain the 2019 NU developments best).

- General Real Estate Development Determinants

*Population growth* is measured by data obtained from the 2010 and 2020 US Census at the place level. Following conclusions from previous research, cities with relatively faster population growth will be more likely to accept NU development, which is a comparatively new phenomenon.

*Population density* is based on urban population distribution data derived from the 2010 US Census. We assume that the more concentrated land use of high-density cities is more likely to increase the demand for NU developments.

*Old housing units* built before 1940 are also measured. We assume that the greater number of old dwelling units that were stocked, the more likely to be built out, and thus the fewer new developments are accommodated, including NU developments which tend to rise in the 1980s.

*Metropolitan statistical area (MSA)*: The previous researcher has found that regional location is a key factor in predicting the housing market [56]. Since the density of NU developments is higher than that of traditional developments, we would expect the MSA cities with relatively high average population densities are more likely to develop NU projects. A dummy variable takes a value of 1 for the city at least partially inside MSA and 0 for completely outside MSA.

*Transportation access*: Better regional transportation access offers better connections between cities and more opportunities to gather the population, which are also more conducive to NU developments. Transportation access is measured with data on the length of the inter-state highways and the proportion of commuters using public transit in sample cities.

*Region*: Dummy variables are used to measure the location of NU developments to see if the city is in the Northeast, South, Midwest, or West region, as the U.S. Census defined. Based on Allison's argument set forth, we omit the South region whose frequencies are relatively large as the reference category [63]. As Table 1 shows, 521 of the 1098 NU developments are located in the South region.

*Coastal*: Taking into account the fact that natural facilities can promote real estate development, coastal cities are expected more likely to attract new urbanism developments. Coastal cities are based on coastal counties' (a coastal county is defined as (1) at least 15 percent of total land area is located within the Nation's coastal watershed; or (2) a portion of or an entire county account for at least 15 percent of a coastal cataloging unit) data obtained from the list developed by the Strategic Environmental Assessments Division of the National Oceanic and Atmospheric Administration (NOAA). A dummy variable is used to indicate whether a city is a coastal city.

*Temperature*: Annual mean daily average temperature of all sample cities is measured using the climate information provided by NOAA. To express the climate more intuitively, referring to the NOAA's temperature range division, we convert the temperature value to a 1 to 9 scale with 1 equating to a temperature less than 32 degrees Fahrenheit and 9 equating to a temperature more than 70 degrees Fahrenheit (1 < 32.0° F; 2: 32.0° F–40.0° F; 3: 40.1° F–45.0° F; 4: 45.1° F–50.0° F; 5: 50.1° F–55.0° F; 6: 55.1° F–60.0° F; 7: 60.1° F–65.0° F; 8: 65.1° F–70.0° F; 9 > 70.0° F).

*Changes in GDP per capita*: According to Mayer and Somerville, real estate development is more likely a function of variations in fiscal positions than levels of that [64]. Changes in average household income between 2010 and 2020 are thus measured to reflect changes in the urban economy.

*Changes in home values*: As the other indicator of changes in economic conditions, variations in median home values between 2010 and 2020 are also measured. Cities with greater gains in property values are expected to tend to accept NU developments.

- Fiscal and Regulatory Status

*Employment Rate*: The employed rate for the civilian population in the labor force 16 years and over is also measured to explore local regulatory capacity. We assume that cities with better employment conditions, indicating better regulatory capacity, are more likely to endorse NU developments.

*State*: The state variable is a dummy variable that takes a value of 1 if a city in the state with statewide land use planning and 0 otherwise. An examination of which state dummies are statistically significant may indicate if there is a pattern that indicates that states with more active statewide land use planning are more prone to adopt NU Developments.



- Advocacy Group

*Environmental advocacy:* Following prior research [55,65], we hypothetically expect the environmental advocacy of cities could reflect the support for principles of NU development. A total number of non-profit environmental organizations are used as metrics to evaluate environmental advocacy for each city. Core Financial Files Database developed by National Center for Charitable Statistics (NCCS) includes all kinds of non-profit organizations data available—501(c)(3) public charities who report gross receipts of at least \$50,000 and 501(c)(3) private foundations who must file Form 990-PF. Non-profit environmental groups are singled out from this data set for our analysis.

