Local Inequality in the Geography of Class-Differentiated Migration

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CHAPTER I

INTRODUCTION

> Geography is a catalog of questions, and the questions—not the phenomena, not the facts, not the method—are geographic.
>
> —Lukermann, 1964, p. 167

Attracting and retaining affluent households and skilled labor has been a component of local development in U.S cities since the earliest westward expansion (Ward, 1998). Efforts to attract these potential inhabitants have, however, taken on a new significance over the past forty years as the diffusion of neoliberal social policy, and the development of the post-productivist economy have effectively tied the prospects of local development to the financial, social, and human capital of a select population (Brenner & Theodore, 2002; Markusen, 2004; Scott, 2008),

The basic logic of this class-oriented approach to place marketing finds support in research linking local revitalization and growth to shares of local employment in technology-intensive and cultural production industries, and the availability of amenities that cater to affluent and skilled households (e.g., Florida, 2002; Glaeser & Gottlieb, 2006). Critics, however, suggest that this research and related policy approaches are myopic, at best, in their consideration of social stratification (Peck, 2005; Slater, 2006; Storper & Scott, 2009). The broader contexts of local growth, it is argued – from increasingly bifurcated opportunity structures (Scott, 2011), to the more overt antagonism of targeting low-income neighborhoods for sustained public divestment (Smith, 2002), and increasingly punitive approaches to law enforcement (McFarlane, 2006; Simon, 2007) – are either overlooked or tacitly accepted as a necessary feature of attractive places.

At issue is the relationship between household mobility and what Fainstein (2001, 2010) describes as the tension negotiated by local governments between promoting economic growth and the equitable provision of resources meant to foster inhabitants' quality of life and sense of community. Households, too, negotiate this tension, and often through the decision to move from one locale to another (Herod, 1997). This study will establish, however, that each aspect of migration – from the micro-level decision to move, to macro-level "pushes" and "pulls" – are divided on the basis of socioeconomic status. Inequality not only characterizes where and how people live, but where and how they move. Inequality, in other words, is in motion.

This study examines the relationship between inequality in motion and inequality in place. It is argued that the aggregate effects of household migration have an impact on communities that is more substantial than commonly recognized. Of particular interest, here, is the association between income dispersion in place, as manifest in local income inequality and segregated residential patterns, and income dispersion between places, affected by income inequality within the population of domestically migrating households.

This first chapter introduces two questions concerning household mobility and migration. First, to what extent are the household and structural conditions that affect migration differentiated on the basis of social class? Migration research, as it is largely concerned with the question of why people move, has tended to approach group difference in terms of the individual or household characteristics that distinguish migrants from nonmigrants. In contrast, the primary question addressed here is less concerned with *why* people move than *how* social class affects distinct patterns of movement.[1]

[1] While there is a growing literature on differential migration patterns between age cohorts (Bailey, 2009), and periodic studies which differentiate migrants on the basis of race and ethnicity (Nelson, Lee, & Nelson, 2009; Fulton, 2008), class-based differences between migrants are less frequently addressed.

A conceptual framework originally developed to explain migration in terms of an interaction between household and local characteristics (Cadwallader, 1992; Massey, 1990) is applied here as a basis for evaluating class-based differentials in migration. It is argued that social class affects qualitatively distinct migration patterns through each of the following components: 1) individual or household level decision-making, 2) objective characteristics of the places where households move to and from, 3) the interpersonal and interorganizational networks in which households are situated, and 4) the geography of interlocal networks through which households move.

Following the argument that class-differentiated migration patterns are distinct spatial structures, the second question turns to the issue of causality. Specifically, it asks how class-differentiated migration patterns affect locales. The relationship between migration and local context has largely been theorized and studied in terms of how locales affect migration. The converse remains as an underdeveloped area of research (Cushing & Poot, 2004; Ellis, 2012; Greenwood, 1985; Massey, 1990; Plane & Bitters, 1997). Two possible explanations for the lack of attention to migration's affect on locales – namely, the significant decline in migration rates since the mid-1980s (Figure 1), and the assumption that migration is epiphenomenal relative to economic base– are discussed, as are theoretical bases for understanding how migration affects locales.

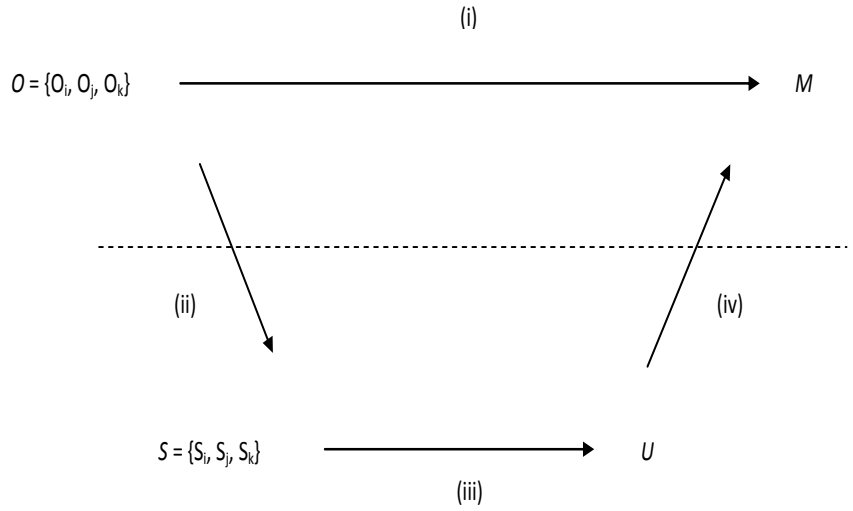


Figure 1. A conceptual model for linking macro- and micro-level approaches to migration. Source: Cadwallader (1992), fig. 1.2.

Migration and Group Difference

A basic tenet of migration research holds that migrating households are not representative of the population at large, but are distinguished by their acute sensitivity to systemic forces that induce or compel them to move (Borjas, Bronars, & Trejo, 1992). Migrants' sensitivity is affected by personal characteristics including age (Greenwood, 1997), earnings potential (Borjas, et al, 1992), employment status (Herzog, Schlottman, & Boehm, 1993), and educational attainment (Glaeser & Redlick, 2008; Krieg, 1991), while the systemic forces that "push" or "pull" households from one place to another are affected by dissimilarities between local labor markets (Saks & Wozniak, 2007), housing markets (Jeanty, Partridge, & Irwin, 2010), education systems (Charney, 1993), and proximity to natural and cultural amenities (Partridge, 2010).

While established theories of migration can be distinguished, in part, by how they frame the relationship between household sensitivity and social structure – in neoclassical theory, for instance, it is assumed that sensitivity is directly related to locational shifts in employment and

housing opportunity, while behavioral and human capital theories assume the relationship to be moderated by households' knowledge and subjective experience of their places of origin and their potential destinations – they nevertheless explain migration in terms of characteristic differences between migrants and nonmigrants.

Highlighting the interaction between household and systemic dynamics, Massey (1990), and similarly, Cadwallader (1992), propose a framework of the migration decision meant to advance "the conceptualization of migration as a social and economic process that involves inherent relationships across time, space, and levels of analysis" (Massey, 1990, p. 18). Here the distinction between migrants and nonmigrants is based on a collectively-made decision involving households and related others (i.e., family, employers, landlords, realtors, state and local governments) who have the ability to influence households' experience of their places of origin and their potential destinations. Kinship and friendship networks, for instance, can affect the decision to move by passing information between places of destination and origin, and by mitigating the risks of moving to a new locale (Massey & Garcia Espana, 1987; McHugh, 1984), while organizational networks can influence migration by transmitting a local or regional brand in an effort to attract households and firms (Hall & Rath, 2007; Molotch, Freudenburg, & Paulsen, 2000). This conceptual framework is multilevel in that it presents households as situated in social and economic structures that affect their decision to move, and it is multi-actor in that it assumes that links between households and social structure are constituted by networks.

In Cadwallader's (1992) depiction of the multi-level, multi-actor framework (Figure 2), the decision to move, *M*, is affected by a set of objective characteristics of place, *O*, and a set of individuals' or households' subjective characteristics, *S*, which can be specified according to the systemic and household factors already mentioned. Their interaction, however, introduces the

mediating effect of interpersonal and interorganizational networks (line ii) on places' overall attractiveness, *U*.

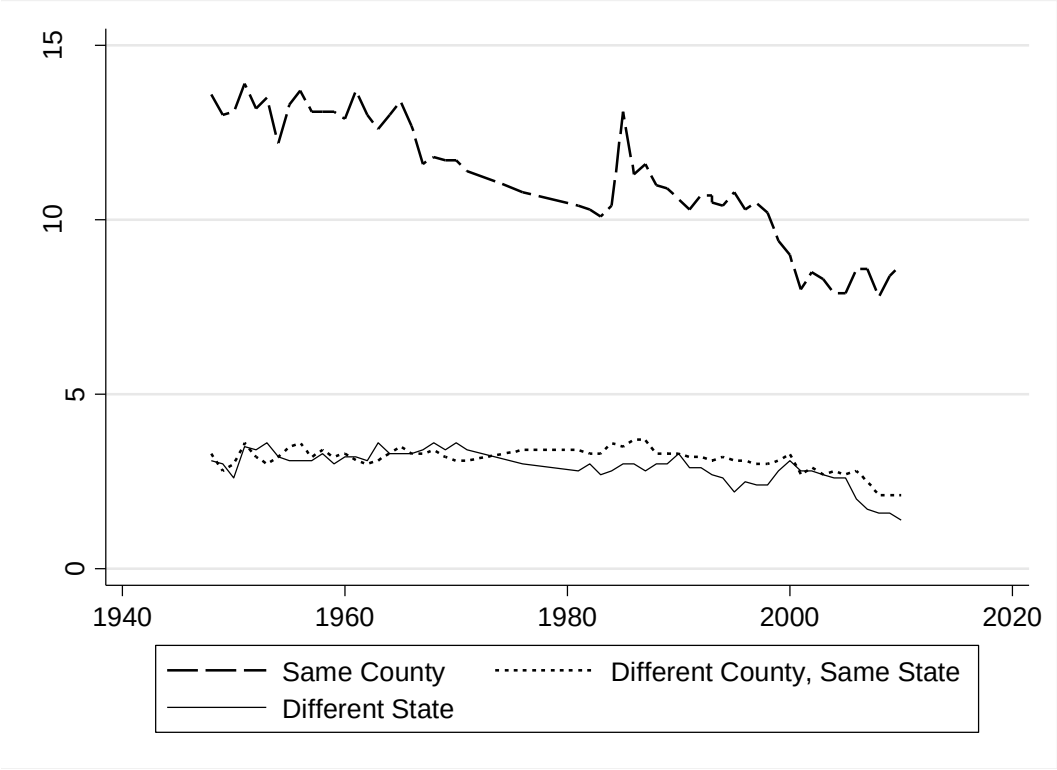


Figure 2. Rates of domestic migration by type, 1949–2009. Source: U.S. Census Bureau, Current Population Survey (2010).

Class-Differentiated Migration

Beyond framing migration in terms of the social and economic conditions that distinguish migrants from nonmigrants, the conceptual model illustrated above offers a framework for evaluating differences within the population of migrating households itself. Group differences are apparent in comparisons of rates as well as relative odds of migrating versus not migrating (Table 1). These figures, however, provide only a nominal indication of difference as it can be argued that groups are distinct to the extent that they move under different sets of micro- and macro-conditions. For example, the variation in migration rates between age cohorts offers no indication, in itself, that younger and older migrants are affected by distinct sets of household and place characteristics, or that they move through distinct types of social or spatial networks. Age-differentiated migration does, in fact, present categorically distinct patterns as personal motives for moving (Bogue, 2009), destination characteristics (Plane, Henrie & Perry, 2005), the composition of social networks(Adams & Stevenson, 2004) and the geography of spatial networks (Johnson, et al, 2005; Plane, 1989) vary significantly between age cohorts.

Table 1

Migration Rates and Odds by Age, Income, Sex, Race, and Educational Attainment, 2010-2011

	Same county			Same state, different county			Different state		
	Rate	Odds	OR	Rate	Odds	OR	Rate	Odds	OR
Age									
1–17	9.31	.11	1.58	2.11	.02	1.47	1.64	.02	1.35
18–34	13.73	.17	2.55	3.60	.05	2.74	2.75	.03	2.46
35–54	6.17	.07	—	1.51	.02	—	1.28	.01	—
55–69	2.62	.03	0.40	0.94	.01	0.59	0.87	.01	0.65
70 and older	1.84	.02	0.28	0.49	.01	0.30	0.60	.01	0.44
Income									
< $30K	11.13	.13	1.30	3.02	.04	1.14	1.82	.02	1.22
$30–$69,999K	8.91	.10	—	2.75	.03	—	1.55	.02	—
≥ $70K	5.23	.06	0.56	1.78	.02	0.61	1.45	.02	0.89
Sex									
Male	7.92	.09	—	2.40	.03	—	1.70	.02	—
Female	8.81	.10	1.12	2.62	.03	1.10	1.49	.02	0.88
Race									
White	7.62	.09	—	2.48	.03	—	1.56	.02	—
Black	12.34	.15	1.72	2.60	.03	1.11	1.76	.02	1.20
Latino	11.67	.14	1.60	2.29	.03	0.97	1.22	.01	0.82
Education									
Less than high school	7.92	.09	1.26	1.59	.02	0.99	1.06	.01	0.85
High School or Some College	6.38	.07	—	1.63	.02	—	1.26	.01	—
Bachelor’s or higher	5.26	.06	0.82	1.66	.02	1.02	1.86	.02	1.47

Note. Odds are the ratio of movers, by type, to nonmovers. Odds ratios are relative to the group in bold, representing largest share of population for each category. Source: U.S. Census Bureau, Current Population Survey, 2011.

