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RESEARCH

Spatial Variation in the Relationship between Hispanic Concentration and County Poverty: A Migration Perspective

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ABSTRACT

Racial/ethnic minority concentration is generally positively related to county poverty. Yet, spatial variation in this relationship may call into question the meaning attached to racial/ethnic concentration. We argue that racial/ethnic concentration reflects more than just the concentration of individuals from a disadvantaged group. In addition, we extend previous work by taking a migration perspective to explain spatial non-stationarity in racial/ethnic concentration's relationship with county poverty. Factors related to the migration process, including migrant selectivity and spatial differentiation in place characteristics, could alter the relationship between a minority group's concentration and poverty. We employ spatially informed methods and 2006-2010 American Community Survey data to examine the relationship between Hispanic concentration and county poverty. The GWR results indicate significant spatial variation in the percent Hispanic-county poverty relationship. Hispanic migration regimes capture some of the observed relationship non-stationarity, suggesting migration-related processes partially drive Hispanic-county poverty relationship non-stationarity. However, we discuss other explanations that should be considered in future research. This work advances research on spatial inequality by examining the social implications of migration and by investigating the role of place in shaping the meaning of minority concentration.

KEYWORDS: county poverty, migration, Hispanic new destinations, spatial methods

INTRODUCTION

Poverty is a feature of place as well as an individual outcome (see e.g. Duncan 1999; Curtis, Voss, and Long 2012; Friedman and Lichter 1998; Lawson, Jarosz, and Bonds 2010; Levernier, Partridge, and Rickman 2000; Lichter and McLaughlin 1995; Rupasingha and Goetz 2007; Tomaskovic-Devey 1987; Voss et al. 2006; Weinberg 1987). But explanations for a covariate's association may differ for places compared to what is observed for individuals. We add to poverty research through a unique analysis of county poverty that utilizes spatial data analysis techniques and innovative ideas regarding how migration processes affect Hispanic concentration's relationship with spatial

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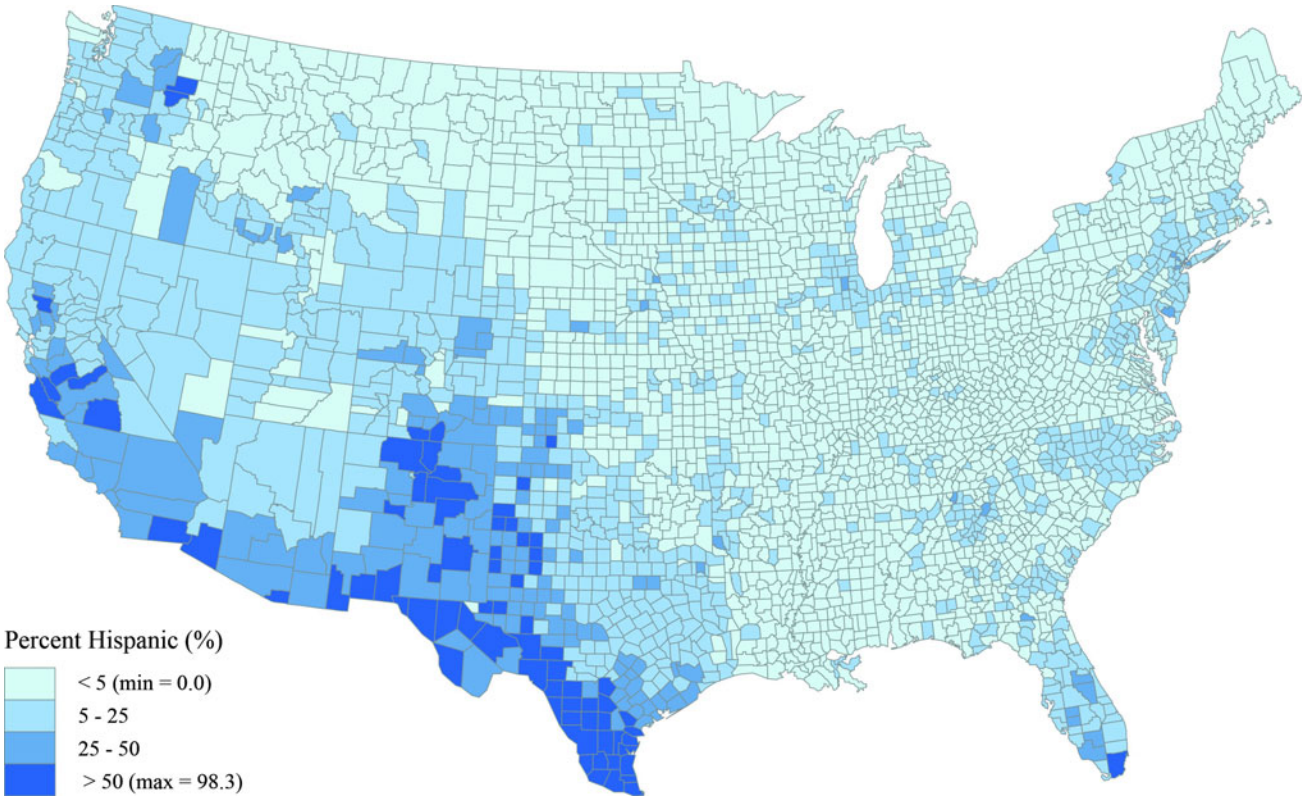
Figure 1. Hispanic Concentration, ACS 2006-2010



inequality in poverty (i.e. the uneven distribution of poverty across space/places). Building from these analyses we aim to better understand the meaning of racial/ethnic concentration in relation to the level of economic disadvantage of a county.

Studies of the spatial distribution of poverty in the United States frequently include variables to represent the relative size of racial/ethnic minority groups in local areas (e.g. Friedman and Lichter 1998; Levernier et al. 2000; Lichter and McLaughlin 1995; Rupasingha and Goetz 2007; Tomaskovic-Devey 1987; Voss et al. 2006; Weinberg 1987). The dominant understanding is that because racial/ethnic minorities have higher poverty rates than non-Hispanic whites (De La Rosa 2000; Schiller 2008) their spatial concentration will be positively related to the county poverty rate (see e.g. Levernier et al. 2000; Lichter and McLaughlin 1995; Rupasingha and Goetz 2007; for an alternative explanation see Tomaskovic-Devey 1991). There are multiple perspectives from which scholars could take issue with or problematize the implicit assumption of a spatially uniform positive relationship. In this paper we focus on the role of migration because we believe it is an important, yet often neglected, underlying feature of research on space and place. In addition, a migration perspective highlights both composition and place-based arguments that may aid in better understanding the meaning of racial/ethnic concentration for spatial inequality.

In contrast to the implicit assumption in the extant literature, we propose that the relationship between racial/ethnic minority concentration and poverty will vary across space. In addition, we examine the extent to which factors related to migration contribute to relationship non-stationarity (throughout the paper we use spatial non-stationarity and spatial differentiation interchangeably to describe differences in either a

relationship or characteristic across space). Spatial variation in the racial/ethnic concentration relationship would have important implications for the meaning scholars tie to racial/ethnic minority concentration measures. Most importantly, it may call into question the interpretation that racial/ethnic concentration is positively related to county poverty strictly because there are more disadvantaged individuals in a county.

It is an ideal time for assessing how migration impacts the relationship between racial/ethnic minority concentration and poverty because the Hispanic population has recently begun to disperse from traditional areas of concentration in the Southwest through both internal and international migration. Rapid spatial diffusion of the Hispanic population is occurring in the South and Midwest (Lichter and Johnson 2006) and in small metropolitan and non-metropolitan areas throughout the United States (Donato et al. 2010; Kandel and Cromartie 2004; Singer 2004).[1] The contemporary spatial distribution of the Hispanic population across the United States is reflective of these recent migration trends (see Figure 1). The majority of Hispanics in the United States live in Texas, California, Arizona, New Mexico, and Colorado (Leach and Bean 2008). However, the number of states containing a Hispanic population has increased since the 1990s as the Hispanic population has spread to new destinations (Suro and Singer 2002). In addition, there are practical and political reasons that make examining Hispanic concentration particularly important. First, Hispanics comprise 16.3 percent of the total population (US Census Bureau 2011b) and are the largest racial/ethnic minority group in the United States. Second, concerns regarding the negative consequences of having Hispanic neighbors (see e.g. Crowley and Lichter 2009; Massey 2008) have increased public attention on this population.