*Democratic voters:* Compared with Republicans, Democrats are more supportive of environmental movements and policies targeting lessening environmental degradation [66–68]. Hence, it stands to reason that Democratic voters will advocate for NU developments that are more environmentally sensitive than conventional sprawl. Since the smallest statistic unit of the presidential election is the county, the percentage of Democratic voters in 2016 of all counties is calculated to match relevant cities' data.

*Income:* Following conclusions set by previous studies, additional community characteristics were also used to evaluate the advocacy group: Wealth, education, household type, and industrial composition [66]. We measure wealth by median household income using the data from the 2010 US Census.

*Education:* The results of previous studies have shown a consensus in a positive correlation between residents' education levels and the advocacy of sustainable development policy. For example, in Florida, cities with higher education levels are more liable to advocate statewide growth management [69]. Additionally, in Oregon, statewide land use planning is more popular in cities with higher education levels [70]. Sprawl-reduction development, environmentalism development, and compact development are also preferred in cities with higher levels of education [51,67,71]. These conclusions give rise to the possibility that citizens with higher education levels are more liable to welcome NU developments. Educational attainment is measured by the proportion of each city's residents that are 25 years and older with a bachelor's degree education or higher.

*Household type:* Previous studies have found that households with children are more likely to be attracted by low-intensity, spacious, auto-oriented, single-family residential settings with larger homes and yards, while childless adults prefer more compact urban form, and are more supportive of reformist land-use policies targeting at restricting urban sprawl [71–75]. Based on these observations, cities with higher proportions of households with children are assumed less liable to accept NU developments. Proportions of households with at least one child under 18 years of sample cities in 2010 are measured to reflect the household types.

*Industrial composition:* As Ringquist noted, advocating for environmental initiatives is generally the highest in modern industrial regions [76]. We thus assume that cities with less manufacturing employment in 2010 are more prone to accept NU developments.

- Cultural Diversity

*Race:* We expect the percentage of non-whites related to ethnic diversity will also have an influence on cultural diversity. Thus, cities with greater percentages of non-whites in 2010 are expected to have better cultural diversity and be more likely to accept NU developments.

### 3.3. Analytical Methods

To fully capture the variation in NU developments, on account of the quantification and distribution of dependent variables, negative binomial regression (using a count variable (with a profusion of zeroes) as the dependent variable necessitate using either Poisson regression or negative binomial regression. Since the variance (0.96) of the dependent variable is significantly greater than the mean (0.15), negative binomial regression is used rather than Poisson regression) is applied to evaluate the degree of association between NU developments and independent variables across all 476 cities with NU developments.

#### 4. Results

In this article, we examined the concentration of NU developments across the U.S. based on four series of hypotheses: (1) General real estate development determinants, (2) fiscal capacity and regulatory authority, (3) advocacy group, and (4) cultural diversity.

Results of the descriptive statistics displayed in Table 1 illustrates that most independent variables have large variations. A comparison of each independent variable between cities that adopt NU developments and those that do not indicate that the largest percent difference in means relates to environmental organizations, being more than 10 times higher in cities with NU developments than in cities without. This is consistent with our expectation that cities that have a stronger commitment to environmental action would be more likely to approve NU developments. There is also relatively large difference with respect to highway access, with more than four times higher for cities with NU developments versus cities without. This is consistent with our hypothesis that cities that are more accessible to the highway with prime locations would be more likely to accept NU developments.

It should be noted that there is a low correlation between most of the independent variables, with some exceptions of gross population density and transit, which have a correlation coefficient of 0.56, the northeast region and old housing units which have a coefficient of 0.49, transit and Democratic voters in 2020 which have a coefficient of 0.43, temperature and old housing units which have a coefficient of  $-0.44$ , and income and education which have a correlation coefficient of 0.68. Being employed is also correlated with three other variables such as, income (0.55), education (0.43), and non-white (0.48).