Group effects on migration patterns extend beyond the example of age cohorts. After age, migration rates and odds of moving versus not moving are most varied on the basis of educational attainment and income status.[2] Again, group variation in migration rates offers only a nominal indication of more substantive differences in migration patterns. The criteria for understanding education and income-differentiated migration patterns (henceforth referred to as class-differentiated migration) as categorically distinct structures include 1) differences in the subjective experiences of movers, 2) objective characteristics of the places to and from which they move, 3) the composition of the social networks that affect their movement, and 4) the geography of the spatial networks through which they move.

Subjective Experience

Since 1998, the U.S. Census Bureau has included in its annual survey of household mobility (as a part of the Current Population Survey, or CPS) a set of items that ask respondents to identify the primary reason for their move. Responses, which include family, employment, housing and neighborhood, and health related reasons, give an indication of the subjective experiences that inform households' decisions to move.

Along with age, education and income status have a moderately strong association with group differences in reasons for moving (Table 2). Twenty-one percent of movers with at least a bachelor's degree and 17 percent of movers with incomes greater than $70,000, for example, cited a new job or job transfer as their primary reason for moving during the past year compared to six percent of movers without a high school diploma and eight percent of movers with income

[2] Income-based variation is greater within the population of Black migrants than in the population at large. Even in the case of movement within the same county, where the odds of moving versus not moving are 72% higher for Black households relative to White households, the odds are 188% higher for low-income Black households than for high-income Black households (CPS, 2011).

less than $30,000. About 20 percent of low education and low income movers cited less expensive housing as their primary reason for moving compared to nearly 10 percent of high education and high income movers.

Table 2

Measures of Association for Relationship between Group Status and Reason for Moving, 2010-2011

	Cramér's V
Education	.28
Income	.26
Age	.21
Sex	.05
Race	.10

Note. All *p* values < .001. Source: U.S. Census Bureau, Current Population Survey, 2011.

While the largest share of respondents across groups cited new or better housing as their primary reason for moving, differences between groups suggest that high-education and high-income movers are more likely to be motivated by work-related issues, while low-education and low-income movers are more likely to be motivated by family, neighborhood quality, and housing affordability issues. Similar findings are presented by Bogue (2009), whose analysis of 2004-2005 CPS data found that poor households tended to cite personal over work-related reasons for moving, while affluent households "most frequently give new employment as the reason for internal migration" (p. 37), and by Geist and McManus (2008), whose analysis of the

Integrated Public Use Microdata Series (IPUMS-CPS) for 1999-2005 found poor households more likely to cite reasons related to financial pressures and the desire for financial autonomy, and affluent households more likely to cite job offers and job transfers as their reason for moving.

Place Characteristics

The qualitative content of decision-making is contingent, in part, on households' position in local labor and housing markets (Galster & Killen, 1995). Inasmuch as jobs and housing – as "push" and "pull" factors that affect the decision to move – present concrete features of what can be understood abstractly as local structures of opportunity and constraint (see Cox & Mair, 1989), class-based migration patterns are distinct to the extent that local opportunity structures are differentiated on the basis of class.

Low-status households. The relationship between decision-making and household position within local opportunity structures has largely been explored in the context of poor households residing in areas of concentrated poverty (e.g., Wilson, 1987). With specific regard to household mobility, the characteristic "hypermobility" of poor households, or the pattern of frequent and quick judgments made in the search for affordable housing (Foulkes & Schafft, 2010), is predicated on households' marginal status in both labor and housing markets.

With the heightened attention to concentrated poverty since Wilson's (1987) *The Truly Disadvantaged*, and the subsequent development of mobility-based urban housing policies meant to deconcentrate poverty (see Imbroscio, 2012), it should be clarified here that the operant characteristic of place affecting low-status migration is not the degree to which poverty is spatially concentrated, but rather the degree to which the opportunity structures that affect places in total are bifurcated.[3] On this point, Nord (1998) argues, "the poor as well as the nonpoor move in response to real economic opportunity, but the migration patterns of the two groups differ

[3] This is not to argue that the two are not interrelated, or that disadvantage is not magnified by the spatial concentration of poverty. Rather, it is to suggest that opportunity structures, or what Galster and Killen (1995) describe as the differential sets of potential that emerge from the interaction of local labor, housing, education, political and criminal justice systems, represent a higher-order construct.

because the opportunities that attract them differentially are mixed in varying proportions in different places" (p. 331).

High-status households. The relationship between decision-making and local opportunity structure is also evident in high status migration patterns where moves based on job offers and transfers are contingent on higher levels of household integration into labor markets. There has been some debate in the past decade as to whether affluent migration, or more generally, skilled migration, is driven primarily by labor markets or by amenities. Labor and amenity-based theories similarly acknowledge that skilled migration has historically been grounded in geographic dissimilarities in economic productivity and wages (Clark, et al, 2002; Graves & Linneman, 1979; Storper & Scott, 2009), and that amenities have always played a role in the locational decisions of firms and households (Myrdal, 1957; Scott, 2010). Amenity theorists, however, contend that skilled migrants' traditional search for higher wages has been supplanted by the search for favorable climates, and recreational and cultural experiences, particularly following the technological revolution of the 1970s and the development of the so-called "knowledge economy" (Clark, et al, 2002; Partridge, 2010).

Given the level of agreement between labor and amenity theorists on the point that skilled migration is affected by the interaction between labor markets and amenities, and that that interaction is increasingly significant in a post-productivist economy (Clark, et al, 2002; Scott, 2011), the distinction between jobs and amenities would seem to be more a rhetorical than substantive grounds for debate.[4] If there is a debate, it may be better characterized as political than as empirical or theoretical, as Peck (2005) suggests with the observation that amenity research may be as much entrepreneurial as it is an academic enterprise.

[4] "Rhetorical" is not to suggest unsubstantial, but rather that the distinction between amenities and jobs is evident primarily as discourse (see Harvey, 1996).

The value of framing the debate as political discourse is illustrated by turning briefly to empirical support for amenity migration to rural areas. Rural migration has been of particular interest to amenity theorists given the history of economic marginalization to which rural places have been made subject, and the relative likelihood of their having high concentrations of natural amenities. As Partridge (2010) argues, skilled migration towards rural areas "blessed with natural amenities (which) faced significant economic barriers in the mid twentieth Century" (p. 524), should offer compelling evidence of households' attraction to amenities over jobs.

Empirical support for amenity migration to rural areas is, indeed, compelling, but not for the reason that Partridge suggests. Numerous studies (e.g., Deller, Lledo, & Marcouiller, 2008; Shumway & Davis, 1996), for instance, find that amenity migration is conditioned by an established tourism industry. McGranahan, Wojan, and Lambert (2011) find that rural amenity migration of the "creative class," in particular, is contingent not only on places' aesthetic appeal and proximity to outdoors recreation, but also on an established presence of business, financial, and professional services. Amenities that attract, in other words, are amenities that have already been integrated into an economy based on the interdependency of urban and rural areas (Lichter & Brown, 2011). This suggests that the defining characteristic of place at the crux of the debate is neither jobs nor amenities generically, but, rather, specific local interactions, or networks, between households, firms, and local governments seeking to integrate locales into broader systems of production and consumption.

Social Networks

The components of class-differentiated migration systems described to this point – households' subjective experiences in interaction with local opportunity structures – are both components of social networks, or connections between sets of individuals, groups, and

organizations. As described earlier, household connections with family members and organizations across a field of potential destinations affect the decision to migrate. Beyond affecting decision-making, these connections also constitute the places that households move to and from, as labor and housing markets do not operate in places so much as through social networks (Bourdieu, 2005; Fligstein, 2002; Granovetter, 1985; Peck, 1996).

An extensive literature addressing the relationship between class and social networks has characterized low-status households as situated in insular patterns of relationship made tenuous by threats of deprivation and the potential for violence, but nonetheless regulated by norms of trust and reciprocity (see Sanchez-Jankowski, 2008; Venkatesh, 2006). Relational patterns of high-status households, on the other hand, are characterized as resource-rich and expansively integrated across groups and organizations (see Granovetter, 1983; Nicholls, 2009). Social capital theorists, concerned generally with the material and affective resources differentially derived from networks (Lin, 2000; Warren, Thompson, & Saegert, 2001), argue that these distinct patterns of relationship are a function of groups' integration into institutions of economic and cultural production (Bourdieu, 1986). In relation to migration, specifically, studies following households beyond the initial decision to move suggest that these relational patterns tend to be sustained through the migration process, and are represented, in the case of low-status households, by the "discouraged migrant" (Davanzo & Morrison, 1981), and, in the case of high-status households, by what might be called the "empowered migrant."

The "discouraged migrant." Twenty to 30 percent of migration flows in a given year are based on migrants returning to their places of origin (Davanzo & Morrison, 1981; Newbold, 2001). Included in these return flows are what Davanzo and Morrison (1981) describe as "discouraged migrants," or households who, within a year or two of moving, return to their

places of origin after finding that "the anticipated benefits of moving may not materialize at all" (p. 88). In a more recent study, Newbold (2001) found that while return migration is for many households a planned event, returns for low-status households are more likely unplanned and result from difficulties integrating in their places of destination. Integration is understood here more in an affiliative than in a purely economic sense as the long-term financial returns to migration for low-status households who do not return to their places of origin tend to be flat (Cadwallader, 1992; Yankow, 2003).

The "empowered migrant." Higher rates of return migration among low-status households exemplify the observation that "migration of the poor follows different, or at least modified rules" (Foulkes & Schafft, 2010, p. 93), as the pronounced mediating effect of social networks challenges the established assumption that migration "pushes" and "pulls" are based solely on macroeconomic conditions (Massey, 1990; Radu, 2008). Inasmuch as class-differentiated network effects indicate that low-status migrants do not follow the rules, they also suggest that high-status migrants are empowered to make the rules that affect the outcome of their own decision to move, as well as the potential for other households to migrate to the same destination. Ethnographic accounts of urban (Lloyd, 2011; Pattillo, 2007) and rural (Salamon, 2003) gentrification present high-status migrants as readily integrated into political networks that affect the course of their new communities' development. Empowerment, in these cases, is not based on personal attributes such as income status or educational attainment, per se, but on the value assigned to those attributes in a field characterized by local governments competing to attract potentially-mobile skilled and affluent households.

Spatial Networks

Finally, class-differentiated migration patterns constitute spatial networks. Like the personal and organizational networks discussed in the previous section, the spatial component of migration patterns is characterized by connections indicative of some quality of relationship between locales. Migration patterns, of course, represent only a facet of relationship between sets of places that might be connected in any number of ways. Economic ties are particularly influential on migration patterns, such that the relationship between economic and migration ties has come to represent a classic "chicken and egg" problem (Muth, 1971). Alternatively, a literature less concerned with resolving the issue of primacy than with situating both migration and economic development in their historical contexts, proposes that the spatial structure of migration patterns represent "migration regimes" (Plane, 1999, p. 326), or the confluence of economic, political, and demographic factors affecting general patterns of movement. Migration regimes have been typified by large scale population shifts such as the Great Migration, and Rustbelt-to-Sunbelt migration, and by smaller scale patterns of suburbanization and counterurbanization.

Class-differentiation in the current migration regime has frequently been framed in terms of "high-status mobility" and "low-status confinement." Castells' (2000) influential account of the technopolitical restructuring of space, for instance, declares that "elites are cosmopolitan, (but) people are local" (p. 446). Considering, though, that poor households, as mentioned earlier, are at least as likely to move long distances as affluent households (Foulkes & Schafft, 2010; Nord, 1998), and that the most recent CPS indicates that the odds of interstate migration are higher among low-income than high-income households, the premise that space, and with it, the potential for mobility, are bifurcated, requires further analyses dealing specifically with the interaction of low and high-status household migration patterns.

To this point, the composition of low and high status migration patterns have been presented as qualitatively distinct structures. The basic components of migration patterns – the subjective experiences which affect households' decisions to move, the characteristics of the places that they move from and to, and the social and spatial networks which they move through – are each differentiated on the basis of social class. The following section turns to the question of causality and develops the theoretical basis for approaching local context as affected by patterns of household mobility.

Migration and Locales

Income differentials in the population of migrating households are a potentially significant determinant of local context (Plane and Rogerson, 1995). Hypothetically, if a metropolitan area were to undergo a period of increased inmigration (outmigration) of middle- and high-income households, coupled with increased outmigration (inmigration) of low-income households, some measure of change in that area's fiscal or political climate would likely be attributable to differential migration. This, or any scenario, involving the balance of differential migration and its effect on local context, presents an underdeveloped area of research as the dominant concern in migration studies has been with the determinants of migration rather than its effects on local context (Cushing & Poot, 2004; Greenwood, 1985; Massey, 1990; Plane & Bitters, 1997). Before reviewing research on migration's effects on locales, this section begins with an overview of the theoretical challenges, as well as the bases of considering migration's impact.

