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Resource Allocation Across Urban and Rural Counties: A Tennessee Case Study

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RESOURCE ALLOCATION ACROSS URBAN AND RURAL COUNTIES: A TENNESSEE STUDY

by

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Abstract

This study addresses how resource allocation of mobility-promoting organizations vary by characteristics of Tennessee counties. More specifically, I examine the variation of resources provided across urban and rural counties. Building on previous studies of mobility-promoting organizations, this study moves away from neighborhood analysis and updates to larger spatial units to a county level analysis. Including county-level data provides an opportunity to explore potential explanations for the observed regional variation in rates of poverty. Furthermore, this study analyzes aspects of disadvantage and organizational density. I utilize the Social Vulnerability Index and the Relative Rurality Index in combination with U.S. Census and U.S. Business Patterns data to describe Tennessee county deprivation characteristics. I categorize organizations into three service types: hardship, employment, and education; all of which are related to an individual's well-being and prospects for mobility. My analyses use Poisson regression models to examine the association between counties' characteristics and the number of mobility-promoting organizations, accounting for counties' population sizes. Results: More urban counties tend to have a higher density of hardship and employment organizations, but not educational organizations, after controlling for social vulnerability.

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Motivation/Introduction

In the 2010 U.S. decennial census, an estimate of 60 million people, about 19 percent of the population lived in rural areas in the United States (U.S. Census Bureau, 2010). There is evidence that high poverty is persistent in rural America when compared to the urban area or urban American; the evidence is disproportioned. Researchers Bishaw and Posey (2017) found that the median household incomes in the rural areas in the Southern and Western region of the U.S. are lower than urban areas, rural areas ($46,891 and $56,061 respectively) and urban areas ($50,989 and $58,541), in 2016. The South has the lowest median household income of the four regions. The reason for rural poverty and its persistence, especially in rural areas of the Southern region is the concentration of poor financial circumstances, low-paying jobs, physical isolation, little or no public transportation, limited access to health-care (physical, mental, and dental) facilities, inadequate schools, and a lack of institutional support services (Lichter and Johnson, 2007; Mammen and Sano, 2012). From previous research on the topic, this puts rural areas at a disadvantage, a rural disadvantage. These rural disadvantages are push factors that discourage individuals from migrating to rural areas. Dalla et al. (2010) found that rural immigrants are a significant source of human and social capital for community development. But to capitalize on the growing ethnic diversity, immigrants must want to stay in rural communities (Dalla et al., 2010). The reason immigrant migrates to America is for a better life and an opportunity to be successful that was not obtained in their previous country. The push and pull factors of educational and economic opportunities, diversity and discrimination, were the reasons why immigrants and state residents to relocate from rural to urban areas. The rural disadvantage is also the cause of the social problem of food insecurities. The lack of food in one an area and the distance between stores have created food decreases in rural areas. Rural areas lack the

infrastructure and commodity chains characteristic of cities, meaning the resources like transportation are not available for getting people to the grocers (Piontak, Rayanne, and Schulman, 2014). Access to food is an essential key to survival, and in some rural areas, individuals do not have the means to get their grocery or nearest convenient store or if they are lucky the food that in supply are often unhealthy. In the South, rural poor are less likely to have access to a vehicle, making the constituent access to an adequate amount of food (Piontak, Rayanne, and Schulman, 2014). There is a lot of resources that are needed in rural areas and of research in rural and urban academic studies shows the impact of the continuous lack of resources.

These resources that are needed to make an impact on the poverty levels in these counties are organizations that give individuals the opportunity for upward mobility and socioeconomic well-being. Socioeconomic well-being refers to an individual's ability to use their income and resources to meet daily needs. Mobility refers to the individual's ability to gain the skills, knowledge, and networks to transition, through employment and education, upward into a higher social class (Murphy and Wallace, 2010). The allocation of these resources impacts a significant part in the poverty level in each rural vs. urban counties. At the disadvantage of rural disadvantage and rural poverty, state poverty will suffer in state funding which would increase the lack of organizational resources.