To examine which cities are more likely to have NU developments, negative binomial regression is performed to explore relationships between dependent and independent variables. Overall, the results in Table 3 support the hypothesis that cities with more environmental awareness, better municipal fiscal and regulatory status, and better cultural diversity are more liable to advocate NU.

**Table 3.** Negative binomial regression for all cities.

Variables	Coefficient	Standard Error	Z Value	p-Value
Population growth	0.16	0.03	4.23	0.00
Gross population density	0.00	0.00	2.27	0.00
Older housing units	$-0.94$	0.47	$-2.04$	0.02
MSA	0.91	0.14	6.42	0.00
Highway Access	0.05	0.01	4.89	0.00
Transit in 2010	0.35	1.38	0.40	0.95
West region	$-0.19$	0.18	$-0.90$	0.53
Midwest region	$-0.64$	0.20	$-2.02$	0.04
Northeast region	$-0.53$	0.26	$-1.03$	0.30
Coastal	0.53	0.12	2.16	0.03
Temperature	0.04	0.05	0.79	0.54
Changes in GDP per capita	0.35	0.21	1.71	0.09
Changes in home values	0.35	0.10	4.18	0.00
Environmental organizations	0.18	0.02	8.03	0.00
Democratic voters in 2016	1.63	0.46	4.07	0.00
Income	$-0.00$	$7.53 \times 10^{-6}$	$-3.89$	0.00
Education	3.81	0.67	5.49	0.00
Household type	$-0.75$	0.74	$-0.50$	0.59
Industrial composition	0.17	0.76	0.09	0.98
Employment Rate	9.77	2.56	3.11	0.00
State	0.22	0.13	1.65	0.10
Race	1.88	0.46	4.11	0.00
Constant	$-22.57$	4.15	$-5.44$	0.00

Number of observations: 6923; LR Chi2 = 1537.86; Pseudo R2: 0.24.

More specifically, as for the general real estate development determinants, the following cities are more likely to have NU developments: Those that are growing faster, denser, within MSA, within coastal counties, more accessible by highway yet not transit, had newer housing stock, and faster increases in home values. We can also see that cities in the Midwest region are less likely to accept NU developments. Regarding the fiscal capacity and regulatory authority, cities with higher employment rates are more prone to support NU developments. With regard to the advocacy group, cities with a lower median household income and larger proportions of highly educated residents are more likely to have NU developments. Above all, it can be seen that cities with more local environmental organizations and higher proportions of Democratic voters are more prone to have NU developments. With respect to cultural diversity, cities with a higher proportion of non-white are more liable to support NU developments.

## 5. Conclusions and Discussion

We examined the geographic concentration of NU developments as of 2019 in the U.S. according to four sets of arguments: (1) General real estate development determinants argument; (2) fiscal capacity and regulatory authority argument; (3) advocacy group argument; and (4) cultural diversity argument. Negative binomial regression was used to explore the relationship between concentrations of NU developments and varieties of determinants with a data set of 6923 cities.

Generally, the results back up the hypothesis that cities with more environmental awareness, better municipal fiscal and regulatory status, and better cultural diversity are more likely to support New Urbanism. More specifically, NU developments are more advocated in cities that are fast growing, denser, newer, within coastal counties, accessible to the highway but not transit, and with faster increases in home values, and that also have more local environmental organizations, a higher portion of Democratic voters as well as highly educated residents. Moreover, NU developments are also more likely in cities with a lower median household income, a larger employment rate, and higher proportions of non-white.

The research results highlight the importance of continuously gaining support from environmental groups and the general public for the effective expansion of New Urbanist developments within the U.S. They also provide a more nuanced understanding of the role that education plays in shaping support for NU developments. This finding appears to corroborate previous studies, showing that more educated people are expected to have a greater awareness of sprawl risks and to display more support for NU developments. The employment rate variable remains statistically significant with an exceedingly large coefficient, suggesting a strong positive relationship between the proportion of municipal population comprising of civilians in the labor force and NU developments adoption. These findings indicate that for noteworthy changes in growth patterns to arise at a large scale across the U.S., there must be changes in values and preferences as well as institutional capacity in updating land-use regulations that allow for sustainable growth [77]. Public policymakers and private consultants and designers can assist to promote such alterations through public educational endeavors, local activism, and cooperation with a variety of stakeholders to garner their advocacy of minimizing sprawl via alternative subdivision planning.