In this paper, we empirically establish spatial non-stationarity in Hispanic concentration's association with county poverty, and then assess migration-related explanations for this spatial differentiation. This work advances our understanding of how and why racial/ethnic concentration's relationship with poverty varies across space. We do so by linking the literatures on county poverty and migration theory, particularly studies of Hispanic migration to new destinations within the United States. Our efforts provide spatial inequality scholars with cause to think more critically about the meaning they attach to racial/ethnic minority concentration.

Place Poverty Research: Relationship Non-Stationarity and Migration

Recent advances in analytical techniques have spurred a flurry of research on spatial variation in a range of relationships (e.g. Gilbert and Chakraborty 2011; Green and Sanchez 2007; Shoff and Yang 2012; Shoff, Yang, and Matthews 2012; Siordia, Saenz, and Tom 2012; Qiu and Wu 2011; Yang, Shoff, and Matthews 2013). Yet, few studies of county poverty have incorporated this approach (for an exception see Curtis et al. 2012). In addition, despite research indicating migration's role in generating the spatial distribution of county poverty (Foulkes and Schafft 2010; Nord 1998; Nord et al. 1995; for an analysis on the impact of international migration see Murdock, Zhai, and Saenz 1999), migration has been neglected in the majority of research on spatial inequality. We contribute to the county poverty literature by bridging previously separate bodies of research on spatial variation in poverty relationships and migration.

Previous research suggests that county poverty relationships vary in magnitude and direction depending on the social/economic context (Curtis et al. 2012). Curtis et al. (2012) argue that the impact of established poverty covariates, such as unemployment and disability, depends on the racial/ethnic composition and/or the economic structure of the locality. They employ spatial

1 Hispanic concentration in new destinations is not purely due to recent migration (for a discussion on the role of natural increase see Johnson and Lichter 2008). However, internal and international migration patterns have been identified as the primary drivers behind these recent trends in Hispanic spatial dispersion and concentration (e.g. Lichter and Johnson 2006; Suro and Singer 2002).

regime analysis to examine differentiation in covariates' associations with poverty across the identified social regimes. Their results indicate significant variation in the poverty relationships for both the racial/ethnic regime and the economic structure regimes. Their research suggests that the meaning of poverty covariates depends on the social context in which they are examined and emphasizes the role of structure in generating the spatial concentration of poverty.

A second body of research on county poverty has directly examined the impact of selective migration patterns of the poor and non-poor on the spatial concentration of poverty (Foulkes and Schafft 2010; Nord 1998; Nord et al. 1995). This migration research suggests that the disproportionate movement of poor people to poor places compared to the movement of non-poor people to places with similarly high levels of poverty reinforces the concentration of poverty over time. In contrast to Curtis et al. (2012) and much of the place poverty research, research on the impact of migration on the spatial concentration of poverty highlights the role of composition, particularly the characteristics of migrants, over local structural characteristics (see especially Nord 1998; Nord et al. 1995). This distinction between individual and structural explanations is also well established within the wider poverty literature (e.g. Cotter 2002; Wilson 1987). We draw on this distinction when assessing explanations for spatial non-stationarity in Hispanic concentration's relationship with county poverty.

Our research builds on previous work by focusing on how migration affects relationships and not just how individual poverty is distributed across place. Previous research has assessed the impact of migration on spatial inequality in the United States (Foulkes and Schafft 2010; Nord 1998; Nord et al. 1995) and has separately examined variation in poverty relationships across sub-regions of the United States (Curtis et al. 2012). However, scholars have yet to articulate and examine how migration could generate spatial differentiation in poverty relationships. This is an important extension because the migration perspective adopted here highlights different axes along which poverty relationships may differ from those previously examined (see Curtis et al. 2012). In addition, a migration perspective may be particularly well-suited to disentangling the compositional and structural components of racial/ethnic minority concentration's relationship with local disadvantage. We develop our expectations for how and why Hispanic concentration's relationship with poverty will vary across the United States after briefly reviewing how the process of migration (i.e. the movement and connection of people to places) may affect observed poverty relationships.

Migration Theory: A Broad Review

In this analysis, migration is viewed primarily as a contextual, background factor. Therefore, although Hispanic migration is central to our analysis, it is not directly observed. We deliberately do so in order to demonstrate how the background processes related to migration, which are often ignored, affect the cross-sectional relationship between the concentration of racial/ethnic minorities and social phenomena. We emphasize that our argument focuses on how migration is related to county poverty *relationships* rather than overall levels of poverty or changes in poverty as examined in previous work (e.g. Murdock et al. 1999). We also note that although migration is an individual-level act, the migration process involves both individuals and places. Migration is often in response to the characteristics of places (see e.g. Lee 1966; McHugh 1984), thereby interlocking place and migration. The following discussion of individual-level migration theories in an analysis of county-level characteristics is justified by the connection between individuals and place throughout the migration process.

We broadly review migration theory to highlight two major features of migration that may contribute to differing associations between minority concentration and county poverty across space. In this discussion we focus on economic explanations and factors related to poverty. Unfortunately, this excludes explanations that

emphasize networks (e.g. Massey et al. 1987), including family ties (e.g. Stack 1996), attachment to place (e.g. McHugh 1984), and other socially-based factors. However, these exclusions are justified by our focus on relationships with county poverty.

The first aspect of migration to note is its selectivity. Theories on why people move, whether they emphasize economic (e.g. Stark and Bloom 1985; Todaro 1976) or social explanations (e.g. Massey et al. 1987), underscore the selectivity that differentiates migrants from non-migrants. We suggest that migrant selectivity can affect poverty relationships by generating spatial differentiation in a population's composition. Compositionally distinct subgroups may emerge within a population through either internal or international migration patterns. For instance, internal migration from one area of the country to a new destination has the potential to produce compositionally distinct sub-groups across space by decreasing the selected characteristic in the settled geography and concentrating that characteristic in the new destination. In addition, theory suggests that international migrants leaving from the same origin country who choose different destination types may be dissimilar in important respects, such as ambition (Shaw 1975). This suggests that differentiation in destination choice related to personal characteristics can lead to compositionally distinct sub-groups within the destination country. Evidence from research on Hispanic new destinations supports the assertion that migration contributes to spatial differentiation in a group's composition. For example, research suggests that there are differences in the educational and economic composition of the Hispanic population in new compared to established destinations (Crowley, Lichter, and Qian 2006; Saenz, Cready, and Morales 2007; Stamps and Bohon 2006) (see below for a more detailed discussion of the geographic differences).

Theory points to a second critical aspect of the migration process, one that emphasizes the role of place characteristics: "push" and "pull" structural factors (Dorigo and Tobler 1983; Lee 1966; also see Massey et al. 1998). Regardless of individual-level factors, migration from economically depressed areas, for example, is greater than from more desirable areas (a "push" factor). Similarly, places with a strong local economy attract individuals who otherwise would not have migrated (a "pull" factor). This role of place characteristics in migration links new migrant groups with strong local economies. Evidence on Hispanic migration substantiates this claim (see e.g. Donato et al. 2007, 2008; Kandel and Parrado 2005; Leach and Bean 2008; Parrado and Kandel 2008). The association between new migrants and a strong economy could alter the relationship between a currently mobile minority group's concentration and poverty; specifically, a strong local economy could reduce poverty more generally and result in a negative relationship between poverty and minority concentration. The economic benefit of a strong economy would apply to all residents, not just recent Hispanic residents; therefore, we would expect to see this negative relationship regardless of the distribution of the minority group's characteristics across space. This is an important distinction from the explanation suggested by migrant selectivity, because it highlights the role of structure rather than composition. Our analysis reflects this distinction as we attempt to arbitrate between the two explanations for how migration contributes to spatial differentiation in the percent Hispanic-county poverty relationship.