This study focuses on Tennessee. Tennessee has experienced all of the push and pulls factors noted above. This southern state 2016 was ranked 40th in the United States for the percentage of individuals living under the poverty line, at 17.2 percent (U.S. Census Bureau, 2016). Tennessee has a total of 95 counties, 31 classified as urban and 64 classified as rural. The metropolitan counties in my sample have an average of 16.1 percent of individuals living in

poverty. Rural counties have an average of 20.5 percent of individuals living in poverty. There are stark disparities between the rural counties which are seen to be a real disadvantage in resources and urban, well-off counties. This study thoroughly examines the differences, that could tell the story of the exact needs of the state.

So, my question of interest is: how does resource allocation of mobility-promoting organizations vary by characteristics of Tennessee counties? I am specifically concerned about the lack of availability of organizational resources oriented towards the poor (Murphy and Wallace, 2010). I want to find out which specific disparities are at the forefront when policymakers are allocating public resources to communities. I argue that by looking at the differences in organizational deprivation and organizational density across Tennessee counties, I can contribute to the understanding of the various circumstances deprived individuals face when trying to meet their daily needs and the chance to have the opportunity to become upwardly mobile. The hope is that this study would be replicated for other states, to pinpoint the needs of their counties and alleviate poverty by allocating upward mobility organizations.

Literature

Many scholars have situated their analyses on city neighborhoods. Within those studies, the poverty of individuals was significantly related to the lack of organizational resources that promote mobility in their neighborhoods and communities (Allard, Tolman, and Rosen, 2003; Galaskiewicz, Inouye and Savage, 2008; Murphy and Wallace, 2010). When comparing poor urban and poor suburban neighborhoods, suburban neighborhoods are more likely to be deprived of organizations that promote upward mobility than urban neighborhoods. Murphy and Wallace (2010) suggested that individuals may be better off living in surrounding urban or central city neighborhoods because of the accessibility to organizational resources. Also, the suburban

residence is isolated due to the distance from organizations that will help meet one's daily needs and even more so from those that offer opportunities for mobility (Murphy and Wallace, 2010). The organizations that were found to be beneficial to the poor are oriented towards hardship, education, and employment (Murphy and Wallace, 2010). Previous research suggests that these organizations in the different service categories were shaped by different demographic neighborhood characteristics (race, age, gender), economic power, and the physical location of the neighborhood (McPherson, 1983; Bielefeld and Murdoch, 2004; Murphy and Wallace, 2010). In the neighborhood effects literature, impoverished individuals' proximity to organizational resources has been seen to be a very vital component for individual success and resource usage. For example, poor neighborhoods see an increase in the connection of goods and services (Marwell, 2007; Small, Jacobs and Massengill, 2008), the formation of networks (Small, 2006), and individual stability within their neighborhoods and communities (Sanchez-Jankowski, 2008).

These findings make a need to contribute to the conversation of resource allocation and expand the spatial units to discuss the possible literature that could explain the broaden the story of concerted or relative poverty clearer. More importantly, what are the finding on the type of lack of organization are in the rural counties, how deprived are these counties?

Deprivation Indices

Deprivation is the lack of material benefits considered to be necessities in society. The aspects of deprivation are multi-dimensional, making it challenging to quantify based on its various features. Those features include high unemployment, high crime rates, poor health, and lack of education. To measure deprivation, the index of multiple deprivation (IMD) is found to be a useful form. This method is commonly used in the United Kingdom and other countries to measure social and relative deprivation, but I note that researchers in the United States are

utilizing similar measurements in contemporary studies (Krieger et al., 2005; Fiscella, Burstin, and Nerenz, 2014; Acevedo-Garcia et al., 2018). With the assistance from census and other administrative data sets, the IMD is designed to measure socioeconomic variation across communities, assess community needs, inform research, adjust clinical funding, allocate community resources, and determine policy impact (Phillips et al., 2016). The index is based on multiple dimensions of deprivation, and each aspect is measured separately then combined into a single overall measure. The IMD is made up of seven types or domain indices: income deprivation, employment deprivation, health deprivation, and disability, education, housing barriers and services, crime rate, and living environment. Each domain is calculated, combined, and ranked into an overall measure of the quality of life. Scores range from 0 to 1. Higher index scores represent areas that are most deprived/low quality of life, and lower index scores represent areas that are the least deprived/high quality of life. Based on the ranking, the IMD allows researchers and policymakers to identify areas' deprivation type and specific causes of deprivation, which is key to resource allocation to alleviate socio-economic problems. Tunstall and Lupton (2003) and Barr et al. (2014) found the IMD was the most effective tool for reaching poor individuals and reducing absolute inequalities across the least and most deprived neighborhoods, cities, and countries. In the United Kingdom, between 2008 and 2011, local authorities and the National Health Service received £1.5 billion and £85 million, respectively (United Kingdom-OECD).[1–2]