Theoretical Challenges

Declining rates versus durable patterns of migration. The first challenge is presented by the fact that rates of U.S. internal migration have significantly declined over the past quarter century (Figure 2). Between 1950 and 1985, the annual rate of domestic mobility in the United States averaged at 19 percent (Census Bureau, 2010). A substantial decline in the mobility rate, however, has brought the average over the last decade down to 13 percent per year. Early on, the decline was characterized by decreasing rates of mobility within counties against relatively stable rates of migration between counties and states. Since 2001, though, migration between counties and states has been decreasing such that the rate of intercounty migration within the same state is approaching two percent, while the rate of interstate migration is approaching one percent per year.

In light of the declining rate of mobility, and what he critiques as the pervasive myth of

American "rootlessness," Claude Fischer (2002, p. 178) has questioned if migration is at all relevant in contemporary community studies. The import, he argues, has less to do with overall rates of mobility than with the manner in which rates are demographically differentiated, particularly on the basis of income. After comparing 30 years of mobility rates between social groups, he states:

> The analysis reveals specific groups that experienced constant rates of mobility or even an increase in mobility, such as older people who rented, service workers, and the least educated. What these groups have in common it seems is economic marginality. And their increasing mobility, however modest those increases, may reflect their increasing marginality over the last few decades" (p. 193).

Regardless of its size in a given year, the population of internal migrants presents a distribution of income which, as shown in Figure 3, has been increasingly unequal over the past 15 years.

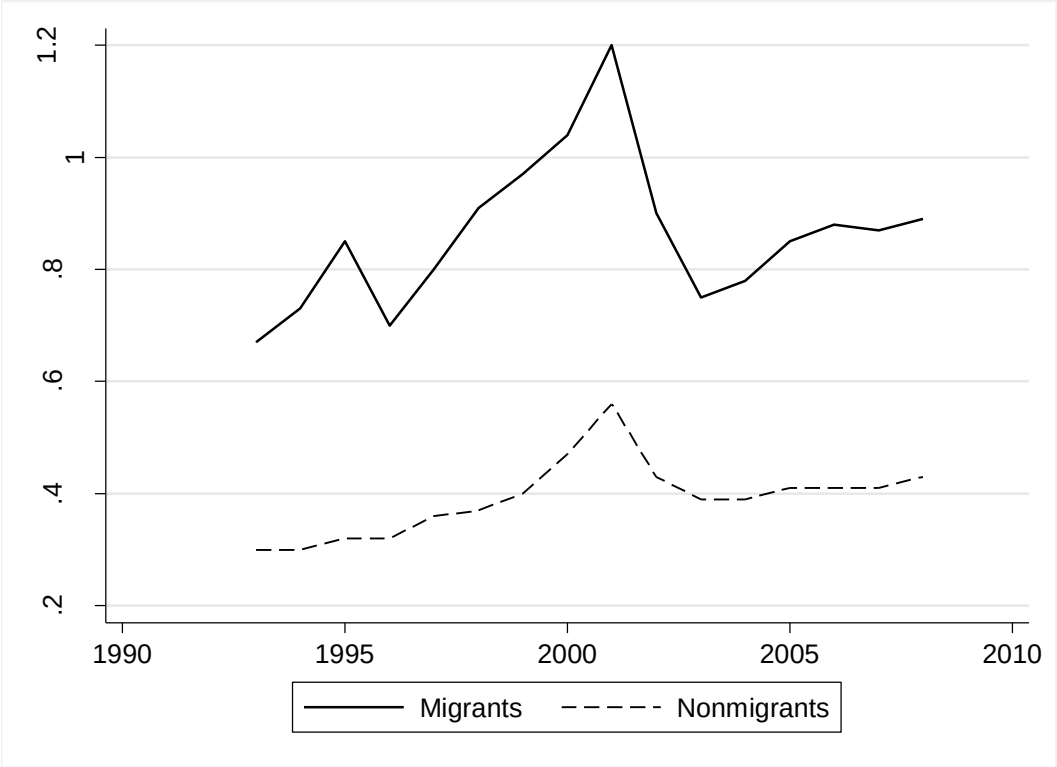


Figure 3. Comparison of income Dispersion, migrating versus nonmigrating households, 1993–2008. Source: IRS County-to-County Migration Data. Standardized Theil measures are presented to allow for comparison between groups.

Migration as epiphenomenal. The second challenge to considering migration as effectual comes with the tendency to study migration solely in terms of its being a response to underlying structural dynamics. Friedmann and Wulff, for example, have suggested that "migration… reflects merely a demographic adjustment to changes in the spatial structure of economic and social opportunities. . . . (It) is a derived phenomenon, a symptom of urbanization and not the thing itself" (as cited in Brown, Lobao & Digiacinto, 1999, p. 37). This is at least partly an acceptable proposition in that migrating households certainly respond to relative conditions of economic and social opportunity between locales. To conclude, however, that their movement is only epiphenomenal, and without effect reinforces what Herod (1997) critiques as

economic geographers' exclusionary focus on the locational decisions of firms to the neglect of considering households' role in shaping the characteristics of place. As a correction, Herod extends the logic of traditional explanations of migration to argue that, if indeed, migrants are responding to a set of potential economic or social benefits presented by their places of destination, it follows that the realization of that potential will fall less to capital than to migrants themselves. Recognizing the heterogeneity of migrating households, Herod suggests that differential migration may affect divergent patterns of consumption and political engagement in a given local context.

Theoretical Bases for Considering the Effects of Migration

The plausibility of researching the effects of differential migration draws on a theory of sociospatial relations which views locales as interdependent, networked members of city-systems. While neither a recent innovation (e.g., McKenzie, 1927), nor limited to analyses of contemporary urban conditions (e.g., Pred, 1973), this family of theories has, over the past forty years, come to represent the mainstream in urban studies following the mid-20th century cultural and technological revolutions and subsequent global economic reorganization (Jessop, Brenner & Jones, 2008; Soja, 2000). Two contributions to sociospatial relations theory, namely Gunnar Myrdal's (1957) model of circular and cumulative causation, and an analytic developed in Marxian geography provide a basis for considering the effects of differential migration on locales.

Circular and cumulative causation. Given a basic assumption of interdependency between an object and the conditions in which it is grounded, traditional approaches to migration research already apply a theory of sociospatial relations. As has already been described, potential migrants are understood in terms of their sensitivity to the relative social and economic

conditions of their places of origin and destination. Households, in other words, are counted as units moving through a city-system characterized by a fluctuating dispersion of productivity and wages. Myrdal (1957) developed this basic understanding by positing an original condition of dispersion based on areas' proximity to natural resources. In his model, the natural advantage of resource-rich areas is expected to attract skilled labor which will, in turn, amplify their advantage over areas that are resource-poor, thus increasing the flow of migrants from poor to rich areas through a process of circular and cumulative causation. Myrdal's framework presents a dynamic system in which income dispersion and migration, are reflexively related. Specifically, migration is expected to affect city-systems in the domain of divergent or convergent paths of local growth and decline.

Where opportunity, in Myrdal's framework, is represented by labor markets, analyses of the reflexive relationship between internal migration and local labor markets in the U.S. have found that increases in inmigration tend to affect increases in local labor demand, albeit at varying magnitudes determined by wage structures and broader cycles of economic expansion and contraction (Gebremariam, et al, 2011; Greenwood, 1975; Greenwood, Hunt, & McDowell, 1986). Studies examining the extent to which skilled migration affects growth in some locales and decline in others have drawn attention to the circular and cumulative process of "brain drain," or the propensity for skilled migration to affect educational segregation between urban and rural places and neighborhoods within the same metropolitan area (Domina, 2006), and between declining and growing metropolitan areas (Hansen, Ban, & Huggins, 2003).

While Myrdal's framework and related analyses have largely focused on the relationship between labor markets and skilled migration, some attention has been given to circular and cumulative effects of migration at the lower tail of the income distribution. Studies representing

the "welfare magnet" debate, for instance, have addressed a centuries-old concern in public administration that perceived generosity in welfare benefits will have the circular effect of attracting poor households, thus increasing levels of poverty and demands for public spending (Allard & Danziger, 2000; Blank, 1988; Cushing, 2005; Gelbach, 2004). Studies attempting to reconcile the literature's conflicting findings suggest that welfare magnet effects are not uniformly distributed across space, but are associated with interstate migration under the following conditions: origin states have a relatively high concentration of poor households residing near a state border, origin and destination states are adjacent, and welfare payments are higher in the destination state (Cushing, 2005; Snarr & Burkey, 2006). Under these conditions, welfare magnet effects are limited to local migration within multistate metropolitan areas.

Marxian geography. Class-differentiated migration patterns present a challenge to theories which view the migration process as an equilibrating mechanism or as a household investment in human capital (Nord, 1998; Nord, Luloff, & Jensen, 1995). Neither spatial equilibrium nor positive returns on household investment can be expected as a general result of differential migration in a city-system which, itself, is characterized by differentiated opportunity structures. The expectation that the effects of class-differentiated migration would be limited exclusively to the domains of macro-level equilibrium or the micro-level development of human capital conflates geographic and social mobility, overlooking the different sets of opportunities and constraints that distinguish low and high status migrants.

Migration affects locales – but in what domain? The proposed research anticipates that class-differentiated migration patterns affect local income inequality and income segregation. This follows the theoretical contribution from Marxian geography of a network-based analytic which considers the development of local divisions of labor as a function of locales' position

within whole systems of production (Harvey, 1978; Lefebvre, 1991, Massey, 1995). Harvey (1978) illustrates using the example of development patterns in the mid-1940s, when interlocal flows of capital served to mitigate the risk of overaccumulation by diverting massive surpluses toward the development of labor and the built environment in suburban areas. Patterns of uneven development emerge both between and within locales as places become more or less central in the geography of capital investment. Shifting the framework from the field of capital mobility to household mobility, it follows that dispersions of household income within locales will be affected by how more or less central locales are in the geography of class-differentiated migration.

Income Migration and Inequality

This dissertation research advances the perspective that locales are situated in networked structures of migration, and that those structures, like locales, are characterized by the dispersion of household income. It is expected, then, that income dispersion within the population of migrating households affects income dispersion within locales. Previous studies of U.S. internal migration patterns have found that state and local measures of aggregate and per capita income are affected by income migration (Manson & Groop, 1999; Plane, 1999). The relationship between income migration and local income dispersion, however, has not been researched. Furthermore, studies of local income dispersion, measured in terms of overall income inequality and neighborhood income segregation, have not addressed these measures' association with income migration. By bridging research on income migration, local income inequality, and income segregation, the proposed study contributes to the understanding of income dispersion in its geographic contexts, and to the understanding of communities as situated in broader opportunity structures.

Income migration. Plane (1999) argues that "among the most significant impacts of inter-regional migration is the ability of place-to-place streams of movement to change the aggregate and per capita income levels of origin and destination populations" (p. 196). To illustrate, the more than $220 billion exchange in household income affected by migration between labor market areas (LMA) from 2009 to 2010 increased the level of aggregate income in the Austin, TX LMA by approximately $600 million. Migration, however, decreased the LMA's average income per household by approximately $53 as outmigrants, on average, had higher incomes than both inmigrants and nonmigrants. Similar analyses following Plane's (1999) approach have studied the effects of income migration on area aggregate and per capita income in the Mountain region (Shumway & Otterstrom, 2001), the Great Plains region (Vias & Collins, 2003), Public Use Microdata Areas (PUMAs) in the Mountian, Plains, and New England regions (Nelson, 2005), and a typology of places based on the spatial clustering of housing costs across the United States (Shumway & Otterstrom, 2010). To date, however, the association between income migration and local income dispersion has not been researched.

Whether in terms of relative position in the system of production and trade, or the internal sorting of population, the spatial dimension of local development is a function of household migration and inequality (Scott, 2006). The relationship between migration and inequality is represented in the following basic framework: regional inequality affects migration between areas which, in turn, affects local inequality between different skill levels within the same area. Migration research has tended to address only the first part of this framework, focusing on migration as a response to interregional inequality. Barro and Sala-i-Martin (2004), for instance, find that migration rates respond to regional wage disparities, but their association with relative rates of economic growth between regions, or convergence, is not significant. As discussed in the

previous section, though, regional convergence is not the domain of interest for the present study. Even if it were established that rates of interregional migration were positively associated with convergence, an equal dispersion of income across regions does not preclude local inequality (Massey, Rothwell, & Domina, 2009; Yamamoto, 2008).

Local income inequality. Analyses of the effects of migration on local income distributions are only a recent development and, so far, have been limited to effects on aggregate and per capita measures of income. Here, the discussion turns to the dispersion of earnings and the increase in inequality which has come to distinguish the U.S. income distribution as the most unequal of the world's affluent societies (Smeeding, 2005; Wallace, Gauchat, & Fullerton, 2011). After presenting two dominant narratives which explain the rise in inequality, the section concludes with a basic framework meant to synthesize the migration and inequality literatures by situating local inequality within class-differentiated patterns of household migration.

Human capital and skill biased technical change. After decades of decline, the level of income inequality in the U.S. reversed course in the early 1970s. Accounting for various sources of household income, the increase has primarily been driven by earnings (Kenworthy, 2007; Piketty & Saez, 2003). Early explanations of the upswing in inequality posit a model of skill-biased technical change (SBTC) of the national wage structure, where wages' response to increased demand for technologically-adept labor vaulted the earnings potential of skilled over unskilled labor (Eckstein & Nagypal, 2004; Katz & Autor, 1999).