Why Hispanic Concentration's Relationship Will Vary: A Migration Perspective

Spatial Differentiation in Hispanic Population Characteristics

We suggest that migrant selectivity may generate geographically distinct subgroups of Hispanics within the United States. Consistent with this argument, evidence suggests that Hispanic Americans who remain in traditional areas are different from those who reside in new destinations (at least at this relatively early stage in their geographic dispersion). For instance, research demonstrates that there is regional

variation in Hispanic poverty rates that is attributable to compositional differences. Specifically, the Mexican immigrant poverty rate is significantly lower outside of the Southwest, particularly when considering Mexican immigrants in the Midwest (Crowley et al. 2006). Twenty-five percent of Mexican immigrants living in the Southwest have incomes below the poverty line. In contrast, the corresponding poverty rate in the Midwest is 18 percent – 7 percentage-points lower than in the Southwest (Crowley et al. 2006). Crowley et al.'s (2006) research suggests regional differences are partially due to compositional differences in the US Mexican immigrant population across space. Specifically, they suggest that selection based on family characteristics (e.g. marital status and number of children) explains regional differences in Mexican poverty rates. However, the same research indicates limited regional differences in poverty for the native-born Hispanic population. Therefore, we note that spatial differentiation in the composition of the Hispanic population as a whole (i.e. foreign- and US-born Hispanics) may be limited or distinct from that suggested by Crowley et al. (2006).

Other research suggests substantial spatial variation in Hispanic educational attainment levels (Saenz et al. 2007; Stamps and Bohon 2006). Research on migration patterns among Southwestern residents indicates that Mexican Americans who migrate to frontier states, or new destinations, have more human and social capital than Mexicans who remain in the Southwest (Saenz et al 2007). Consistent with this migration pattern, educational attainment is higher among the Hispanic population living in new destinations than for their counterparts in established areas (Stamps and Bohon 2006). As discussed below, we investigate compositional differences in poverty, marital status, and educational attainment to assess the extent to which spatial differentiation in composition generates relationship non-stationarity between Hispanic concentration and county poverty.

Thus far we have focused on positive selection into new destinations. However, one additional compositional characteristic that is negatively related to economic position deserves consideration. The literature indicates that Hispanic population growth in new destinations is largely driven by recent immigrants (i.e. international migrants), particularly after 1990 (Durand, Massey, and Capoferro 2005; Saenz et al. 2007). Therefore, the Hispanic population in new destinations would have a larger share of foreign-born Hispanics compared to the Hispanic population in established areas. Foreign-born Hispanics have lower levels of educational attainment (Bean and Tienda 1987; Stoops 2004) and higher poverty rates than native-born Hispanics (Crowley et al. 2006). The spatial distribution of the concentration of the foreign-born Hispanic population suggests greater economic disadvantage among the new destination Hispanic population compared to Hispanics in the Southwest. This would suggest a more positive relationship between Hispanic concentration and county poverty in new destinations relative to established Hispanic destinations. Although also suggestive of spatial differentiation in the relationship between Hispanic concentration and poverty, this is in the opposite direction indicated by positive migrant selection.

In sum, to the extent that positive selection (i.e. selection on characteristics that are negatively related to poverty) explains spatial differentiation in the association between Hispanic concentration and poverty, we expect Hispanic concentration to be less positively or negatively related to poverty outside of the Southwest. In addition, we would expect a lower Hispanic poverty rate to drive this spatial differentiation, as indicated by a lower Hispanic poverty rate in new destination counties compared to established destinations. In contrast, to the extent that the relative size of the foreign-born population among Hispanics drives the spatial differentiation, we expect that Hispanic concentration will be more positively related to county poverty outside of the Southwest. As far as the implications for understanding the meaning of racial/ethnic concentration, these selection-based arguments for relationship non-stationarity are generally consistent with the

dominant composition explanation for why percent Hispanic is related to county poverty (i.e. explanations that rely on the idea of a concentration of disadvantaged individuals).

Place Characteristics related to Economic Growth

Regardless of the Hispanic population composition, characteristics of the places with emergent Hispanic populations can generate spatial differentiation in the Hispanic-poverty relationship. Consistent with this argument, research demonstrates a link between the Hispanic population and economic prosperity outside of the Southwest. Hispanic growth outside of established areas has been concentrated in places experiencing economic growth (Crowley and Lichter 2009; Donato et al. 2007, 2008; Kandel and Parrado 2005; Leach and Bean 2008; Liaw and Frey 2008). In line with the "push-pull" migration perspective, researchers have shown that the pull of jobs is a central factor in the diffusion of the Hispanic population (Donato et al. 2007, 2008; Kandel and Parrado 2005; Leach and Bean 2008; Parrado and Kandel 2008). For example, previous research indicates that the construction and meat-packing industries are essential to understanding the redistribution of the US Hispanic population (Kandel and Parrado 2005; Leach and Bean 2008; Parrado and Kandel 2008, 2010).

Strong local economies translate into higher incomes, lower unemployment rates, and lower poverty rates for all residents, and not just Hispanic residents. Positive economic conditions in new destinations reduce poverty generally, which could lead to a negative association between Hispanic concentration and poverty outside of established areas where Hispanic concentration is mostly driven by recent migration (Lichter and Johnson 2006; Suro and Singer 2002). Consistent with this expectation, there is evidence of lower *total* poverty rates (i.e. the poverty rate for all residents, not just Hispanics) in high Hispanic growth counties, particularly when compared to established areas (Crowley and Lichter 2009; Donato et al. 2008).

To the extent that the local economy plays a role in spatial non-stationarity in the Hispanic relationship, we expect Hispanic concentration to be negatively related to poverty outside of the Southwest. This is the same direction of spatial non-stationarity suggested by positive migrant selection. However, in the case of the place-characteristic explanation, spatial non-stationarity in Hispanic concentration's relationship with poverty would be explained by indicators of local area economic prosperity, rather than by spatial differentiation in the Hispanic poverty rate. This may suggest that structural factors associated with the places in which Hispanics concentrate are actually what drive percent Hispanic's relationship with county poverty, rather than the presence of more Hispanics. We assess the above migration-based explanations of relationship non-stationarity in our pursuit to better understand the meaning of Hispanic concentration for county poverty.

DATA AND METHODOLOGY

Data

We analyze county-level data from the 2006-2010 American Community Survey (ACS) (US Census Bureau 2011a) for counties in the continental United States (N = 3,075).[2] We

2 We focus on the contiguous United States because Alaska and Hawaii represent physical outliers; the contiguous United States better fits the adaptive bandwidth selection approach used to determine which counties are included in a focal county's model in Geographically Weighted Regression (GWR). To clarify, all counties are technically included in each regression model; however, counties outside of the bandwidth of the kernel density function are given a weight of zero, which essentially excludes them from the focal county's model. The number of observations was further reduced from the total number of contiguous county units, because the independent cities of Virginia were included in their respective counties to limit inconsistency in the size of the analyzed units.

Table 1. Variable Definitions

Dependent variable	
Logit poverty	The proportion of the total population for whom poverty status is determined that lives in a household with an income below the designated poverty threshold (p); logit = log(p/(1-p))
Independent variables	
% Hispanic	The percentage of the total population who identify as Hispanic
% In-migration	The percentage of the total population that migrated to the focal county in the past five years
% Employed in construction	The percentage of the labor force employed in construction
% Unemployed	The percentage of the civilian population 16 years and over who are in the labor force and are unemployed
Metropolitan status	Metropolitan counties (codes 1-3) are coded as 1 and nonmetropolitan counties (codes 4-9) are coded 0
% African American	The percentage of the total population who identify as single race non-Hispanic black
% AIAN	The percentage of the total population who identify as single race non-Hispanic American Indian/Alaskan Native
% Foreign born	The percentage of foreign born residents
% Female-headed families with kids	The percentage of families headed by a single female (no husband present) with children living in the household under 18 years of age
% Less than high school	The percentage of the population 25 years of age and over with less than a high school degree
% Employed in agriculture	The percentage of the civilian labor force employed in the agriculture and fishing industry
% Employed in mining	The percentage of the civilian labor force employed in mining
% Employed in manufacturing	The percentage of the civilian labor force employed in manufacturing (durable and non-durable goods)
% Employed in FIRE	The percentage of the civilian labor forced employed in finance, insurance, and real estate
% Under age 18	The percentage of the total population under the age of 18
% Over age 65	The percentage of the total population over the age of 65
Hispanic-specific composition variables	
Hispanic % poverty	The percentage of the Hispanic population for whom poverty status is determined that lives in a household with an income below the official poverty threshold
Hispanic % less than high school	The percentage of the Hispanic population 25 years and over with less than a high school degree
Hispanic % un-married households	The percentage of Hispanic families that are not headed by a married couple
Hispanic % foreign born	The percentage of Hispanics who were born outside of the United States

employ the county as our unit of analysis for several reasons. First, we are interested in the poverty of places. Second, consistent with previous research, we assert that counties represent a meaningful social space across which economic processes unfold (see Irwin 2007). Finally, counties cover all of the geographic space in the United States including rural areas, which

are major destinations for Hispanics in all parts of the United States.[3]

The data used in this analysis were extracted from Social Explorer (Social Explorer 2012; American Community Survey 2006-2010). The dependent variable is county poverty and we use the logit transformation, *logit poverty* = log(proportion poor/(1-proportion poor)), to adjust for the skewed distribution of the dependent variable.[4, 5] A description of how this variable and the independent variables are measured can be found in Table 1.