As previously mentioned, despite the fact that the NU movement is championed by a variety of advocacy groups, initial scholarly responses argued that its capability for decreasing the negative environmental effect on sprawl was not being fulfilled [35,78–83]. As time goes by, promoters of the NU movement have reacted to these criticisms by endeavoring to enlarge the extent to which environmental concerns are tackled in NU developments. This can be seen from a body of literature that shows new urbanist developments do outperform conventional style suburban subdivisions in promoting walking, fostering social interaction, and heightening the sense of community [36,84–87]. The results of advocacy

group argument and cultural diversity argument in our research also illustrate that the NU movement has shown good performance on environmental and societal concerns.

In addition, it is also important to note that income and NU developments are negatively correlated. This is largely due to the fact that some public housing projects and housing redevelopment projects initiated by municipal, county, and federal governments have followed NU design models. A typical example is the HOPE VI project, whose philosophy is largely based on the NU and concept of defensible space. The federal government accelerated the transformation of traditional public housing through the HOPE VI Program in the 1990s. Furthermore, there are also tens of post-Katrina redevelopment projects along the gulf that have implemented redevelopment plans according to the NU. The Chicago Housing Authority also adopted NU design strategies in the Plan for Transformation to disperse low-income families to communities where middle-income families are located, in order to alleviate the trend of concentration of poor communities. Consequently, it is understandable that NU developments are more likely to appear in lower-income areas, although this result is contrary to the general understanding of NU developments. These urban renewal projects also effectively counterattack scholars' misunderstanding that the focus of new urbanism is suburbs rather than cities.

Although NU advocates returning to traditional towns, it does not mean abandoning modern conveniences. New urbanists are well aware that the American automobile society has formed, and two modes of TND and TOD do not completely exclude private car travel. Therefore, they have set relatively realistic and feasible goals, as far as possible to encourage and create a walkable environment to reduce the frequency of private car use. Unfortunately, NU projects have not achieved the expected results in restricting the use of private cars. The result of highway access in our research also illustrates this fact. Since the U.S. has entered a mature automobile society after World War II, most American families, especially suburban families, rely heavily on cars for their daily travel. Low fuel prices and convenient highways under government subsidies have created conditions for car travel. It is bound to be time-consuming and difficult for American families to change their travel habits and reuse public transport. Therefore, it is not enough to rely solely on the architects' design concepts and enthusiastic appeals. The governments should also give policy encouragement. For example, the government subsidizes public transportation to ensure that public transportation is convenient, punctual, and safe. In some cases, residents can even use public transportation for free.

These findings give a preview of future research on New Urbanism. First, research should compare the environmental performance of New Urbanist developments before and after 2003 (2003 is the year that Smart Code was distributed as mentioned in Section 1), in order to determine whether and how the performance has changed and which factors (if any) brought about the changes. Such comparison could include the preservation of natural vegetation and landscape features, transportation mode shares, natural hazard mitigation, and so on. Some of these concerns have been examined in previous research [88–93], but have not been controlled for longitudinal effects relating to the release of multiple New Urbanism development codes after 2003. Second, in addition to replicating our analysis with more variables, future research can possibly improve upon it by using enhanced measures of these arguments. While we have measured environmental advocacy in terms of the number of local environmental organizations, it can also be measured in terms of public opinion or legislative policy [65]. Tax revenue and Wharton Residential Land Use Regulation Index (WRLURI) can also be measured as the indicators of local capacity and regulatory authority when the data is available (for now, the 1992 U.S. Census of Governments is just able to provide us with tax revenue data for 857 of the 6922 municipalities in our sample. Similarly, using the Stata file offered by Gyourko (2008), we can just extract WRLURI values for 2203 cities, which are far from enough for all 6922 city samples. We thus have had to currently drop these two variables from our independent variables). Lastly, we recommend that future research utilize qualitative research methods aimed at explaining

how local jurisdictions make decisions regarding whether or not to promote New Urbanist development.

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