Much of the SBTC literature has focused on the polarization of earnings within industries. Bound and Johnson (1992), for instance, found that the transformation of the wage structure through the 1970s and 1980s was strongly associated with a labor demand shift favoring experienced older workers and college-educated, presumably computer savvy, younger

workers across industries, including the traditionally "blue-collar" occupations. Noting that the dramatic increase in computer use during the 1980s was evident across all major industries, Krueger (1993) found that, by the end of the decade, wages of computer users were 18 percent higher than non-computer users after controlling for education, union membership, race, gender and occupation. More recently, Autor and Dorn (2011) have highlighted regional outcomes of SBTC, finding that between 1980 and 2005, wage polarization has been most pronounced in labor markets that, in the earlier time period, had higher concentrations of routine task-occupations in the middle of their wage distribution.

Along with a bifurcated wage structure within industries and the hollowing out of middle-range earnings, SBTC has also been applied to studies of income shifts at the upper tail of the earnings distribution. Where technological change has expanded the potential for productivity, it has also limited the highest payments to a distinct set of employees that compete to develop the necessarily singular "best idea" in their respective industries (Rosen, 1981; Saint-Paul, 2001).

***Historical institutionalism*.** While SBTC has been a durable explanation for the increase in inequality, it has been critiqued for its failure to explain the exceptional rates of increase in the U.S. and the United Kingdom compared to other affluent nations whose labor markets have been no less affected by technological change (DiPrete, 2005; Lemieux, 2008). The shortcomings of SBTC, along with disciplinary rifts between neoclassical economists and sociologists (Morris & Western, 1999; Weeden, et al, 2007), have lead to efforts at contextualizing the relationship between labor markets and inequality through an historical institutionalist framework. Particularly influential is Harrison and Bluestone (1988), which situates SBTC in the context of the monetary crisis of the 1970s. Here, the increase in inequality is an outcome of the immediate

and long term political responses to the crisis, including the conversion of the U.S. Dollar to fiat currency, the deregulation of the financial services sector, and the automation and overseas deployment of manufacturing. More than a market response to demand shock, the historical institutionalist narrative argues that SBTC is only a facet of the technopolitical restructuring of the entire system of production.

The social and political effects of restructuring have varied considerably between locales (Brenner & Theodore, 2002; Jenkins, Leicht, & Wendt, 2006), allowing for empirical studies of the relationship between local inequality and changes in wage structure, welfare policy, and the influence of organized labor. This literature, however, has not addressed migration's role in affecting local inequality. An exception is Molder, Alderson, and Nielsen's (2009) analysis of inequality in US counties in 1970, 1980, 1990, and 2000. The study regresses county-level Gini coefficients on measures of county economic development, a set of measures reflecting the degree of heterogeneity in occupational structure, racial composition, educational attainment, and state-level measures of political context, including state union density, presidential election voter turnout, and public welfare spending. Cross-sectionally, the level of county economic development was found to have a significant negative effect on inequality across all four time periods. The effect of economic development diminished longitudinally, however, indicating that over the 30 years included in the study, income inequality increased in prosperous counties. Of particular interest here is the studies treatment of domestic migration, which the authors' argue is "captured by explicitly incorporating changes in population density over time (p. 1066). Based on the argument established thus far, however, changes in population density do not capture locales' position within patterns of class differentiated migration.

To date, the migration literature has analyzed the relationship between differential migration and aggregate and per capita income without consideration of income dispersion. The literature on local inequality, on the other hand, has only considered the effect of migration to the extent that it is represented by proxies which likely represent a type of migration rather than whole migration systems. Lacking is an empirical demonstration of the relationship between class-differentiated migration patterns and local income dispersion. The theoretical and empirical contributions reviewed here suggest that stratified places are situated in stratified migration systems. Local wage structure and interlocal migration systems represent two interrelated facets of sociospatial relations, where the former represents income inequality in place, and the latter, income inequality as it moves between places. Figure 4 provides a conceptual illustration of a labor market area dually-situated within income differentiated migration patterns.

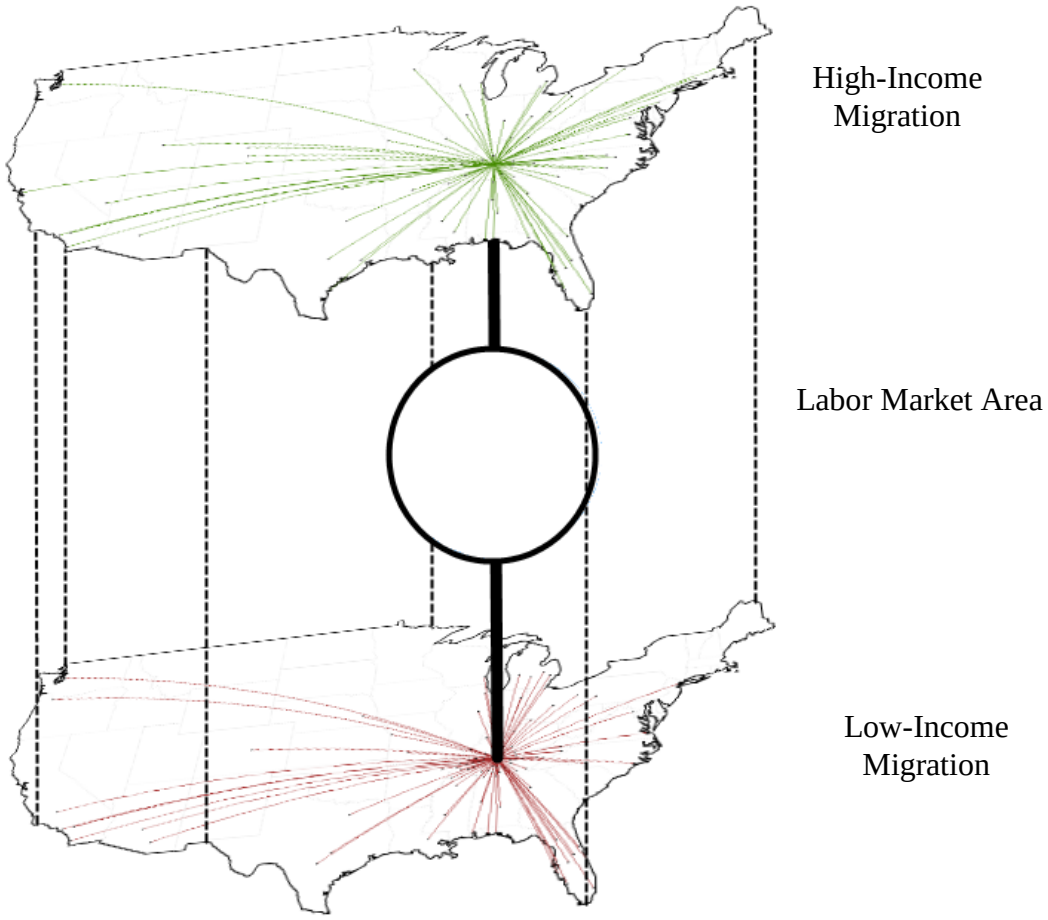


Figure 4. Conceptual illustration of LMA situated in income-differentiated migration patterns.

CHAPTER II

METHODOLOGY

Having established a framework for relating migration patterns and income inequality, such that the distribution of income over migrating households affects structurally distinct systems of movement, this chapter presents the research strategy used to analyze income differentiation in US domestic migration patterns. First, the guiding questions introduced in the previous chapter - to what extent does income differentiation affect structurally distinct migration patterns, and how do those patterns affect locales? – are restated along with their related hypotheses. Then, the data sets used to analyze migration patterns and locales are described. The chapter concludes with an overview of the research methods used to address each question.

Research Questions and Hypotheses

Income-Differentiated Migration Patterns

Income-differentiated migration is described in the previous chapter as a multilevel phenomenon that could potentially be studied from the household to the global scale. This study is ultimately multiscalar, relating local inequality and neighborhood segregation to household movement within and between labor market areas. It should be noted that this study is principally concerned with internal migration patterns in the United States. There is no doubt that processes of internal migration are grounded in places that are more or less integrated into global territories of trade and migration, and there is evidence that internal and international patterns of migration are linked (Frey, 1996; Frey, et al, 1996; Walker, Ellis, & Barff, 1992). The interest here,

however, is in understanding the relationship between migration and income dispersion in the US context. As Ellis (2012) has recently argued, it is likely that the economic and political repercussions of internal migration patterns are at least as profound as that of transnational patterns.

The study begins, then, with a focus on migration patterns as spatial systems of interconnected locales. The scope and magnitude of income-differentiation of these spatial systems is analyzed from multiple perspectives, beginning with a holistic view of migration patterns, followed by a focus on specific pattern characteristics, and concluding with an analysis of how income-differentiated patterns relate to local labor and housing markets. Beginning in the most general terms, income differentiation of whole migration patterns is hypothesized as:

Hypothesis 1A. Income differentials within the population of migrating households will affect distinct migration patterns between classes.

Income-differentiation is also analyzed in terms of specific pattern characteristics, including the distances between interconnected LMAs, and levels of migration efficiency, or the extent to which connections between locales are unreciprocated. With regards to efficiency, in particular, higher migration rates among low-income households, and the relative frequency of their returning to their places origin can be expected to affect a structural distinction between high- and low-income patterns. A second hypothesis is stated as:

Hypothesis 1B. Relative to low-income migration patterns, high-income patterns will more efficiently redistribute population within the contiguous US. Conversely, low-income migration patterns will tend to be characterized by a churn, rather than redistribution of population.

Finally, income differentiation is analyzed in terms of how high- and low-income patterns respond to LMA labor and housing market characteristics. Given the motivational differences between high- and low-income households described in the previous chapter, a third hypothesis can be stated as:

Hypothesis 1C. High- and low-income migration systems significantly differ in their responses to local labor and housing market characteristics.

Local Income Inequality and Segregation

The previous chapter contends that, because locales are situated in income-differentiated migration patterns, and that these patterns reflect the distribution of income over migrating households, income-differentiated migration will affect local income inequality and segregation. Given the increasing inequality, nationally, can largely be attributed to changes at the upper tail of the income distribution, a hypothesis concerning migration patterns' impact on local income inequality is stated as:

Hypothesis 2A. Local income inequality has a significant positive association with place attractiveness in the system of high-income migration.

Finally, insofar as increases in income segregation have been attributed to concentrations of affluence, a hypothesis concerning migration patterns' impact on segregation is stated as:

Hypothesis 2B. Local income segregation has a significant positive association with place attractiveness in the system of high-income migration.

Data

The analyses combine multiple sources of secondary data related to U.S. domestic migration, local labor and housing market characteristics, and household income. As each of the

analyses builds off the assumption that income-differentiated migration patterns are categorically distinct, this section begins with data and measures related specifically to migration, and continues with place-specific measures of labor and housing market characteristics, income inequality, and income segregation. A summary of study variables is provided in Table 3.

Table 3

List of Study Variables

Variable	Description	Geographic unit	Coverage
Migration pattern			
TEDSTNC	Ellipsoidal distance of migration tie.	Inter-LMA migration tie	1993–2010
LEFFNCY	LMA-level migration efficiency	Income-differentiated migration patterns	1993–2010
NETCENT[a]	Net centrality of places based on overall connectivity, average distance and volume of in- and outmigration ties.	LMA	1993–2010
INTRMBL	Rate of mobility within LMA	LMA	1990, 2000, 2010
Labor and housing markets			
AVGWAGE[c]	Average wages by 3-digit NAICS codes (BLS Standardized)	LMA	2000
SECTPCT	Percent share of sector employment by 3-digit NAICS code (BLS Standardized)	LMA	1990, 2000, 2010
UNEMPLY	Annual unemployment rate	County LMA	1990–2010
EDUCHET	Educational heterogeneity	LMA	2000
RACEHET	Racial heterogeneity	LMA	2007–2011
RENTBRD	Percentage of renters with housing costs greater than 30% household income	LMA	1990, 2000, 2010
MRTGBRD	Percentage of homeowners with housing costs greater than 30% household income	LMA	1990, 2000, 2010
NTAMNTY	Average Natural Amenities Scale Score	LMA	1990, 2000, 2010
Income inequality			
GINICFT	Gini coefficient	LMA	1990, 2000, 2010
Income segregation			
INCMSEG	Rank-order information theory index	LMA	1990, 2000, 2010

[a] These are sets of variables measured for each of three income-differentiated migration systems

[b] Two sets of county-level variables will represent intra- and inter-labor market area migration

[c] Earnings in industries representing a facet of national wage structure are collapsed based on results of factor analysis.

Migration Data

Migration patterns are analyzed using county-to-county migration data obtained from the Internal Revenue Service (IRS) from 1992-93 to 2009-10. The number of households moving from county, or county-equivalent, *i* to county *j* in the course of a given year is estimated as the number of households filing tax returns in county *j* who, in the previous year, had filed in county *i.* Along with the count of tax returns, the data also provide the aggregate taxable household income constituting each county-to-county tie, x_{ij}.