Percent Hispanic

The primary independent variable, *percent Hispanic*, combines Hispanics of all races, both native-born and foreign-born. We take this approach rather than using measures of the different Hispanic sub-groups for both substantive and methodological reasons. Substantively, a broad measure of Hispanics is preferable because it is consistent with the approach taken in the county poverty literature which we aim to address. Methodologically, a broad measure is most feasible given that sub-groups of Hispanics that we may be interested in, such as Cubans who have lower poverty rates than other Hispanics, comprise an extremely small proportion of the total population and are highly spatially concentrated. However, we can take this into further consideration by examining the relationship spatial differentiation for quirks that may be related to the uneven spatial distribution of Hispanic sub-groups.

Before continuing, we consider other potential limitations of our use of Census measures of Hispanic concentration and poverty. Census data are a collection of responses to surveys mailed to known residential addresses. They are beneficial for analyses, such as ours, because of the large samples; however, the population that is captured

3 We are not concerned about issues related to the modifiable areal unit problem (MAUP) that may arise due to our use of the county as our unit of analysis rather than a larger or different geographic unit. We assert that the county is a meaningful social place to which poverty happens. In addition, similarities in poverty rates of neighboring counties is not necessarily attributable to choosing an inappropriate unit of analysis and the subsequent "spill over" of poverty into adjacent counties. Similar poverty rates for adjacent counties may also be explained by the fact that near places are more similar in characteristics related to poverty than are far places.

4 Although it is common practice to rely on the census definition of poverty within the extant literature, we note one limitation of this definition that is particularly relevant to spatial analysis: poverty status is defined using the same household-composition-specific thresholds for all individuals without regard to a person's geographic location (for additional details see https://www.census.gov/hhes/www/poverty/about/overview/measure.html). Such a-spatial definitions of poverty do not take into account geographic variation in the cost of living. Despite differences in a person's ability to meet her basic needs on an income of 11,344 dollars as a result of differences in the cost of living, all single individuals with that income would be considered poor. This approach underestimates poverty in places with a cost of living above that assumed when calculating the official poverty thresholds, and overestimates it in places with a lower cost of living. Using an a-spatial poverty definition may hinder researchers' ability to detect spatial and spatially varying relationships because it artificially affects the spatial distribution of poverty and may weaken the appearance of county poverty relationships if the official poverty rate does not respond to local factors in the same way as does the felt economic hardship. However, at present, the official poverty rate is the best measure available for estimating how poor a place is for a large number of geographies within the United States.

5 Although migration unfolds over time and therefore may suggest analyzing the change in county poverty rates over time we do not do so because that outcome is not consistent with the aim of this paper, which is to demonstrate how migration dynamics can be incorporated into our understandings of even cross-sectional relationships. In addition, despite taking place over time, migration that has already happen affects and is reflected in the current distribution of populations across places. However, we have incorporated one aspect of time by analyzing the same models using 1990 data to assess the extent to which there is a change in the spatial patterning of the relationship depending on the stage of Hispanic dispersion. See the results section for a description of the 1990 results.

by large-scale surveys may be skewed, especially for groups with large undocumented populations, such as Hispanics. There are at least two potential consequences of this data limitation for our analysis. First, the county-level estimates may undercount the Hispanic population. However, potential undercounts are unlikely to affect the relative position of a county on Hispanic concentration, especially to the extent to which undocumented Hispanics are concentrated in counties with already large Hispanic populations. Therefore, this potential limitation should not affect our substantive conclusions. Second, undercounting undocumented Hispanic immigrants may affect the estimated poverty rates, particularly the Hispanic poverty rate. Mexican immigrants have a higher poverty rate than the native-born Mexican American population (Crowley et al. 2006), and undocumented immigrants are likely to have even higher poverty rates than legal immigrants given their more tenuous position relative to legal immigrants. This may cast doubt on results comparing the Hispanic poverty rates across regimes and state clusters to the extent to which we would expect more undocumented Hispanics in some parts of the country relative to others. The full impact of this potential limitation is unclear given limited information on the county-specific distribution of undocumented Hispanics (who did not respond to the American Community Survey) and their poverty status. However, the most likely scenario of undercounting, namely that the exclusion of undocumented Hispanics increased the Hispanic poverty rate in the Southwest to a greater extent than in other areas of the country, would not change the core of our composition comparison results (discussed below).

Local Economy, Poverty Covariates, and Hispanic Composition Variables

The strength of the local economy may explain spatial non-stationarity in *percent Hispanic*'s association with county poverty. We use three variables to estimate the strength of the local economy: *percent in-migration*; *percent employed in construction*; and *percent unemployed* (for definitions see Table 1). We have chosen to include a measure of in-migration and the size of the construction industry in addition to the more traditional indicator of economic strength (*percent unemployed*), because these factors are closely related to the recent redistribution of the US Hispanic population. For instance, total in-migration is suggested to coincide with economic growth in an area, and it is increasing in some of the same regions as is Hispanic migration (e.g. the southeastern region; see Hunt, Hunt, and Falk 2008). Research has also connected economic growth and Hispanic migration through the relative size of the construction industry (Donato et al. 2007; Kandel and Parrado 2005; Parrado and Kandel 2010). Where economic opportunities are growing, more buildings need to be built, which leads to a demand for construction workers, including Hispanic labor.

The remaining variables are the same as those found in standard county poverty analyses. Metropolitan status is from the Economic Research Services (ERS) 2003 Rural-Urban Continuum Codes.[6] The race variables include the *percent African American* and *percent AIAN*.[7] We also account for the *percent foreign born*, *percent female-headed families with kids*, and *percent less than high school education*. Industrial composition is represented by a series of variables: *percent employed in agriculture*; *percent employed in mining*; *percent employed in manufacturing*; and *percent employed in FIRE*. The final two standard poverty covariates capture age composition: *percent under age 18* and *percent over age 65* (for definitions see Table 1). Given that the control variables are included in the baseline model, it is important to interpret Hispanic concentration's relationship as net of other factors, including some that may be considered as mediators (e.g. educational composition). This approach is consistent with

6 For the data source see http://www.ers.usda.gov/Data/RuralUrban ContinuumCodes/.

7 We do not include the concentration of non-Hispanic whites to avoid overestimating the model for areas that have, for example, only non-Hispanic white and non-Hispanic black residents.

our aim to demonstrate the extent to which Hispanic concentration's relationship with county poverty varies across space net of traditional poverty covariates, and our focus on the interpretation of *percent Hispanic's* residual association with county poverty.

Finally, we compare four Hispanic-specific composition variable averages across destination types to assess the possibility that spatial differentiation in Hispanic population composition accounts for spatial non-stationarity in *percent Hispanic*'s association with county poverty. These Hispanic-specific composition variables include measures of the *Hispanic poverty rate*, *Hispanic educational attainment*, *Hispanic family composition*, and *Hispanic foreign born*.[8]

Methodological Approach

Geographically Weighted Regression

We begin our analysis with the examination of geographically weighted regression (GWR) results and corresponding maps. GWR is a useful first step for examining the stability of the Hispanic-poverty relationship because it provides information for mapping spatial variation in the association between the dependent variable and a predictor of interest. Knowing the geographic location of the results is necessary for distinguishing between the competing expectations discussed above.

GWR is a localized approach to regression analysis. GWR is closely aligned with the first "law" of geography that suggests that "everything is related to everything else, but near things are more related than distant things" (Tobler 1970: 236). Extending this geographic logic, GWR builds from the premise that a variable's *relationship* is more similar in near areas than it is in areas that are far from one another. That is, the direction and strength of an association are allowed to vary over geographic space. In contrast to GWR, ordinary least squares (OLS) regression, the traditional approach taken in place poverty research, assumes a stationary relationship between the dependent variable and the included covariates. A stationary process implies a one-unit change in *X* is related to the same change in *Y* in all parts of the study region (i.e. all relationships are global). However, the underlying global assumptions of OLS regression may not hold due to contextual effects that produce different responses to the same stimuli.[9] GWR also allows associations to vary across space without a priori assumptions about where the association will vary, which makes this method ideal for exploratory analyses.