[1] Reports from the UK Department for Communities and Local Government. Working Neighborhoods Fund allocations. London: The Department; 2008.
[2] Reports from the UK Department of Health, Financial Planning and Allocations Division. Resource allocation: weighted capitation formula, 7th edition. Leeds: UK Department of Health; 2011.

The common indices used in the United States, are oriented towards improving public health. The Index of Social Deprivation[3] was developed by the Robert Graham Center, a similar index to the indices used in the United Kingdom and other countries. The index is used to model outcomes and health service use and to study the stability of the model across different geographies based on neighborhood and community social determinants of health (Butler et al., 2013, and Phillips et al., 2016). Singh et al. (2013) created a county-level deprivation index to measure the causes of mortality to provide support for clinical, public health, and policy intervention needs at the sub-county level. The CDC's Social Vulnerability Index (SVI), developed by the Geospatial Research, Analysis and Services Program (GRASP), expanded on census tract and county level deprivation data. This method of measurement is used to assist public health officials and emergency response planners in allocating resources to states, counties, cities, and communities that need support before, during, and after a hazardous event. The index indicates the vulnerability of every U.S. Census tract. The Social Vulnerability Index ranks geographic areas on 15 social factors, dividing them into four related groups: Socioeconomic theme, Household Composition and Disability, Minority Status and Language, and Housing and Transportation. Table 1 lists the factors that form each of the four SVI groups.

[3] Appendix shows dimensions associated with the Social Deprivation Index.

Table 1. Components of Social Vulnerability Indices

Socioeconomic Status	Below Poverty
	Unemployed
	Income
	No High School Diploma
Household composition & Disability	Aged 65 or Older
	Aged 17 or Younger
	Civilian with a Disability
	Single-Parent Households
Minority Status & Language	Minority
	Speak English "Less than Well"
Housing & Transportation	Multi-Unit Structures
	Mobile Homes
	Crowding
	No Vehicle
	Group Quarters

Social Vulnerability Index. 2014.Centers for Disease Control and Prevention. Social Vulnerability Index 2014 Documentation. http://svi.cdc.gov/Documents/Data/2014_SVI_Data/SVI2014

The Census variables from all related groups are combined into an overall ranking of vulnerability (Social Vulnerability Index). IMD and SVI measure on a scale of 0 to 1. Higher index scores represent areas that are most vulnerable in quality of life, and lower index scores represent areas that are least vulnerable in quality of life.

Organizational density

My research builds on the common perspective that rural areas are more likely to be deprived than urban areas. I use this perspective to explain how a rural county's poverty level has a significant impact on the number of resources allotted. The subject of poverty is discussed in the same discourse with spatial inequality, which is the unequal distribution of resources and services based on location, in this case, urban versus rural counties. State and federal anti-poverty policies often are directed more in urban spaces, leaving rural areas with little to no organizational resources to combat their poverty problem. There is strong evidence to back rural organizational deprivation. For example, Murphy and Wallace's (2010) "urban orientation

model" suggests that policymakers and funders focus their efforts and money on urban poverty programs and neglect the rising poverty in the suburbs, ultimately creating policy blind spots. Logan and Molotch's (1987) found that federal, state and city governments play a significant role in developing policies that attract businesses in urban spaces. Earlier literature that displays similar findings like the urban orientation model are: Salmon (1987) with public, private and non-profit partnerships in promoting business development in deprived urban areas; Marwell (2007) with organizations engaged in local government to shape resource distribution and Small and Stark's (2005) work in housing and child vouchers offers and attainment.