Overall, it is estimated that these data represent roughly 80 percent of all actual county-to-county migration (Plane, 1998). Households not filing tax returns are not represented in the data. While this is certain to lead to an underrepresentation of poor households, it is difficult to determine the extent of underrepresentation as millions of exempt households unnecessarily file tax returns each year (IRS, 2007). Additionally, county-to-county ties involving less than ten migrating households are suppressed. The analyses described below will exclude a small number of cases in each wave of data reporting negative aggregate income. These values indicate that total credits exceed taxable income, and likely represent cases from the upper and lower tails of the distribution of income over migration ties. Lastly, as the analyses are concerned with spatial aspects of class-differentiated patterns, migration to and from Alaska and Hawaii are excluded to limit the influence of large distances.

Labor and Housing Market Data

County-level employment and wage data are obtained from the Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW) program. Longitudinal data from 1990 to the present have been uniformly coded by North American Industrial Classification

System two-digit industry codes. Housing market data are drawn at the county level from the 1990 and 2000 decennial census, and the 2007-2011 American Communities Survey.

Income Data

Measures of local income inequality and income segregation will be derived from county and census tract level income data from the 1990 and 2000 decennial census, and the 2007-2011 American Communities Survey. Tract data over the three time periods are made uniform through application of the Longitudinal Tract Data Base (LTDB) which interpolates previous years' data to the 2010 census tract geography (Logan, Xu, & Stults, 2012).

Analysis Strategy

The analyses described below draw on two novel uses of IRS migration data. The first takes advantage of the inclusion of aggregate household income data since 1993 to differentiate high- and low-income migration patterns. The second develops the tradition of structural analyses in geography by developing the network centrality measure, Net Attractiveness.

Income-differentiated Ties

The IRS county-to-county migration data will be manipulated to represent three types of migration patterns made distinct by the quality of their ties, or interlocal connections. Specifically, migration ties will be classified as having more or less income per household relative to a condition of perfect equality where every tie has a share of total income equal to its share of total household migration. Ties, in other words, will be grouped according to the degree to which they have more or less than their "fair share" of income given their number of

households. For each year, tie classification will be based on the between-group component of the Theil measure of income inequality, or Theil elements, calculated as:

$$T_i' = \left(\frac{h_i}{H}\right)\left(\frac{y_i}{\mu}\right)\log\left(\frac{y_i}{\mu}\right)$$

where i indexes county-to-county ties, h_i is the number of households constituting tie i, H is the total number of migrating households, y_i is average income per household for tie i, and μ is the average income per household for all migrating households. Extending the entropy metaphor on which the Theil index is based, values derived from the equation above indicate the extent to which a given tie's position in a field of income dispersion is more or less affected by equality decay, with positive values representing income gain and negative values income loss.

To illustrate, there are 76,319 ties, x_{ij}, in the 2009-2010 county-to-county migration data, representing a total of 5.2 million households and $221 billion dollars of taxable household income. For each x_{ij} where the balance of households and income presents an average income per household of y_i = $42,568, T_i' will be zero, indicating that that tie is within the condition of equal dispersion of income over households. As y_i decreases (increases) relative to $42, 568, T_i' is increasingly negative (positive) and weighted by the number of households, h_i.

Each value for T_i' in a given year will be recoded to create a categorical variable representing one of three tie types, x_{ij}^n : the bottom third of ties ($N \approx 25{,}440$, in the case of the illustration above) will consist of county-to-county ties with the lowest average income per household, the middle third will consist of ties having slightly more or less money per household than the average tie, and the top third will consist of ties having the highest average income per household.

Theil element values and their corresponding categories only reflect the average income per household of the ties themselves and reveal nothing about the distribution of income within a

given tie. It may be, for instance, that a low-income tie includes some affluent households, or that a high-income tie includes poor households. Nevertheless, the proposed method for differentiating ties does allow for the analysis of three distinct types of migration patterns, as the mean household income in the patterns comprised of low-income ties will be significantly lower than mean household income in the patterns comprised of high-income ties.

Local and interlocal migration. Income-differentiated ties are aggregated to reflect migration patterns between local labor market areas (LMA). This is, first, a matter of necessity as comparing patterns in the manner proposed here assumes that the interlocal ties in one type of pattern are, at the very least, possible in another. Because the data allow for only one county-to-county relationship, c_{ij}, comparisons of high- and low-income migration patterns are precluded at the county level. Alternatively, patterns composed of income-differentiated ties between LMAs are comparable given the possibility of places at this scale relating in more than one type of income-differentiated system (Figure 5).

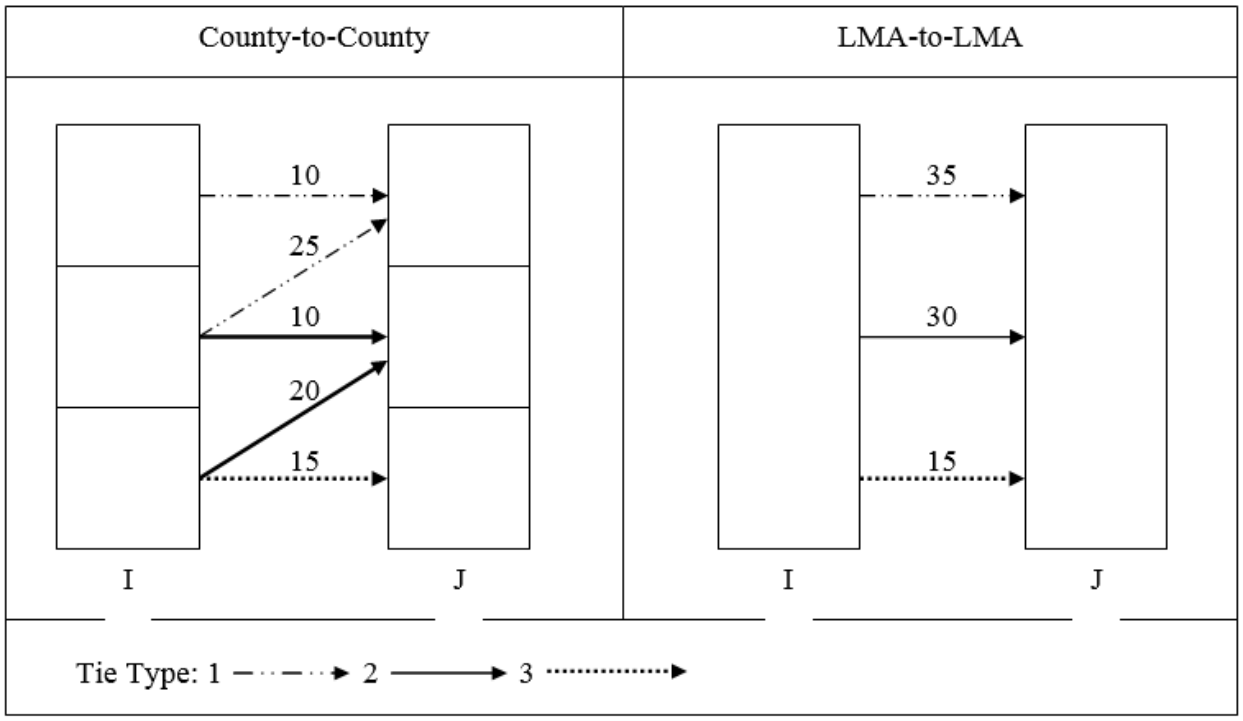


Figure 5. County-to-county versus LMA-to-LMA migration.

Additional motivation for aggregating ties to the LMA comes from the driving interest of the proposed research, namely, local income dispersion. Considering that income crosses county lines with commuting households, the LMA, even as an administratively and statistically defined unit of analysis, offers a suitable approximation of the functional space of local labor markets (Bureau of Labor Statistics, 2011). In the context of migration research, however, the LMA introduces the modifiable areal units problem as measures including migration rates, migration efficiency, and place attractiveness are influenced by units of analysis size. LMAs in the Far West, Southwest, and Rocky Mountain regions are generally larger (Figure 6), and hence, more likely to present migration-related measures that are muted in comparison to those derived from LMAs in other regions. These biases may be curtailed by considering LMAs as situated in both regional and national migration systems. Drawing on the distinction between regional and national migration systems validated in Plane and Isserman (1983) and Plane (1984), migration ties that begin and end in a given region will be used to measure LMAs' regional attractiveness, while interregional ties will be used to measure places' national attractiveness.

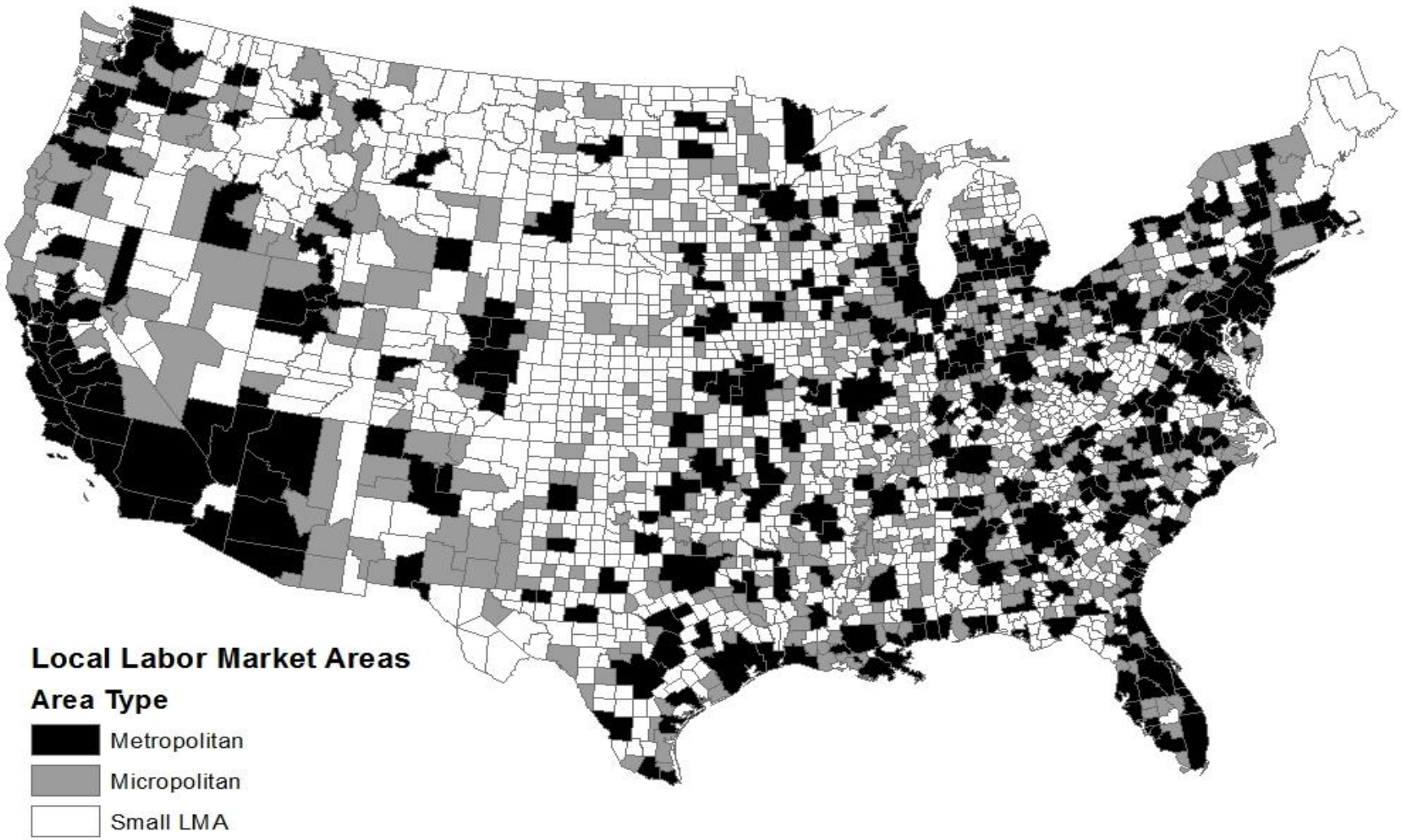


Figure 6. Map of labor market areas in contiguous US.

Net Attractiveness

Social network analysis provides multiple approaches for describing the relative positions of nodes. These include degree centrality, which measures the number of a node's connections, or the cumulative strength of its connections when they are valued, say, by the number of migrating households constituting each connection; closeness centrality, commonly measured as the reciprocal of a node's maximal distance to all other nodes in the network; betweenness centrality, a measure based on how frequently a node bridges otherwise disconnected nodes. Not all approaches to measuring node centrality, though, are appropriate for all networks, or the modes of relationship on which networks are based (Borgatti, 2005). In the case of the proposed study, the migration networks that will be analyzed are particularly dense, and will be drawn from an annual aggregation of de-identified households, rendering most centrality measures either meaningless or inappropriate. Locales, however, are more or less connected to each other, and, for each locale, the volume of a given connection may change over time. Degree centrality is appropriate for the proposed analysis, and will offer an informative description of how more or less central locales become over time in each of the three migration systems.

As originally proposed by Freeman (1979), degree centrality simply represents a count of a given node's connections to all other nodes in a network. In the case of a directional network, where nodes both send and receive connections, a nodes degree centrality is the cumulative count of its indegrees, or connections received from other nodes, and its outdegrees, or the connections that it sends out to the rest of the network. The measure was refined in Barrat, et al, (2004), who proposed that, in the case of valued connections, degree centrality is based on the sum of the values of each connection sent or received by a given node.