The GWR model can be expressed as:

$$(1) \quad y_i = \beta_{(0i)}(u_i, v_i) + \sum_{(n=1)}^{k} \beta_{(ni)}(u_i, v_i)\, x_{(ni)} + \varepsilon_i$$

where y_i is the percentage of the population living in poverty for county i and (u_i, v_i) denotes the xy-coordinates of the centroid of county *i*. $\beta_{(0i)}$ and $\beta_{(ni)}$ represent the local estimated intercept and the coefficient for variable *n* for county *i*, respectively. To calibrate this formula, we employ the bi-square weighting kernel function (Brunsdon, Fotheringham, and Charlton 1998), where the counties closer to i have a stronger influence in the estimation of $\beta_{(ni)}(u_i, v_i)$ than do those located farther from *i*. Herein lies the strength of GWR: localized parameter estimates are obtained for all locations, which allows for the creation of maps and subsequent examination of the spatial variability or non-stationarity of those parameter estimates (Fotheringham et al. 2002). The GWR models were estimated using GWR 3.0 (Fotheringham et al. 2002).

8 Hispanic-specific foreign born data are not currently available from the 2006-2010 ACS. Therefore, we rely on estimates from the 2005-2009 ACS. All other variables are from the 2006-2010 ACS.

9 Relationships may also vary spatially for statistical reasons, such as sampling variation or model misspecification (Fotheringham, Brunsdon, and Charlton 2002).

Figure 2. Hispanic Migration Regimes

We adopt the Monte Carlo approach to test for spatial non-stationarity in the *percent Hispanic* parameter estimates (Hope 1968; Fotheringham et al. 2002; Brunsdon et al. 1998). If the *p*-value of the Monte Carlo test is less than or equal to 0.05, then we have sufficient evidence to reject the null hypothesis and to conclude that the effect of variable *n* on the percentage of the population in poverty varies spatially (Brunsdon et al. 1998). We provide the results of the Monte Carlo test and the 5-number parameter summaries in Table 2. Our hypotheses rest on non-stationarity as well as on the location of positive and negative parameter estimates. Therefore, we provide a map of the relationship between *percent Hispanic* and *logit poverty* after controlling for other covariates in order to identify the areas with significant local parameter estimates (see Figure 3).

GWR is a useful first step for identifying geographically based spatial non-stationarity in relationships. However, it is not well-suited to addressing all research questions because GWR relies exclusively on geographic proximity to define areas where relationships differ. Our hypotheses were developed around whether a county is a new or an established Hispanic destination. This distinction in Hispanic migration destination type is related to geographic position within the United States, but it is not a perfect correspondence (see Lichter and Johnson 2009) and it may be more accurately captured by a socially defined spatial regime (for an example of research employing a socially defined spatial regime see Curtis et al. 2012; Shoff and Yang 2012). A social spatial regime approach allows us to treat all counties of the same migration destination type as one related group regardless of geographic proximity (Anselin 1990a). Compared to the GWR approach, our migration regime analysis provides a more direct assessment of the extent to which *percent Hispanic*'s relationship with county

poverty varies across counties of differing migration destination types. Therefore, we also conduct a spatial regime analysis to assess the extent to which observed spatial non-stationarity in the GWR results is captured by migration regimes.

Spatial Regime Analysis by Migration Destination Type

We use spatial regime analysis to examine differences in the Hispanic concentration-county poverty relationship for established and new Hispanic destinations. Similar to previous migration research, we define established destinations as any county with a Hispanic concentration of 10 percent or more in both 1990 and 2000; and new/high-growth destinations as all other counties with an increase in the number of Hispanics between 1990 and 2000 of 1,000 or more that also had a Hispanic growth rate of 150 percent or higher (Kandel and Cromartie 2004; for alternative, yet similar, migration typologies see Lichter and Johnson 2009; Parrado and Kandel 2010).[10] We rely on the 1990 and 2000 Census data (US Census Bureau 1992, 2002) to define the migration regimes because relying on more recent data would exclude new destinations that experienced a high enough volume of in-migration in previous years to classify them as established destinations. The two migration regimes are depicted in Figure 2.[11]

A regime analysis is conceptually equivalent to a fully interacted model and conducting regression analyses separately for each identified regime (Anselin 1988, 1990a). However, employing a regime model is analytically beneficial for at least two reasons. First, the regime model is more parsimonious and easier to interpret than a fully interacted model, which would include a separate interaction parameter for each explanatory variable. Second, there are built-in tests for structural instability in the parameter estimates across the specified regimes (i.e. Chow test) that are not readily available when running separate models (Anselin 1990b). We will compare the *percent Hispanic* coefficient estimates for the two regimes to gauge the difference in the percent Hispanic-county poverty relationship across the two migration destinations. The statistical significance of all observed differences in the models will be assessed using a Chow test or a spatial Chow test in the event that a spatial error or spatial lag model is necessary.

A regime analysis captures non-stationarity in the relationships, but it may not fully handle the spatial dependence embedded in the data. Spatial autocorrelation among model residuals violates the OLS assumption of independent residuals and may bias coefficient and standard error estimates (Cliff and Ord 1973, 1981; for a discussion of the impact of spatially autocorrelated residuals on county poverty models see Voss et al. 2006). Therefore, we estimated global Moran's I statistics for the residuals of our regime models to evaluate the extent to which our results are affected by spatially autocorrelated residuals. We found significant residual spatial autocorrelation in both regime Model 1 (Moran's $I = .10$, $p < .001$) and Model 2 (Moran's $I = .08$, $p < .001$). In order to minimize the impact of spatial dependence on our estimates, we incorporate a spatial lag term into the spatial regime analysis as suggested by a spatial diagnostics test (Anselin 1990a). The spatial regime analysis and corresponding spatial Chow tests were conducted using the spdep package in R 2.14.0 (R Development Core Team, 2012).

Data Analysis

10 The growth rate is calculated as the Hispanic population difference (Hispanic population in 2000 minus the Hispanic population in 1990) divided by the Hispanic population in 1990.

11 Although we depict a residual "other" category in the figure of the migration regimes, we do not include it in our regime analysis. This is in contrast to the GWR analysis that includes all counties in the contiguous United States. The GWR analysis speaks to relationship spatial non-stationarity across all places within the United States, whereas the regime analysis isolates spatial non-stationarity in the Hispanic-county poverty relationship that is related to Hispanic migration destination type. This distinction should be kept in mind when interpreting the results.

Table 2. Geographically Weighted Regression (GWR) Summary Results and Monte Carlo Significance Tests for Spatial Non-Stationarity in Local Parameter Estimates, ACS 2006-2010