This study expands on the application of deprivation indices by adding the aspect of upward mobility. Currently, the implementation of deprivation indices has been tested against health outcomes within communities. The use of these various indices has illuminated health inequalities, providing insight on cities, states, and countries that are seen to be better or worse by their predicted deprivation levels. With the strides in research, there is an opportunity to use social determinants of deprivation indices to evaluate other socioeconomic issues. Identifying how resilient communities overcome deprivation can provide a blueprint for similar communities to replicate (Phillips et al.,2016). Also, by calculating the type and degree of deprivation experienced in a specific county along with the organizational density, the aspect of the actual need for resource allocation could be better identified for policymakers. Below, I describe the methods of utilizing a deprivation index in combination with county organizational density data, and then I present results for resource allocation needs.

Methods

To examine both nonmetropolitan areas and metropolitan areas, I use county-level data. By including county-level data, I can explore potential explanations for the observed regional

variation in rates of poverty. Importantly, this data allows me to capture rural areas. (Levernier, Partridge, and Rickman, 2000). For more background, Tennessee ranked in the lower half of all 50 states in income equality ratio[4], higher education attainment[5], hunger and food insecurities[6], assets and savings[7], and health insurance coverage[8] in 2016. The primary independent variable is a county's rurality. For the definition of the rural and urban counties in the state, I utilized the Index of Relative Rurality (IRR). Developed by Brigitte S. Waldorf, the index is an ordinal measurement of rurality in a specific area. The index identifies characteristics of rurality: counties density, population, remoteness, and build-up area[9] as a percentage of total land area. The Index ranks the counties on a 1 (rural) to 4 (urban) scale (Waldorf and Kim, 2018).

I also control for the deprivation of the county. To analyze the rural-urban county deprivation and socioeconomic inequalities, I utilize the previously published factor-based deprivation index of the 2016 version of the Social Vulnerability Index. I chose this index because of the usage and specific features present in the index. The 2016 deprivation index consists of 15 census-based socioeconomic indicators, is represented in four themes: socioeconomic status, household composition, and disability, minority status and language, and housing and transportation. The Social Vulnerability Index uses census data to map and analyze

[4] Ranked: 32nd; The share of income going to the top 20 percent of households versus that going to the bottom 20 percent of households in 2016.
Analysis of data from the U.S. Census Bureau, American Community Survey, Table B19082.
[5] Ranked: 37th; Percentage of young adults ages 25 to 34 who had an associate degree or higher in 2016.
United States Census Bureau, Sex by Age by Educational Attainment: 2016 American Community Survey 1-year Estimates.
[6] Ranked: 31st; Percentage of households who were food insecure on average from 2014 to 2016, meaning that at some point during the year, they had trouble providing enough food due to a lack of money or resources.
U.S. Department of Agriculture Economic Research Service, "Household Food Security in the United States in 2016", No. 237.
[7] Ranked: 49th; Percentage of households that used high-cost, high-risk forms of credit to make ends meet during 2015. This includes payday loans, automobile title loans, refund anticipation loans, rent-to-own, and pawning.
Federal Deposit Insurance Corporation, National Survey of Unbanked and Underbanked households, 2016.
[8] Ranked: 32nd; Percentage of people under age 65 and below 138 percent of the poverty line who did not have health insurance at any time in 2016.
[9] Build-up area is urban area defined by the U.S. Census

relative vulnerability or deprivation in individual states. The index allows the ranking of counties in the entire United States and compares one against another, for more in-depth analysis purposes. The county rankings are based on percentiles, where the percentile ranking values range from 0 to 1, with the higher values indicating greater vulnerability (Social Vulnerability Index). The overall county ranking is a summation of each theme and calculated into a general percentile ranking.