Both of these approaches are somewhat problematic in their application to migration networks. First, the assumption that a greater number of outdegrees positively affects central

position, while valid in the case of social networks involving affiliation or information sharing, does not hold for migration networks. This is addressed simply by using a measure of net, rather than total centrality, where the effect of inmigration is offset by outmigration. Second, centrality measures in social network analysis are typically aspatial which is problematic given that centrality in migration networks is positively affected by distance (Newbold & Peterson, 2001). Noting that conventional measures of migration patterns do not, by in large, account for spatial distance, Newbold and Peterson (2001) proposes a distance-weighted measure of net attractiveness. Unresolved in this approach, however, is the issue of connectivity. Following the assumption that migration is conditioned by households' awareness of potential destinations (see Cadwallader, 1992), higher levels of indegree connectivity, all else being equal, should pull places toward centrality.

The centrality measure proposed here is based, first, on individual ties' volume and distance. Tie volume is the number of households in a given tie expressed as a proportion of the total households for its point of origin, and is calculated as:

$$V_{ijkl} = \frac{m_{ijkl}}{m_{ik} + n_i}$$

where *i* indexes origin and *j*, destination labor market areas for migrants, *m*, in region *k* in income group *l*, and *n* is non-migrating households. The contribution of the number of households to strength is calculated as a proportion to minimize the bias of large places which would otherwise have stronger tie values based solely on the size of their population. Similarly, given the variation in regional size, and the observation that distance decay parameters are not constant, but, rather, place dependent (Elridge & Jones, 1991), the contribution of distance, *D*, to tie strength is normalized by region and income group, and calculated as:

$$D_{ijkl} = d_{ij} - \min(d_{kl}) \,/\, \max(d_{kl}) - \min(d_{kl})$$

Finally, tie strength is calculated as the arithmetic mean of the contribution of volume and distance:

$$S_{ijkl} = (V_{ijkl} + D_{ijkl})/2$$

Given the regional variation in the number of LMAs, and, hence, possible ties, calculating in-degree centrality begins by normalizing the number of in-degrees with the equation:

$$NI_{jkl} = I_j - \min(I_{kl}) \,/\, \max(I_{kl}) - \min(I_{kl})$$

In-degree centrality for a given LMA in region *k* for income group *l* is then calculated as the weighted geometric mean of its normalized number of in-degrees and the overall strength, *S*, of its ties:

$$IC = NI^{.4} * (\sum S)^{.6}$$

Using the same procedure is used to calculate outdegree centrality, normalizing outdegrees instead of indegrees, a labor market area's net centrality in a given regional and income group pattern is calculated as the difference between indegree and ourdegree centrality:

$$NC = IC - OC$$

Income-Differentiated Migration Patterns

The first set of analyses, addressing the scope and magnitude of income differentiation in US domestic migration patterns, first compare high- and low-income patterns holistically, and then on the basis of the specific components of distance and migration efficiency.

Pattern correlation. Quadratic Assignment Procedure (QAP) correlation is used to test the hypothesis that migration patterns within a given system do not strongly predict patterns in other systems. QAP correlation determines the extent to which a network grounded in one type of relationship, say, the exchange of high-income households, predicts network composition

between the same nodes in another type of relationship - the exchange of low-income households, for instance. This involves a two-step process which begins by determining the actual correlation coefficient between tie values in each of the migration systems being compared. In the second step, a correlation coefficient is generated using the tie values in a given system and randomly permuted values in the system with which it is being compared. After hundreds of repeat random permutations, QAP produces a significance level indicating the proportion of permuted correlations that were equal to or greater than the actual correlation coefficient. QAP correlation will be used to compare income-differentiated systems cross-sectionally and longitudinally.

Geographic distance. Using geographic coordinates of county centers of population obtained from the Census Bureau, labor market area location is the mean latitude and longitude for counties nested in the same labor market area. Tie distance is measured as the ellipsoidal distance between labor market areas. Average distances of ties comprising high- and low-income patterns are compared using a repeated measures analysis of variance (ANOVA).

Migration efficiency. Migration efficiency measures the extent to which migration over a given time period effectively redistributes a population between places. In its application to whole systems, efficiency is calculated as:

$$E = 100 \, \Sigma \, |I_j - O_j| \, / \, \Sigma \, (I_j + O_j)$$

where I is the number of place j's inmigrants and O is its number of outmigrants. In this case, efficiency values range from 0 to 100, with low values indicating that population gains through inmigration were, for all places, canceled out by losses through outmigration. High efficiency values, then, indicate a substantial redistribution of the population affected by migration. The extent to which high- and low-income migration patterns differentially affect a churn versus

redistribution of population is analyzed using a repeated measures ANOVA comparing levels of migration effectiveness between and within income-differentiated migration patterns over time.

Continuing with the distinction between high- and low-income migration patterns, analyses turn here to the consideration of how LMA's are situated in each pattern type. Net attractiveness measures are used to test for spatial autocorrelation, and to analyze the differential association between labor and housing market characteristics and high- versus low-income attractiveness.

Spatial autocorrelation. High- and low-income migration patterns will likely be distinguished by the manner in which centrality extends beyond individual labor market areas to define subregional clusters of central, or attractive, areas. The extent to which net centrality scores are clustered within regional and interregional patterns is analyzed with Moran's I and Geary's C test statistics. Both distance and graph-based criteria are used to define neighboring LMAs.

Labor and housing markets. As a progression from the previous set of analyses which address the extent to which migration patterns are differentiated on the basis of income, this analysis will regress place attractiveness on local characteristics related to labor and housing markets and proximity to natural amenities. The same set of independent variables will be used to model attractiveness in both high- and low-income migration systems using a joint-model that will allow for the comparison of coefficients between groups. It is anticipated that the strength and direction of labor and housing market variables' association with place-attractiveness will differ between the two types of patterns.

Local Income Inequality and Segregation

Analyses addressing migration's impact on local income inequality and income segregation, respectively, begin with a description of overall levels of income migration. A typology of relative incomes, comparing in-migrant, out-migrant, and non-migrant incomes is then introduced to relate local income distributions to the distribution of income over migrating households. Finally, measures of income inequality and segregation are presented and incorporated in a multilevel model of change that analyzes the relationship between migration inequality and segregation over time.

Income migration. Following Plane's (1999) approach to identifying the extent to which changes in state aggregate and per capita income are attributable to migration, the analyses describe how income-differentiated migration systems differ in terms of the gross income redistributed by each, and will identify the local labor market areas most affected by flows of household income from 1993 to 2010.

Aggregate income. The change in local aggregate income attributable to migration consists of a net migration component, or the gain or loss in income based solely on the volume of an areas in- and out-migration flows, and a differential income component, which reflects the extent to which income change is based solely on the differences between in- and outmigrants' per capita incomes (Plane, 1999). The net migration component of aggregate income change is calculated as:

$$Y_N^{NMC} = N(y_I + y_O)/2$$

where N is net household migration and y_I and y_O are average income per household for inmigrants and outmigrants respectively. The differential income component is

$$Y_N^{DMC} = T(y_I + y_O)/2$$

where *T* is total migration, or the sum of in- and outmigrating households.

Income per household. Changes in area income per household affected by migration are based on income differentials between inmigrants, outmigrants and nonmigrants. An inmigrant/nonmigrant component of change reflects the change in area per capita income attributable to the income differential between an area's inmigrants and its base population of nonmigrating households, and is calculated as:

$$\Delta y^{ISC} = (y_I - y_S)IS \,/\, [(S + I)(S + O)]$$

where *S* is the count of an area's nonmigrating households and y_S is their average income per household. Similarly, an outmigrant/stayer component of change reflects the change in area per household income affected by the difference between outmigrant and nonmigrant income and is calculated as:

$$\Delta y^{OSC} = (y_S - y_O)OS \,/\, [(S + I)(S + O)]$$

Finally, an inmigrant/outmigrant component of change reflects the change in area per capita income attributable to income differentials between an area's inmigrants and outmigrants, and is calculated as:

$$\Delta y^{IOC} = (y_I - y_O)IO \,/\, [(S + I)(S + O)]$$

Typology of relative income. Given that the potential for income migration to affect local income distributions is determined by the relationship between in-migrant, out-migrant, and non-migrant income (Plane, 1999), high- and low-income migration patterns are compared in reference to a typology of relative incomes (Figure 7). This typology demonstrates that high- and low-income migration patterns tend to relate to the upper and lower tails, respectively, of local income distributions.

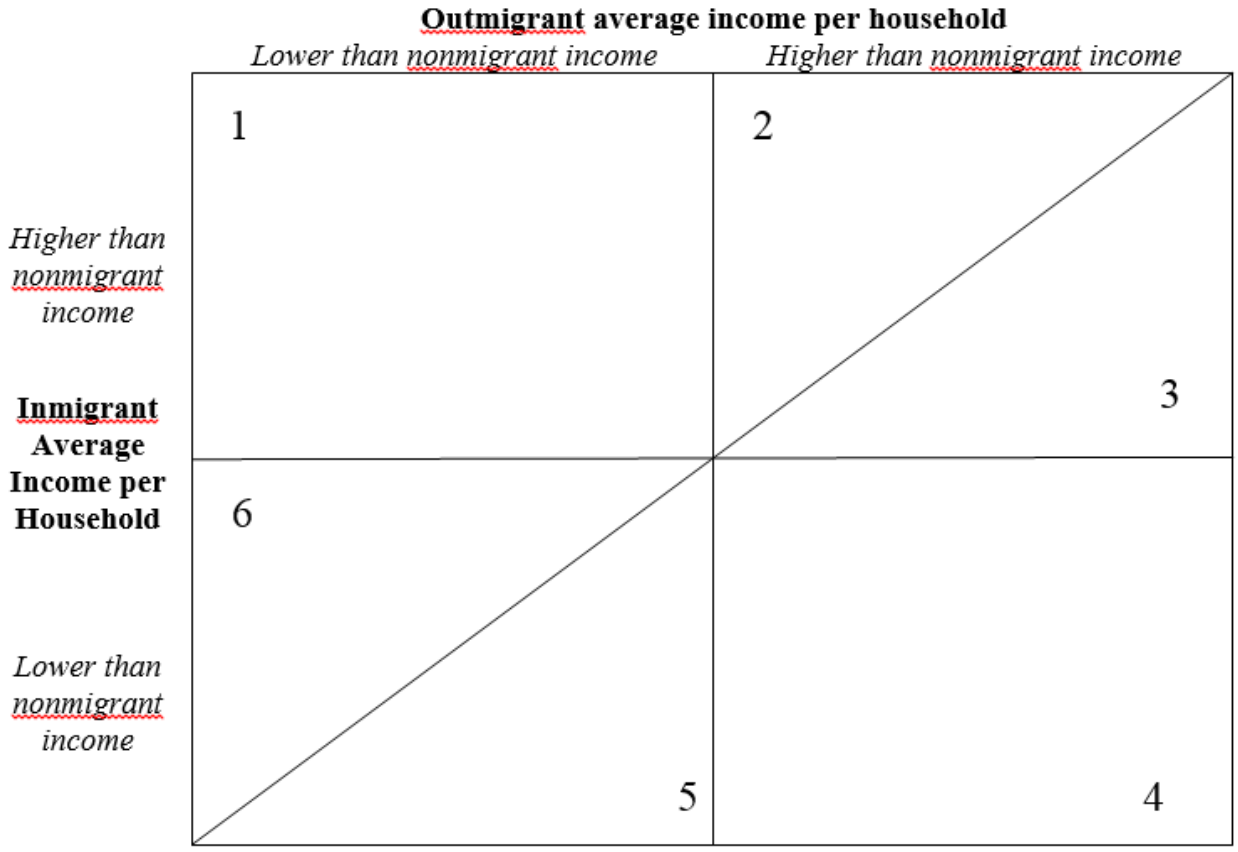


Figure 7. Typology of relative income levels of inmigrants, outmigrants, and nonmigrants. Areas above the diagonal have higher inmigrant than outmigrant average income per household; those below have higher outmigrant than inmigrant average income per household. Adopted from Plane (1999).

Income inequality. County and labor market area income inequality will be measured by Gini coefficients ranging from 0 to 1, reflecting perfect equality and perfect inequality, respectively. To obtain Gini coefficients using categorical data as is available in the census, Cowell (2009) proposes a three-step method involving the calculation of a lower-bound inequality estimate which assumes that all households in a given income category receive exactly the mean income of their category, calculated as:

$$G_L = \frac{1}{2} \sum_{i=1}^{k} \sum_{j=1}^{k} \frac{n_i n_j}{n^2 \mu} |\bar{y}_i - \bar{y}_j|$$

where n is the number of households, $\bar{y}$ is group mean income, μ is population mean income, and i and j index adjacent categories in a distribution ordered from i to k. An upper-bound estimate is calculated based on the assumption that individuals within the group receive income equal to either the lower limit, a_i, or the upper limit, a_{i+1}, of the group interval using:

$$G_U = G_L + \sum_{i=1}^{k} \frac{n_i^2}{n^2 \mu} \lambda_i [\bar{y}_i - a_i]$$

Finally, the Gini coefficient is calculated using:

$$G = \frac{1}{3} G_L + \frac{2}{3} G_U$$

Gini coefficients measuring LMA income inequality at three time points will be regressed on earnings-based location quotients, annual unemployment rates, and net attractiveness scores for both the high- and low-income migration systems. The model represents the association over time between LMA income inequality and local position in the high-income migration system, controlling for position in the low-income migration system, relative concentration of earnings by grouped sector, and level of unemployment. It is anticipated that increased attractiveness in the high-income migration system will be associated with an increase in local income inequality.