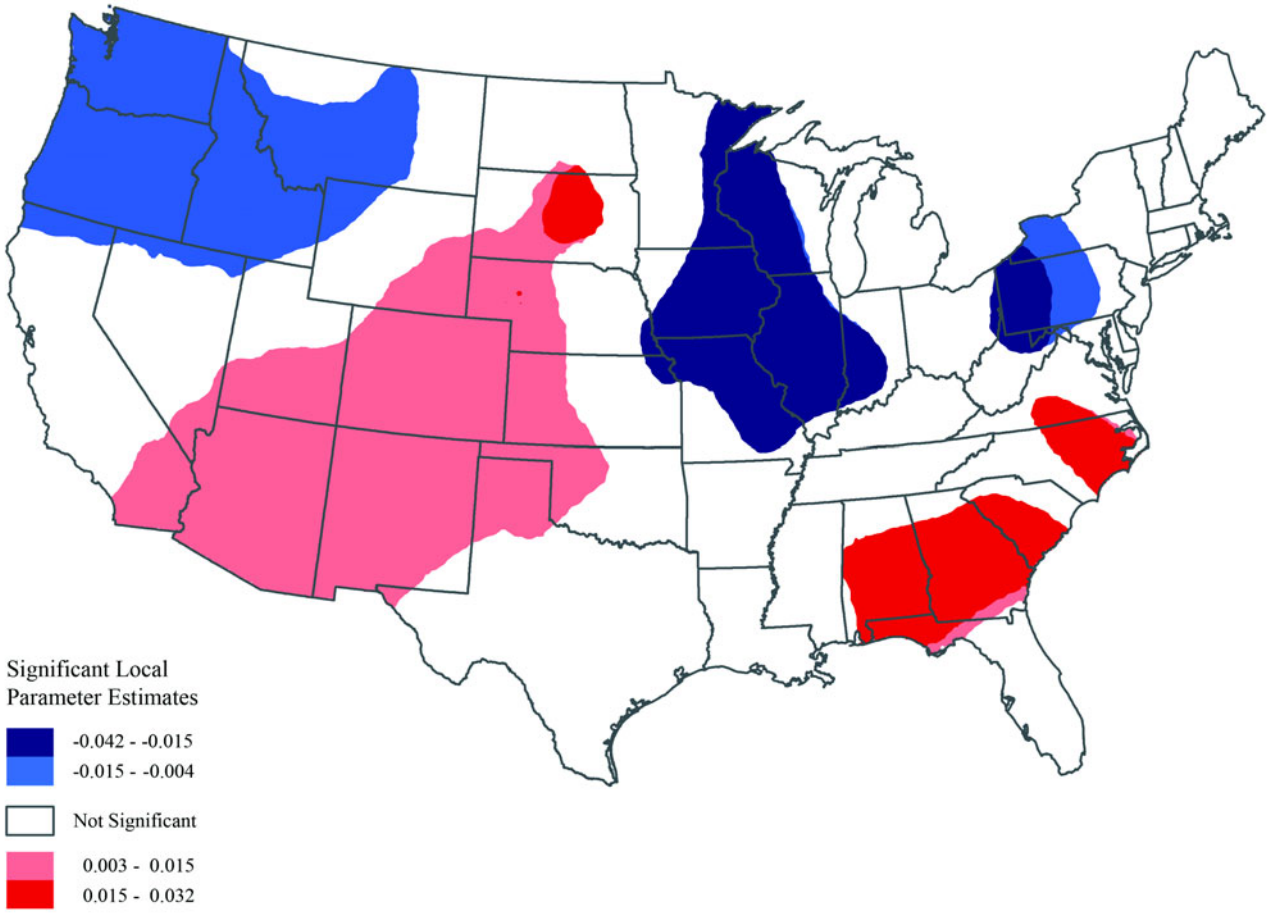
	Model 1				Model 2			
	Min	Med	Max	Monte Carlo	Min	Med	Max	Monte Carlo
Intercept	-2.57	-1.59	-0.38	Stationary	-2.83	-1.64	-0.52	Stationary
Hispanic	-0.05	-0.00	0.03	Variation***	-0.04	-0.00	0.03	Variation***
African American	-0.02	0.00	0.07	Variation***	-0.02	-0.00	0.06	Variation***
AIAN[a]	-0.02	0.01	0.32	Variation***	-0.06	0.01	0.22	Variation***
Foreign Born	-0.03	-0.00	0.07	Variation***	-0.03	-0.00	0.06	Variation***
FHFK[b]	0.00	0.05	0.10	Variation***	0.01	0.04	0.08	Variation***
Less than HS Education	0.01	0.03	0.06	Variation***	0.01	0.03	0.05	Variation***
Under Age 18	-0.07	-0.03	0.00	Variation*	-0.06	-0.04	0.00	Variation*
Over Age 65	-0.04	-0.01	0.02	Stationary	-0.04	-0.01	0.02	Stationary
Metropolitan Status	-0.28	-0.10	0.00	Stationary	-0.26	-0.10	-0.01	Stationary
Agriculture	-0.04	0.00	0.04	Variation***	-0.02	0.00	0.04	Variation***
Mining	-0.05	-0.00	0.12	Variation***	-0.04	-0.00	0.08	Variation***
Manufacturing	-0.02	-0.01	0.02	Variation***	-0.02	-0.01	0.01	Variation**
FIRE[c]	-0.07	-0.04	0.00	Stationary	-0.07	-0.03	-0.01	Stationary
In-Migration					-0.02	-0.00	0.04	Stationary
Construction					-0.03	-0.01	0.01	Stationary
Unemployed					0.00	0.03	0.06	Variation***
Adjusted R-Square				0.76				0.77
Local Sample Size (N)				385				459

Note: All variables are formatted as a percentage (i.e. a value of 26.2 = 26.2%), except metropolitan status (dichotomous) and county poverty (logit).
Med = Median
* $p \leq 0.05$
** $p \leq 0.01$
*** $p \leq 0.001$
[a] American Indian/Alaskan Native
[b] Female-headed Families with Kids
[c] Finance, Insurance, and Real Estate

Our data analysis plan is as follows. First, we establish spatial variation in the local parameter estimate for the Hispanic concentration variable in a standard county poverty model using GWR. Second, we add controls for the strength of the local economy (e.g. the county unemployment rate, the percent of the labor force employed in the construction industry, and the county in-migration rate) to the baseline GWR model. A comparison of Model 1 and Model 2 will be used as our first attempt to estimate the impact of economic pull factors in generating spatial differentiation in Hispanic concentration's relationship with county poverty. Third, we estimate Model 1 and Model 2 using a regime analysis approach for the identified Hispanic migration regimes. This step adds to the GWR analysis by focusing on socially defined regimes rather than geographically defined neighbors. In addition, it assesses the extent to which geographic differences identified in the GWR analysis can be attributed to differences across migration contexts.

As a final step to our analysis, we compare Hispanic population characteristics for established and new destination counties. This step addresses the role of selection in generating spatial differentiation in the Hispanic-poverty relationship. We compare Hispanic poverty rates, Hispanic educational attainment, the percentage of un-married Hispanic families, and the

Figure 3. GWR Estimates for Percent Hispanic on Logit Poverty, ACS 2006-2010



percentage of the Hispanic population that is foreign-born. We focus on characteristics that are simultaneously related to poverty and vary between traditional and new Hispanic destinations (e.g. Crowley et al. 2006; Stamps and Bohon 2006).

It is important to emphasize that educational attainment, family composition, and foreign-born concentration are secondary factors in this portion of the analysis. Significant differences in these characteristics mean less if Hispanic poverty rates are not also significantly different. That is, those differences alone would not explain why the relationship between Hispanic concentration and county poverty varies. However, they may provide guidance for understanding why the Hispanic poverty rates differ (i.e. are the higher rates attributable to low levels of educational attainment, a high concentration of foreign born, or are rates higher despite positive selection on characteristics related to poverty status).

RESULTS

GWR: Spatial Non-Stationarity in the Relationship between Hispanic

Concentration and County Poverty

The localized GWR models suggest significant variation in the Hispanic-poverty relationship across geographic location ($p < 0.001$; Table 2). The spatial variation is such that in Model 2 the local parameter estimate for *percent Hispanic* ranges from a minimum of -0.04 to a maximum of 0.03. The Hispanic concentration-county poverty relationship is not uniform across the continental United States.

The map of significant local *percent Hispanic* parameter estimates emphasizes the geographic variation in the relationship (see Figure 3).[12] The positive association between Hispanic concentration and county poverty in the Southwest stands in stark contrast to the relationship in most areas outside of that region. Examination of the spatial distribution of the local estimates indicates that positive associations (red) are primarily found within the Southwest region. Consistent with both a positive selection and local economy explanation, we find negative associations in the Northwest, the central United States, and around Pennsylvania. However, contrary to our expectations based on the general location of new Hispanic destinations, there are pockets of positive associations in Alabama, Florida, Georgia, North Carolina, South Carolina, and Virginia. Although unexpected, this finding highlights one of the benefits of using GWR, which is that regimes do not need to be predefined prior to model estimation. The flexibility of GWR can provide insight into the place-specific processes underlying the examined association. These results suggest that multiple processes are involved in the spatial non-stationarity of the Hispanic-county poverty relationship, and are not limited to factors related to migration.