All 15 socioeconomic indicators combined contribute to the specific level of need for resources of interest in my analysis. Looking at the four themes of social vulnerability (deprivation), the variables associated with socioeconomic status are: poverty, measured by persons below poverty estimate; unemployment, measured by civilian (age 16+) unemployed estimates; income, measured by per capita income estimates; and education, measured by persons (age 25+) with no high school diploma estimates. Household Composition/Disability variables consist of the age cohorts of 65 and older and 17 and younger; disability, measured by civilian noninstitutionalized population with disability estimates; and household, single-parent households with children under 18 estimates. Minority Status/Language variables are listed as minority demographics, minority (all persons except white, non-Hispanic) estimates; and language, the person (age 5+) who speak English "less than well" estimates. Finally, the last variables used are represented in the Housing/Transportation theme and those variables are: multi-unit structures, housing structures with 10 or more units estimates; mobile homes estimates; crowding, occupied housing units where there are more people than rooms estimates;

vehicle, households with no vehicle available estimates; and group quarters, persons in institutionalized group quarters estimates.[10]

I use three separate dependent variables: the density of hardship organizations, the frequency of employment organizations, and the density of education organizations. To measure county organizational density, I utilize 2016 U.S. County Business Patterns data and 2016 U.S. Census data. The U.S. County Business Patterns is a collection of data on various establishments (organizations and businesses) in the United States. The data are separated into identifiable codes by the North American Classification System Code (NAICs); that delineate different types of organizations and businesses. With the description of each establishment type, I can identify the services that promote social mobility for individuals. In addition to providing information on the specific variety of organizations or businesses, the U.S. County Business Patterns database also provides formal payroll[11]. I mention this because, in other studies that use this dataset, all note that businesses without payroll are not included and there is a potential to undercount the number of organizations or companies in any given spatial unit (Small and McDermott, 2006; Murphy and Wallace, 2010). The smallest spatial unit offered by the U.S. County Business Patterns data is a zip code, but for this analysis, I use state-county level data. I then collect demographic information from the U.S. Census and combine it with the U.S. County Business Pattern data for each county in the analysis.

[10] Social Vulnerability Index. 2014.Centers for Disease Control and Prevention. Social Vulnerability Index 2014 Documentation. http://svi.cdc.gov/Documents/Data/2014_SVI_Data/SVI2014
[11] U.S. Census Bureau, 2016 County Business Patterns.

Table 2. 15 socioeconomic variables for the of Tennessee comprising the area vulnerability index, USA, 2012-2016 ACS 5-year estimates

Socioeconomic Variable		**Rural Counties Index**	**Urban Counties Index**	**Overall Index**
Socioeconomic Status				
	Poverty	.5916	.3003	.8919
	Unemployment	.5637	.3465	.9102
	Income	.6232	.2457	.8689
	No High School Diploma	.6331	.2173	.8504
Household Composition & Disability				
	Aged 65 or Older	.5535	.3730	.9265
	Aged 17 or Younger	.4746	.5525	1.0271
	Civilian with a Disability	.5922	.2971	.8893
	Single-Parent Household	.4912	.5182	1.0094
Minority Status & Language				
	Minority	.4458	.6118	1.0576
	Speak English	.4120	.6805	1.0925
Housing & Transportation				
	Multi-Unit Structures	.3672	.7742	1.1414
	Mobile Homes	.6127	.2632	.8759
	Crowding	.5295	.4389	.9684
	No Vehicle	.5311	.4115	.9426
	Group Quarters	.5043	.4911	.9954

Tennessee, 2016 Social Vulnerability Index.

This analysis focuses on three typologies of organizations that are related to the well-being of individuals and the opportunity for mobility. The organizations of interest address hardship, education, and employment. Using NAICs codes from the U.S. County Business Patterns data, I consider hardship organizations (related to well-being) as the health and social assistance (NAICS code: 62) and accommodation and food service establishments (NAICS code: 72). I consider educational organizations (related to mobility) as education services (NAICS

code: 61). These include schools (Kindergarten through college level) and trade schools and computer training centers. Lastly, I consider employment organizations (related to well-being and mobility) as employment placement agencies and temporary support organizations (NAICS code: 56).