Income segregation. Income segregation measures are derived from the rank-order information theory index, H_R, proposed by Reardon, et al, (2006). H_R is an entropy measure

representing the variation of tract income from a hypothetical condition of income evenly distributed across tracts. The procedure for estimating income segregation begins with the tract-level computation of p_k ,the proportion of households at income threshold *k* or below, where income thresholds are defined by the census. Also computed at the tract-level are a series of entropy measures representing the variance of each tract's cumulative proportion distribution of income from the condition of perfect equality using:

$$E(p_k) = -[p \log_2 p + (1-p) \log_2 (1-p)]$$

Values for p_k and $E(p_k)$ are also computed at the county or LMA level and used to compute an information theory segregation index as:

$$H(p_k) = \sum_{n}^{N} \frac{t_n}{TE(p_k)} \left[E(p_k) - E(p_{nk})\right]$$

where *n* indexes census tracts, and *t* is the share of total population, *T*, residing in tract *n*. Each value, $H(p_k)$, is plotted against its corresponding p_k, and a polynomial curve is fitted using weighted least squares regression, where each point is weighted by $E(p_k)^2$ to minimize weighted square errors. Finally, estimated coefficients from the polynomial regression model are used to compute an estimate of the rank-order information theory index, H_R, using:

$$\widehat{H}_R = \hat{\beta}_0 + \frac{1}{2}\hat{\beta}_1 + \frac{11}{36}\hat{\beta}_2 + \cdots + \left[\frac{2}{(m+2)^2} + 2\sum_{n=0}^{m} \frac{(-1)^{m-n}\left(\frac{m!}{n!\,(m-n)!}\right)}{(m-n+2)^2}\right]\hat{\beta}_m$$

Rank-order information indexes measuring LMA income segregation at three time points will be regressed on Gini coefficients, net attractiveness scores for high- and low-income migration systems, and income migration concentration values for both inter- and intra-LMA migration. The specific measure of income concentration affected by intra-LMA migration is to be determined as the analysis proceeds, but will reflect income sorting between counties in the same

LMA. The model represents the association over time between local income segregation and locational shifts in household income, controlling for the overall distribution of income over households within each LMA. It is anticipated that increased attractiveness in the high-income migration system will be associated with an increase in local income segregation.

CHAPTER III

RESULTS

The presentation of results follows the basic structure of the guiding questions introduced in the first chapter - to what extent does income differentiation affect structurally distinct migration patterns, and how do those patterns affect locales? Beginning with income-differentiated patterns, results describe the holistic and component-based comparisons of high- and low-income migration patterns over time. This is followed by a description of LMA net centrality, and analyses of spatial clustering and the relationship between centrality and local labor and housing market characteristics. Finally, a description of how high- and low-income migration patterns differ with regards to income migration concludes with the results of analyses relating LMA net centrality to local income inequality and segregation over time.

Income-Differentiated Migration Patterns

Using IRS county-to-county migration data for the 18 time periods ranging from 1992-1993 to 2009-2010, a set of 324 *n x n* matrices were produced by the following procedure. For each time period, county-to-county ties were geographically parsed into eight regional and one national migration patterns, with the former comprised of ties beginning and ending in the same Bureau of Economic Analysis (BEA) defined economic region, and the latter of ties beginning and ending in different BEA regions. For each geographic area, income dispersion over migrating households was measured using the Theil index in order to differentiate ties by income as described in the previous chapter. Finally, the number of households and amount of household income for each county-to-county tie were aggregated by income group (high or low) to Labor

Market Areas (LMA). Two income-differentiated patterns (high and low) for each of nine geographical areas (regional and national) over 18 time periods (1992-1993 to 2009-2010) were represented, then, by 324 *n x n* matrices, with the number of LMAs ranging from *n* = 16 (New England) to *n* = 600 (Southeast) among regional patterns, and *n* = 2,210 for national patterns. Data derived from these matrices include the overall composition (i.e., pattern shape) of LMA-to-LMA ties, tie distances, and migration effectiveness for LMAs in their respective regional patterns and each national pattern. Additionally, four observations of net centrality were calculated for each LMA using the equation detailed in the previous chapter, representing LMA's positions in high- and low-income migration patterns at the regional and national level.

Pattern Structure

Pattern correlation. The extent to which high- and low-income migration patterns are predictive of one another was analyzed using the quadratic assignment procedure (QAP) with a set of 324 *n x n* matrices. Coefficient values measuring the correlation between high- and low-income patterns at each time period, along with year-by-year correlations of patterns within each income group are presented in Figure 8. With the exception of national patterns, and regional patterns in New England, the Mideast, and the Far West, high- and low-income migration patterns tend to be positively, but weakly correlated at every time period. Furthermore, there is no period where, either regionally or nationally, the correlation between high- and low-income ties is as strong as the year-by-year correlation of patterns within each income group. Beyond the connectivity of LMA-to-LMA ties, the distinction between high- and low-income patterns presented here indicates that patterns differentially affect the redistribution of population, given that LMA-to-LMA ties are valued as the percentage of total migrating households.

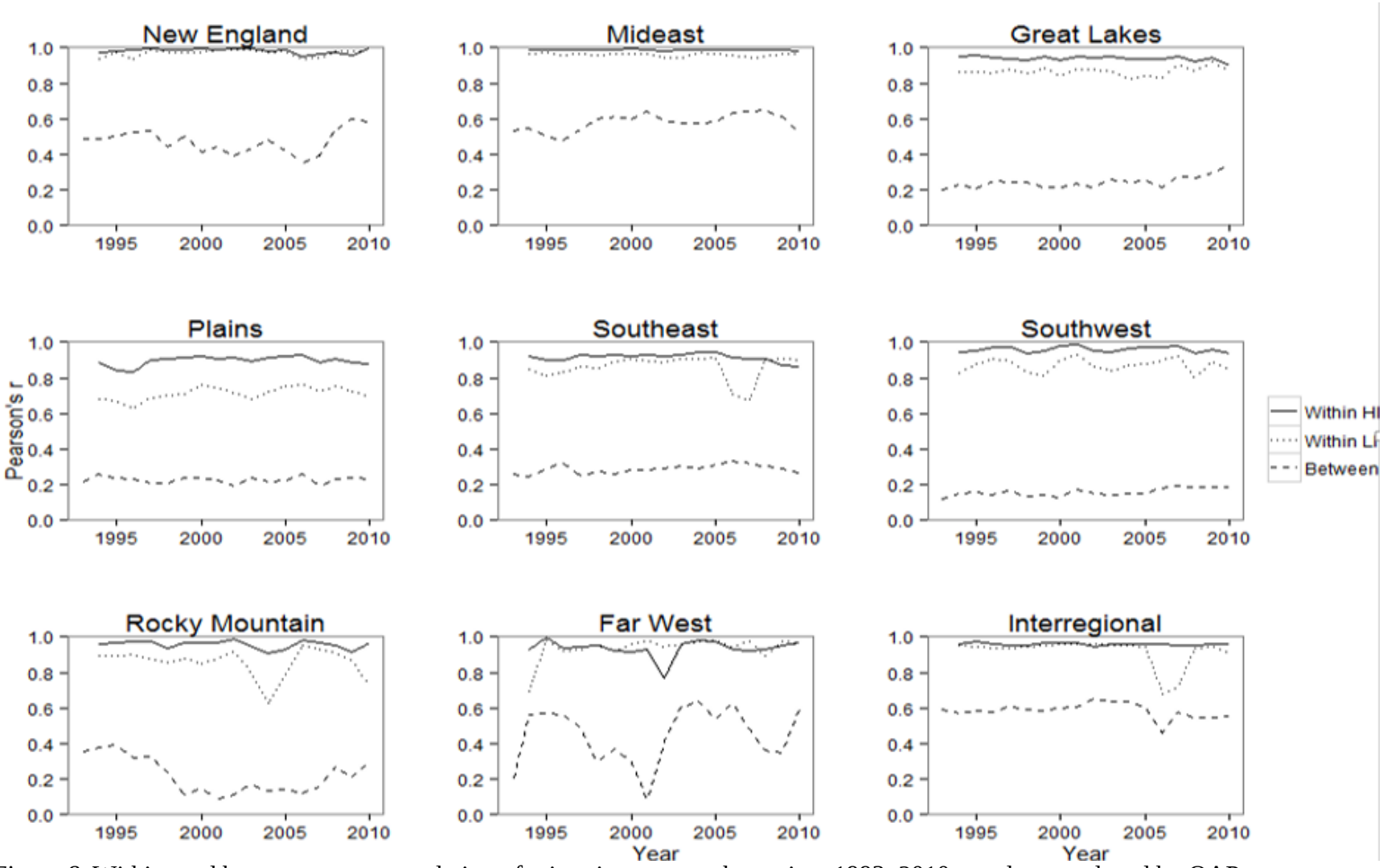


Figure 8. Within- and between-group correlation of migration patterns by region, 1993–2010. *p* values produced by QAP were significant in every case at at least the .01 level.

Tie distance. Average distances of ties comprising high- and low-income patterns were compared using a repeated measures analysis of variance (ANOVA). Results are presented in Table 4. With the exception of New England, the smallest region by area, high-income ties tend to be of significantly greater distance than low-income ties. In addition to significant group effects differentiating high- and low-income ties, the ANOVA results indicate significant group and time interaction effects in all but the New England and Mideast regions. Most notable are the increasingly divergent average distances of high- and low-income ties apparent in the interregional migration patterns, $F(17, 18711)=3.32$, $p<.001$ (Figure 9).

Migration effectiveness. The extent to which high- and low-income migration patterns differentially affect a churn versus redistribution of population was analyzed using a repeated measures ANOVA comparing levels of migration effectiveness between and within income-differentiated migration patterns over time. Where the range of effectiveness ratios represents a continuum of population churn versus redistribution (0 and 100, respectively), ANOVA results indicate that high-income patterns tend to affect significantly greater levels of population redistribution than low-income patterns across all regions and interregionally (Table 4). In network terminology, high-income migration patterns are characterized by significantly lower levels of dyadic reciprocity than low-income patterns. While group effects are significant in all areas, high- and low-income levels of reciprocity are most distinct in the Mideast, $F(1, 3278) = 371.2$, $p<.001$, and Far West regions, $F(1, 4049) = 78.57$, $p<.001$. Group and time interaction effects were found to be significant in most regions. This is noteworthy in that high- and low-income effectiveness ratios appear to trend towards convergence in a number of regions, but most prominently in New England, the Great Lakes, and the Southwest, where high-income patterns in particular have been decreasingly effective in redistributing population (Figure 10).

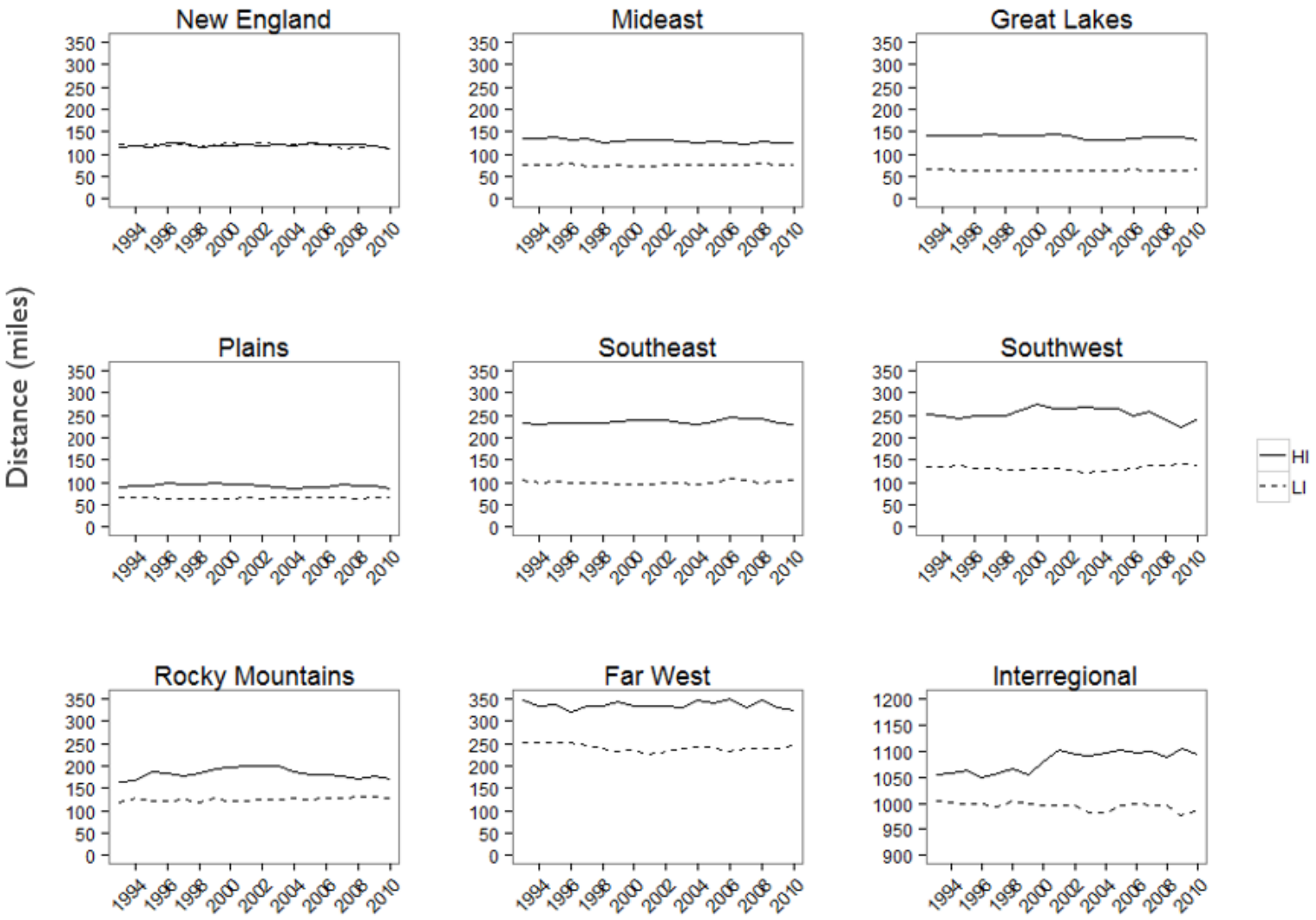


Figure 9. Mean tie distance (miles) by region, 1993–2010.