The inclusion of factors related to the strength of the local economy (the unemployment rate, total in-migration, and the relative size of the construction industry) have little impact on the spatial non-stationarity in the Hispanic-county poverty relationship. In fact, the results for Model 2 so closely resemble those from Model 1 that we only present the map for the full model (i.e. Model 2). The minimal change in the significant local Hispanic coefficients suggests that the local economy aspect of migration does not account for the relationship non-stationarity found in the GWR results.[13]

As mentioned in footnote 11, the GWR analysis refers to relationship non-stationarity across geographic space and may not apply to spatial differentiation across socially-defined space, such as Hispanic migration destinations. Therefore, the migration context may still condition the relationship between percent Hispanic and county poverty; and spatial variation across regimes may be more tightly linked to local economy strength. We discuss the social regime results below to assess the extent to which Hispanic migration destination type captures the observed geographic variation.

Migration Regimes: A Social Approach to Understanding Geographic Non-Stationarity in the Relationship between Hispanic Concentration and County Poverty

12 Unless otherwise specified, significant local parameter estimates are identified by comparing local t-statistic estimates to the critical t-value of 1.96.

13 These results are generally consistent when employing a more conservative t-statistic for determining significance. The primary difference is that the positive associations in the Southeast and the negative associations in the Northwest do not reach significance in either Model 1 or Model 2. However, there is some informal debate over the extent to which the employed adjusted critical t-value is too conservative. Therefore, we are cautious not to overemphasize the results based on the conservative critical t-value. The conservative local t-statistic significance tests were conducted using an adjusted critical t-value based on an alpha of 0.05, the number of estimated parameters ($p = 14$ for Model 1; $p = 17$ for Model 2), the number of local estimates ($n = 3{,}075$) and the effective number of parameters ($p_e = 257.11$ for Model 1; $p_e = 266.49$ for Model 2), which is provided in the GWR listing file. In an Excel spreadsheet, the final formula is TINV(β, $n - p_e$), where $\beta = \alpha/(1 + p_e - (p_e/n*p))$.

Table 3. Unstandardized Estimates for Established and New Destination Counties, 2006-2010 ACS

	Model 1				Model 2			
	New Destination		Established Destination		New Destination		Established Destination	
	β	SE	β	SE	β	SE	β	SE
Intercept	-1.03***	0.30	-1.58***	0.17	-1.09**	0.36	-1.70***	0.22
Hispanic	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00
African American	-0.01*	0.00	0.00	0.00	-0.01**	0.00	0.00	0.00
AIAN[a]	0.00	0.01	0.01***	0.00	0.01	0.01	0.01***	0.00
Foreign Born	-0.02*	0.01	-0.01*	0.00	-0.02**	0.01	-0.01*	0.00
FHFK[b]	0.07***	0.01	0.03***	0.01	0.06***	0.01	0.03***	0.01
Less than HS Education	0.03***	0.00	0.03***	0.00	0.03***	0.00	0.03***	0.00
Under Age 18	-0.04***	0.01	-0.01***	0.00	-0.04***	0.01	-0.02***	0.00
Over Age 65	-0.01*	0.01	-0.00	0.00	-0.02*	0.01	-0.00	0.00
Metropolitan Status	-0.04	0.04	-0.05	0.04	-0.06	0.04	-0.07	0.04
Agriculture	0.00	0.01	-0.01**	0.00	0.00	0.01	-0.00	0.00
Mining	-0.00	0.01	-0.02***	0.00	-0.00	0.01	-0.02***	0.00
Manufacturing	-0.01*	0.00	-0.01*	0.00	-0.01*	0.00	-0.01	0.00
FIRE[c]	-0.03***	0.01	-0.04***	0.01	-0.03***	0.01	-0.03***	0.01
In-Migration					0.01	0.01	-0.00	0.00
Construction					-0.02*	0.01	0.01**	0.01
Unemployed					0.02*	0.01	0.02***	0.01
Spatial Lag (ρ)	0.19***				0.20***			
Spatial Chow Test (χ^2)	33.19**				47.78***			

* $p \leq 0.05$
** $p \leq 0.01$
*** $p \leq 0.001$
[a] American Indian/Alaskan Native
[b] Female-headed Families with Kids
[c] Finance, Insurance, and Real Estate

Table 4. Hispanic Population Composition: Mean Comparisons across Hispanic Migration Regimes, ACS 2006-2010

Hispanic Variables (%)	Average for Established Destination Counties (N = 326)	Average for New Destination Counties (N = 315)
Poverty Rate	25.1	28.1***
Foreign Born Concentration	26.7	47.2***
Educational Attainment (Less than High School)	43.9	47.7***
Family Composition (Not Married)	51.7***	49.4

Note: The foreign born estimates are from the 2005-2009 ACS.
* $p \leq 0.05$
** $p \leq 0.01$
*** $p \leq 0.001$

The migration regime results suggest that the *percent Hispanic*-county poverty relationship is relatively constant across migration destination types (see Model 1 in Table 3). The *percent Hispanic* coefficient is positive and non-significant for both migration destination types. This suggests that differences in the relationship across migration destination types are not the driving force behind the observed relationship non-stationarity across the United States.[14]

Further analysis indicates that the concentration of the foreign-born population and its relationship with county poverty explain initial variation in the Hispanic relationship across the migration regimes (not shown). In a regime model identical to the one reported in Table 3 aside from the exclusion of *percent foreign born*, the coefficient for *percent Hispanic* in the new destination regime is negative and significant (β = -.007, $p < .05$). In contrast, the coefficient for percent Hispanic in the established destination regime has a positive sign but is non-significant (β = .001, $p > .10$).

Percent foreign born is traditionally viewed as a composition variable. Yet, it is unclear if this measure is reflective of composition or a feature of the place.[15] Contrary to what would be expected by a composition explanation, *percent foreign born* is negatively related to county poverty.[16] It is possible that *percent foreign born* mediates *percent Hispanic's* negative relationship with poverty in new destinations because counties with large immigrant populations have strong economies. Drawing from the latter interpretation, this would suggest that the minimal spatial differentiation in the Hispanic concentration coefficient across migration regimes is explained by Hispanic concentration's link to strong local economies in new destinations.

Hispanic Composition Analyses

To assess the role of spatial differentiation in the composition of the Hispanic population we compare the percent of the Hispanic population that is poor, that has less than a high school education, that is not married, and/or that is foreign born in each regime (Table 4).

The average Hispanic poverty rate is higher in the new destination counties compared to the established destination counties ($p < 0.001$), which is contrary to a positive migrant selection story but consistent with the other compositional differences results. The concentration of foreign-born within the Hispanic population is particularly high in new destinations compared to established destinations (47.2 percent vs. 26.7 percent, respectively), as suggested by previous research (Crowley et al. 2006; Durand et al. 2005; Saenz et al. 2007). Similarly, a larger percentage of Hispanics have less than a high school education in new destination counties than in established destination counties ($p < 0.001$). Contrary to the other composition comparisons, the comparison of the percentage of Hispanic families headed by un-married household heads suggests a compositional advantage for Hispanics in new destinations relative to Hispanics in established destinations ($p < 0.001$).

14 These results are consistent with sensitivity analyses that adjusted for new destination counties in the Southeast that had positive local estimates for *percent Hispanic* in the GWR analysis. We estimated supplemental regime models where new destination counties that are located in a state with positive local estimates (i.e. AL, FL, GA, NC, SC, and VA) were included in the established destination regime rather than in the new destination regime. The results suggest positive or minimally negative *percent Hispanic* coefficients for both regimes even after this adjustment.

15 Percent foreign born refers to all foreign-born individuals relative to the total county population; therefore, this measure cannot be used to inform arguments related to the concentration of foreign-born among Hispanics.

16 The negative coefficient for *percent foreign born* in our results may be unique among county poverty studies because our regime analysis only includes new and established Hispanic destinations. These counties may be distinct from other counties with less in-migration due to disparities in the volume of immigration to the different areas.

Despite the clear compositional disadvantage for Hispanics in new destinations compared to established destinations we found no evidence of a stronger positive association for new destinations in the regime analysis. This complex set of results suggests that the Hispanic contribution to county poverty is affected by more than just the characteristics of the local population. The economic strength of new destinations may have combined with the compositional disadvantage of Hispanics in new destinations to produce the null regime results.[17]

Supplemental Analyses

This leaves the relationship variation identified in the GWR analysis largely unexplained. Although the regime results suggest that differences related to the migration context capture some of the variation, it does not provide a comprehensive explanation. We conduct supplemental analyses to further investigate possible explanations.