My approach is to examine the circumstances of upward mobility through the lack of organizations or in other words, organizational density. My study is unique in the fact that I am looking at resource allocation and county level characteristics, that could be predicted by deprivation. To reiterate, I use Social Vulnerability Index data along with the Index of Relative Rurality (IRR 2, IRR 3, IRR 4) as my independent or covariate variables. My dependent variables are organization density data from U.S. County Business Patterns (hardship, employment, education organizations). The reference group for this analysis will be the IRR 1, the most rural areas. For the report to bring this whole study to a conclusion is utilizing a Poisson regression. The reason for using a Poisson regression is to find the rate of the possibility of each variable, in another word I find the rate of an organization that promotes upwards are in each county, based on the presented demographics. By using this analysis that dependent or outcome variables are a rate divided by the population of the county. In the Poisson models, the log of the number is a linear function of the relative rurality index (IRR) and the social vulnerability index (SVI). Models are offset by the log of the population to model the rates. I exponentiated the Poisson coefficients and expressed them as rate ratios. Rate ratios greater than 1 indicates a higher rate of organizations. This approach adds another element to the states' overall deprivation level, allowing the implementation of the necessary resources and policy to reduce the issues.

Model 1: $\ln(org) = \alpha + \beta_{RR2} X_{RR2} + \beta_{RR3} X_{RR3} + \beta_{RR4} X_{RR4} + \ln(pop)$

Model 1: $\ln(\frac{Orgs}{Pop}) = \epsilon^{\beta RR2} X_{RR2} + \epsilon^{\beta RR3} X_{RR3} + \epsilon^{\beta RR4} X_{RR4}$

Model 2: $\ln(org) = \alpha + \beta_{RR2} X_{RR2} + \beta_{RR3} X_{RR3} + \beta_{RR4} X_{RR4} + \beta_{SE} X_{SE} + \beta_{HH} X_{HH} + \beta_{Min} X_{Min} + \beta_{HT} X_{HT} + \ln(pop)$

Model 2: $\ln(\frac{Orgs}{Pop}) = \epsilon^{\beta RR2} X_{RR2} + \epsilon^{\beta RR3} X_{RR3} + \epsilon^{\beta RR4} X_{RR4} + \epsilon^{\beta SE} X_{SE} + \epsilon^{\beta HH} X_{HH} + \epsilon^{\beta Min} X_{Min} + \epsilon^{\beta HT} X_{HT}$

Results

Table 3. Tennessee Descriptive Statistics for the variables used in the analysis (N=95)

	Mean	Standard Deviation	Mean	Maximum
Population Size	68926.41	130254.77	5096	936990
Hardship Organization	302.88	665.92	3	4094
Employment Organization	72.99	188.76	0	1182
Education Organization	14.41	42.64	0	269
Socioeconomic SVI	0.5	0.293	0	1
CompDis SVI	0.499	0.293	0	1
MinorityStatus SVI	0.499	0.293	0	1
HousingTransport SVI	0.5	0.293	0	1
Overall SVI	0.5	0.293	0	1
IRR	2.28	0.63	0	4
HardRate	321.64	123.24	53.18	780.65
EmplRate	63.99	40.05	0	238.27
EducRate	9.7	9.43	0	50.09

Data for counties are based on U.S. Census Bureau characteristics.

Note * All 95 Tennessee counties are represented, including the 2016 demographic and Business Patterns characteristics.

Table 3 presents statistics that describe the distribution of the dependent variables (rate of hardship organizations, rate of employment organizations, and rate of educational organizations) and the independent variables. I present the mean, standard deviation, minimum value, and maximum value because all variables are measured on the interval/ratio level. Counties tend to have more hardship organizations (mean = 302.88) than employment or educational organizations (means = 72.99 and 14.41, respectively). Some of the 95 Tennessee counties have no employment or educational organizations.

Bivariate analyses are showing the rate of organizations in each of the counties reveal anticipated effects on the outcomes variables (table 4). In other words, I conducted multiple independent T-tests. Following the Index of Relative Rurality (IRR), there is a gradual increase in the rate of organizations moving from rural to urban counties. By using this type of analysis, I was able to explore the relationship (if any) between the two variables, the classification of the rurality of counties and the rate of the organization (created by dividing each of the organization's hardship, employment, and education with the population sizes of the respected counties). The hardship organizations rate means gradually increased with overlapped between the IRR 3 (Somewhat Urban) and IRR4 (Most Urban) when the standard deviation is considered. The education rate means increased steadily as moved counties type, but the overlapped was showed in most counties, IRR 1 (Most Rural) and IRR 2 (Somewhat Rural).

Interestingly, most rural counties means showed a negative reply in education organizations. I can infer that the rural counties are educational deprived, which a possible reason why these rural counties present a higher poverty rate. The employment organizations showed no striking results based on this bivariate analysis.

Table 4. Bivariate associations between Index of Relative Rurality and Organizational Density

	IRR 1	IRR 2	IRR 3	IRR 4
Hardship Density	231.8	309.6	415.3	533.2
	(142.0, 321.6)	(285.5, 333.7)	(362.6, 468)	(462.8, 603.6)
Employment Density	29.1	50.1	94.4	142.1
	(22, 36.2)	(43.2, 57)	(77.7, 111.1)	(121.3, 162.9)
Education Density	2.6	6.5	16	32
	(-2.5, 7.7)	(5.03, 8.0)	(12.1, 19.9)	(26.5, 37.5)

Note * N= 95; Independent T-test.

The primary analysis for my study is applying Poisson regression for rate data. Table 5 presents the rate of hardship organizations. Using the most rural counties as the reference group, I was able to find the rate of the other covariates. Based on the finding, in model 1 the rates of the most urban counties (IRR 4), are two times more likely to have hardship organizations. There is a gradual increase in the rate of organizations presented in the counties as you move from rural to urban. In Model 2 I add the Social Vulnerability Index (SVI) to controls for demographics that indicate the level of need for organization. With these controls that are associations between relative rurality and hardship organizations, the rates are attenuated but remain significant. But while there are significance remaining, they became less significant. Something that caught my attention was the minority SVI rate, but even though hardship organizations are likely in counties, they are not as substantial as the other demographic covariates.

Table 5. Poisson Regression of the rate of Hardship Organizations

	Model I	Model II
IRR 1	ref.	ref.
IRR 2	1.40**	1.27*
IRR 3	1.83***	1.33*
IRR4	2.18***	1.38**
Socioeconomic SVI		0.59***
Household Composition SVI		0.86***
Minority SVI		1.09*
Housing and Transportation SVI		1.24***

*p<0.1, **p<.05, ***p<.001

Table 6 is a representation of the rate of employment organizations. Without the social vulnerability index covariates, the is a stark difference in the rate of organization between the counties. There is an increase as you move up to the most urban counties, but the disparities are too significant not to discuss. Model 1 shows IRR 4 is four times as likely to have employment organizations to IRR 2 lower rate of having these organizations. In Model 2 the rates decreased toward 1.0 and decreased in significance. For IRR 2 with the new covariates, the rate is no longer significant. This finding could be the effect of rural counties losing jobs due to the low economy, or job markets moved to urban counties. Another interesting finding is the rate minority in a county bring jobs and as the result show it to be very significant.

Table 6. Poisson Regression of the rate of Employment Organizations

	Model I	Model II
IRR 1	ref.	ref.
IRR 2	1.94**	1.49
IRR 3	3.56***	1.88**
IRR4	4.84***	2.46**
Socioeconomic SVI		0.54***
Household Composition SVI		0.82**
Minority SVI		1.5***
Housing and Transportation SVI		0.87

*p<0.1, **p<.05, ***p<.001

Table 7 shows a considerable gap between the counties. The rate of IRR 4 shows that it is ten times more likely to have these education organization while the rural county or IRR 2 is two times as likely of these education organizations to be located in the area. As expected, there was an increase in an organization with increasing urbanicity 1 to 2, 2 to 3, and 3 to 4. When observing both models, there are fewer significant rates than the two other tests (hardship and employment). The large gap of educational resources is very apparent, and by this data, the deficit would be hard to recover.