First, we estimated the Hispanic composition averages for geographies derived from the coefficient clusters presented in Figure 3. The GWR results suggest that Hispanic composition may differ by state clusters rather than strictly by migration regime. These supplemental analyses indicate that differential composition may explain some of the variation, but not all of it. The cluster of southeastern states with a positive local Hispanic coefficient (Alabama, Florida, Georgia, North Carolina, South Carolina, and Virginia; also see Figure 3) has the highest average Hispanic poverty rate (29.2 percent), even compared to the southwestern states with a positive coefficient (25.0 percent). However, the states with negative coefficients also have a higher Hispanic poverty rate than the positive southwestern states (e.g. 26.6 percent for the northwestern states). This suggests that although the positive coefficients in the southeast may be reflective of a particularly disadvantaged Hispanic population, composition cannot explain the negative coefficients. Therefore, multiple processes are likely driving the contrasting patterns of association across space.

Second, we estimate GWR and migration regime models using 1990 data. 1990 is a useful comparison because it marks the early stages of Hispanic dispersion within the United States. We would not expect any variation observed in the 2006-2010 data that is related to migration to be evident in this time period since the dispersion had only just begun. On the other hand, time-constant geographic patterns may be indicative of engrained differences across place, such as spatial variation in the local dominant industry, natural resources, and social climate. Unfortunately, we cannot do a comparison of compositional differences because the Hispanic-specific data are not available in 1990.

Consistent with the results from the first supplemental analysis, we find evidence of multiple processes driving spatial non-stationarity in the Hispanic concentration relationship. As expected, the regime results are even weaker in 1990 than in 2006-2010 – *percent Hispanic* is non-significant even when excluding the concentration of the foreign born population (not shown). This suggests that differences between new and established destinations develop over this period that may be related to the migration process. However, they are still a minor part of the explanation.

The spatial pattern from the 1990 GWR results is surprisingly similar to that found for 2006-2010– a swath of positive coefficients originating in the Southwest; and separate clusters of negative coefficients in the Northwest and Midwest (not shown). Yet, there are notable differences. The most striking are the lack of positive coefficients in the Southeast and the emergence of positive coefficients in the upper Northeast (i.e. Connecticut, Maine, Massachusetts, New Hampshire, eastern New York, Rhode Island, and Vermont). This pattern of consistency and change is consistent with the argument that whereas the

17 However, we cannot exclude the possibility that there is no significant relationship in either the new or established regime because an increase in Hispanic concentration simply does not mean anything for county poverty when we are only examining counties of a certain regime type.

composition of the Hispanic population may explain the positive associations in the Southeast in 2006-2010, alternative explanations need to be considered for the Midwest, Northwest, and Southwest. We discuss possible explanations and the implications of our results for understanding why percent Hispanic is related county poverty below.

DISCUSSION

This research adds a unique perspective to research on place poverty. Previous research suggests that the spatial distribution of poverty is related to migration flows (e.g. Nord 1998; Nord et al. 1995) and that poverty covariates are not related to county poverty in the same way in all parts of the United States (Curtis et al. 2012). We take a new approach to understanding how migration affects spatial inequality by combining these research areas to assess the role of migration in explaining spatial differentiation in the Hispanic-county poverty relationship.

The implications of this research for understanding the meaning of Hispanic concentration, or concentrations of other disadvantaged populations, are multifaceted. Of most importance, our results suggest that we cannot rely strictly on explanations that imply that more Hispanics mean higher poverty rates because there is a larger disadvantaged population. Hispanics have a higher poverty rate compared to non-Hispanic whites in all areas of the United States (De La Rosa 2000; Schiller 2008; also see Crowley et al. 2006; Murdock et al. 1999), yet the relationship between Hispanic concentration and county poverty is not universally positive. This highlights the need to construct new explanations for poverty covariates, particularly racial/ethnic minority concentration, when shifting from individual to place-level analyses.

This conclusion is complicated by our findings for the positive associations in the Southeast. The Hispanics in the identified Southeastern states (see Figure 3) are particularly disadvantaged, as indicated by the high Hispanic poverty rate, relative to Hispanics in other parts of the country. The composition of the Hispanic population and the subsequent concentration of economic disadvantage may explain the positive association between percent Hispanic and county poverty in the Southeast. But a composition argument does not appear to explain the negative associations or potentially even the positive associations in the Southwest (for an alternative perspective on how composition affects poverty in the Southwest, see Murdock et al. 1999). This suggests that we need to develop context-specific understandings of the meaning of racial/ethnic concentration for local disadvantage that include both compositional and structural explanations.

Our regime results indicate that variation in the Hispanic relationship related to the migration context (i.e. new versus established destination) captures only a small portion of the geographic differentiation, if any. This suggests that alternative hypotheses need to be examined in future research, particularly for parts of the country outside of the Southeast. We provide a discussion of possible explanations below, drawing from our understanding of the GWR results.

The reliance of GWR on geographic proximity suggests that differences related to place that are unevenly distributed across space are crucial to understanding the relationship non-stationarity. Relatively permanent characteristics of the locations, such as natural resources and amenities, and local history, may explain differences in the relationship across space. Indeed, research suggests that a primary difference between the Southwest and other parts of the country is its history with Hispanics, particularly Mexicans. Exploitation of Hispanics in the United States was historically concentrated in the Southwest; and that history may have lingering effects on the social and economic position of Hispanics in the region (Saenz 1997; Snipp 1996). This difference in social/historical context may explain why we find a time-constant positive relationship in the Southwest but relatively stable negative associations in other

regions.

One means of generating the positive and negative relationships that could stem from the distinct social/historical context is differential levels of restriction on Hispanic residential location. That is, Hispanic mobility or residence in certain counties may be more or less restricted based on a region's social/racial context. In this way migration may still play a role, albeit a different one than examined here. Drawing from our results, this would suggest that Hispanics are largely confined to the most disadvantaged counties in the Southwest, yet concentrated in less disadvantaged places in the Northwest and Midwest, because their mobility choices are less constrained in the latter regions compared to in the Southwest. Future research building from the residential segregation literature could begin to assess this proposition by examining regional differentiation in the residential mobility of Hispanics and the reasons for those decisions.

We should note that this potential explanation is group-specific, meaning that the same region may display different associations depending on the observed racial/ethnic group, and the region of greatest disadvantage may differ for each racial/ethnic group (see Snipp 1996). In addition, although rooted in history, the social context may change in response to contemporary events, including the increasingly permanent residence of a racial/ethnic group in an area (for a discussion of the importance of temporal persistence for group relations see DeWaard 2013). For example, the position of Hispanics in previously accepting areas may decline with an increase in their local population (see Shutika 2008).

Our research also contributes to understanding approaches employed in spatial demography. First, it demonstrates the utility of spatially informed techniques, such as GWR and spatial regime analysis. Spatial approaches to county poverty provide a more complete picture of the relationships with county poverty than do standard OLS models that assume global associations. Second, this work illustrates the distinct, albeit related, concepts underlying GWR and regime analyses. GWR is strictly based on geographic proximity as defined by the spatial weights matrix, which lends itself to exploring place-based explanations for spatial non-stationarity in relationships (Fotheringham et al. 2002). On the other hand, regimes can be defined by geographic as well as social characteristics (Anselin 1990a). GWR and spatial regime analysis are similar in that they examine relationship heterogeneity, but they address different aspects of spatial non-stationarity questions. Third, this research exhibits how taking a spatially-informed or place-based approach can extend our understanding of social questions that have broad implications, like understanding the meaning of racial/ethnic concentration in relation to county poverty. Spatially informed techniques not only improve the fit of our models, they provide the means to address theoretical questions central to advancing research in the social sciences. Finally, this work demonstrates the utility of incorporating migration into the conceptual models of commonly studied phenomena such as the spatial distribution of poverty. Migration may be particularly important for understanding spatial phenomena given its inherent connection to the distribution of people, goods, and ideas across space.

Hispanic concentration is related to the level of economic disadvantage of a place in multiple areas of the country, yet it is differentially so. The social and geographic context has important consequences for how and why Hispanic concentration is related to county poverty. Additional research should employ a spatial approach to assess the extent to which our conclusions regarding the meaning of racial/ethnic concentration extend to other disadvantaged minority groups. The results of this and future research may have a critical impact on public discussions by challenging perceptions of racial/ethnic minorities as causing economic decline in a place (also see Crowley and Lichter 2009; Crowley et al. 2006). This is an important step towards addressing the underlying causes of poverty and its concentration in certain places.

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