Table 7. Poisson Regression of the rate of Education Organizations

	Model I	Model II
IRR 1	ref.	ref.
IRR 2	2.51	2
IRR 3	6.63*	3.45
IRR4	10.87**	5.05
Socioeconomic SVI		0.46**
Household Composition SVI		0.65**
Minority SVI		1.26
Housing and Transportation SVI		1.04

*p<0.1, **p<.05, ***p<.001

Discussion

This analysis further demonstrates that rural counties are disadvantaged concerning organizational resources that would promote mobility among their residents. By breaking down organizational resources by type, I was not only able to locate where deprivation occurs across counties, but I was able to identify the different kinds of deprivation that the state was experiencing. The variations shown in multivariate analyses strongly correlate with the prominent rates of the organizations the overall state (Tennessee) is displaying. Rural county deprivation strongly correlates with the lack of organizational resources provided to individuals. Not only are rural counties deprived in this study and lack the necessary resources for mobility, but the state of Tennessee is also shown to be affected by this lack of resources significantly. For example, while rural counties lack the organizational resources comparable to urban counties, the education organizations representation starkly different. So different that the lack of these educational organizations hindered rural county residents the opportunity for upward mobility

and the chance to increase their socioeconomic well-being. The most recurring reasoning for lower educational organizations in rural counties is because of the smaller population, but as this study shows the rural counties to be strongly disadvantaged. Since Tennessee has 64 rural counties out of the 95 total counties, the effect of the lack of organizational resources that promote upward mobility shows why Tennessee was ranked so low in varies socioeconomic categories.

I built on previous work by linking a deprivation index with the methods of organizational density. The addition of deprivation indices allows researchers and policy planners to assess resource allocation. In previous studies, deprivation indices have traditionally been used to assist health policies. For this study, I utilized a deprivation index in an around the realm of context that could benefit from the addition. Deprivation indices include a variety of socioeconomic characteristics that would help give policy markers a better picture of counties that need resource allocation. A limitation of using a deprivation index, Phillips et al. (2016) states that researchers and policymakers may disagree over the criteria required to judge the validity of indices. Phillips et al. (2016) concluded that the usage of indices is continuously modified to fit a researcher or policy maker's needs. Future implementation, after refinement, is policy driven. Assessments of organization resource allocation with the assistance of the deprivation index provides policymakers the tools and data to combat more socioeconomic issues and offer more opportunities to the fund and provide resources to help individuals become upwardly mobile.

Conclusion

This study is a blueprint for conducting analyses for resource allocation in state counties. There is a hope that further research on this topic and type of analysis could make a difference in the way policies markers decide to allocation resources. Finding counties weak points in the sense of organization types (hardship, employment, or educational) would be very beneficial to the residents that felt the experience of lack of resources.

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Appendix

Social Deprivation Index

Dimension of Deprivation	Description of Variables
Household	This variable identifies single-mother households
Poverty	This variable identifies portions of the population living below the poverty line
Transportation	This variable identifies the rate of no car ownership
Education	This variable identifies education (12 years and less)
Home Ownership	This variable identifies renter-occupied housing
Employment	The variable identifies the unemployment rate
Crowding	This variable identifies the percent of areas overcrowding
Race and Ethnicity	This variable identifies the percentage of the Black/African American population
Age	This variable identifies the age group of high need

Source: Butler, Danielle C., Stephen Petterson, Robert L. Phillips, and Andrew W. Bazemore. 2013. "Measures of Social Deprivation That Predict Health Care Access and Need within a Rational Area of Primary Care Service Delivery." *Health Services Research* 48 (2 Pt 1): 539–59.

Social Vulnerability Index

Themes of Deprivation	**Variables**
Socioeconomic Status	Below Poverty
	Unemployment
	Income
	No High School Diploma
Household Composition & Disability	Aged 65 or Older
	Aged 17 or Younger
	Civilian with a Disability
	Single-Parent Households
Minority Status & Language	Minority
	Speak English "Less than Well"
Housing & Transportation	Multi-Unit Structures
	Mobile Homes
	Crowding
	No Vehicle
	Group Quarters

Source: Social Vulnerability Index; Centers for Disease Control and Prevention. Social Vulnerability Index 2014 Documentation. http://svi.cdc.gov/Documents/Data/2014_SVI_Data/SVI2014 Documentation.pdf.