Table 4

Repeated-measures ANOVA of Tie Distance and LMA Efficiency by Region

	Distance		Efficiency	
	F	*p*	*F*	*p*
New England				
Group	0.05 (1, 457)	.824	28.44 (1, 426)	.000***
Time	1.13 (17, 457)	.324	1.61 (17, 426)	.058
Group × Time	0.67 (17, 457)	.837	1.5 (17, 426)	.092
Mideast				
Group	33.09 (1, 2941)	.000***	121.28 (1, 2568)	.000***
Time	0.7 (17, 2941)	.81	3.73 (17, 2568)	.000***
Group × Time	1.14 (17, 2941)	.309	2.62 (17, 2568)	.000***
Great Lakes				
Group	73.84 (1, 9131)	.000***	376.92 (1, 7514)	.000***
Time	2.77 (17, 9131)	.000***	2.02 (17, 7514)	.008**
Group × Time	4.56 (17, 9131)	.000***	4.25 (17, 7514)	.000***
Plains				
Group	7.82 (1, 11605)	.005**	45.85 (1, 6661)	.000***
Time	1.64 (17, 11605)	.046*	3.38 (17, 6661)	.000***
Group × Time	2.31 (17, 11605)	.002**	1.61 (17, 6661)	.054
Southeast				
Group	76.91 (1, 18235)	.000***	453.39 (1, 14789)	.000***
Time	1.46 (1, 18235)	.098	3.59 (17, 14789)	.000***
Group × Time	3.69 (1, 18235)	.000***	2.2 (17, 14789)	.003**
Southwest				
Group	40.73 (1, 7672)	.000***	200.25 (1, 5753)	.000***
Time	2.64 (17, 7672)	.000***	2.18 (17, 5753)	.003**
Group × Time	5.09 (17, 7672)	.000***	2.96 (17, 5753)	.000***
Rocky Mountains				
Group	8.97 (1, 4004)	.003**	18.94 (1, 2668)	.000***
Time	3 (17, 4004)	.000***	1.88 (17, 2668)	.016*
Group × Time	4.86 (17, 4004)	.000***	0.97 (17, 2668)	.493
Far West				
Group	25.96 (1, 3812)	.000***	147.58 (1, 3187)	.000***
Time	2.05 (17, 3812)	.007**	6.74 (17, 3187)	.000***
Group × Time	3.54 (17, 3812)	.000***	3.38 (17, 3187)	.000***
Interregional				
Group	24.14 (1, 18711)	.000***	525 (1, 13134)	.000***
Time	1.59 (17, 18711)	.057	4.35 (17, 13134)	.000***
Group × Time	3.32 (17, 18711)	.000***	1.79 (17, 13134)	.023*

*$p < .05$. **$p < .01$. ***$p < .001$.

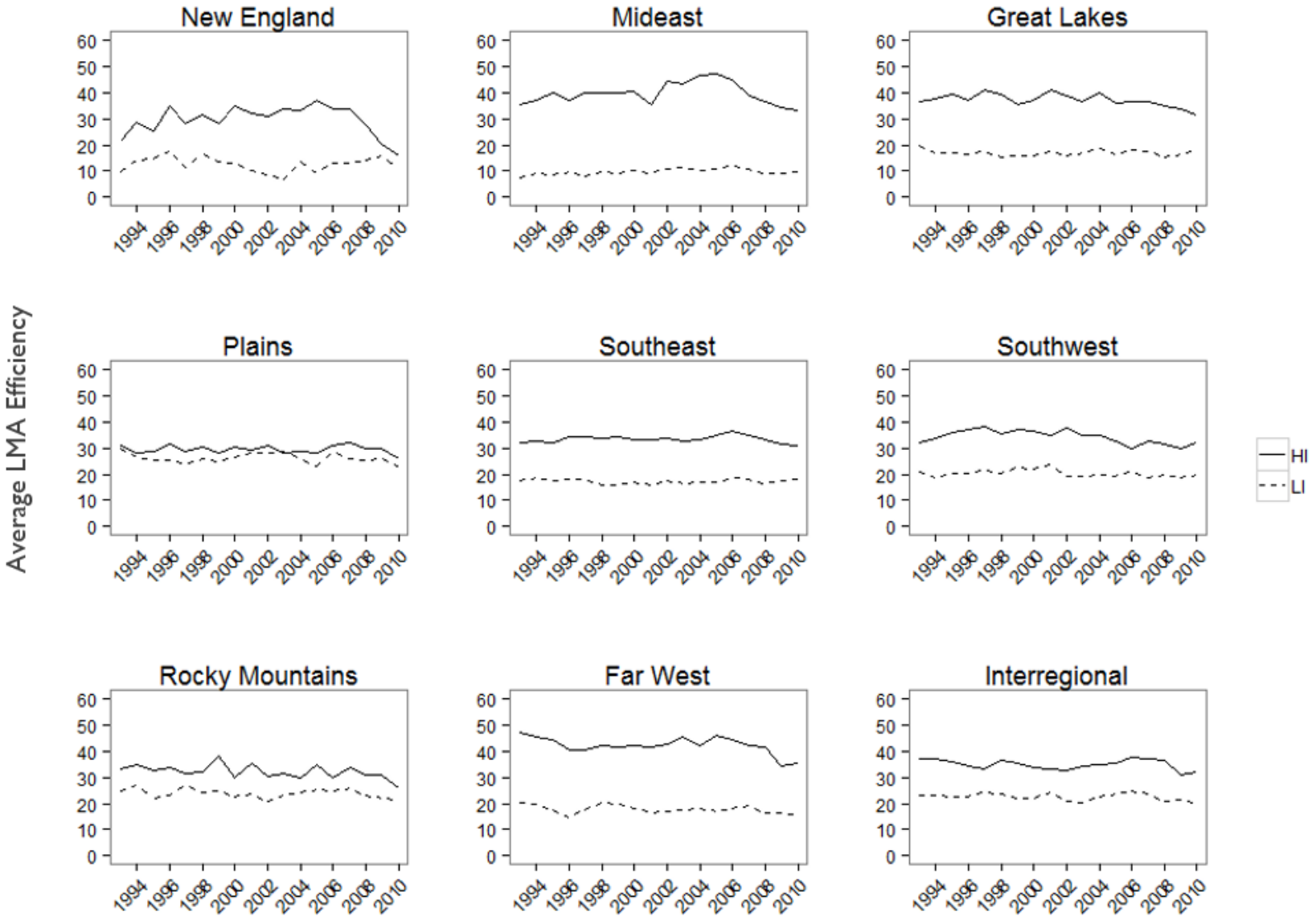


Figure 10. Mean LMA efficiency by region, 1993–2010.

Net Centrality

Introduced in the previous chapter as a measure of connectivity for places situated in migration networks, net centrality is calculated for LMAs for each of the 18 years included in the study. Geographically, LMAs are regarded as being situated, first, in regional migration patterns, that is, within sets of ties that begin and end in the same region, and, second, in a national network of ties beginning and ending in different regions. For a given LMA in a given year, then, there are four observations of net centrality representing its position in both high- and low-income migration patterns at the regional and national level. Comparing mean values of LMAs' net centrality offers an initial indication of high- and low-income patterns' distinct spatial distributions. Labor market area rankings (Table 5) and intensity maps (Figures 11 to 19) of net centrality values suggest that there is little correspondence between high- and low-income patterns whether regional or national.

Spatial clustering. Beyond spatial focusing at the LMA level, income-differentiated migration patterns may also be distinguished by the manner in which selectivity extends beyond individual labor market areas to define subregional clusters of central areas. This appears to be the case in several regional patterns, as well as interregionally. The northern edge of Michigan's Lower Peninsula in the Great Lakes region (Figure 13), and the southeastern edge of Appalachia (Figure 15) in the Southeast region, for instance, present numerous LMAs in close proximity with similar high-income net centrality scores.

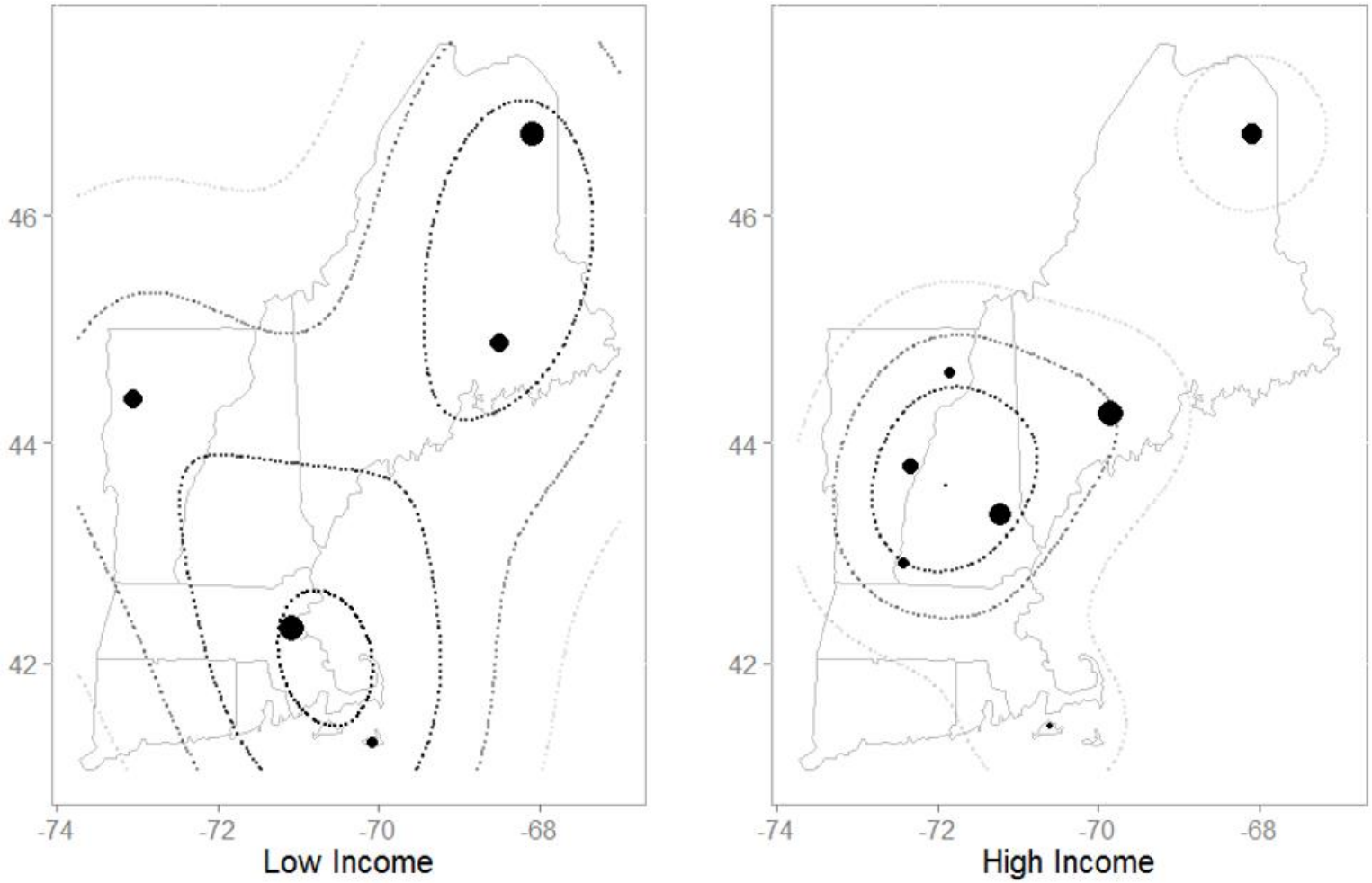


Figure 11. Average net centrality of LMAs in New England region, 2006–2010. Contours indicate clustering of positive net centrality values. X and y axes are longitude and latitude, respectively.

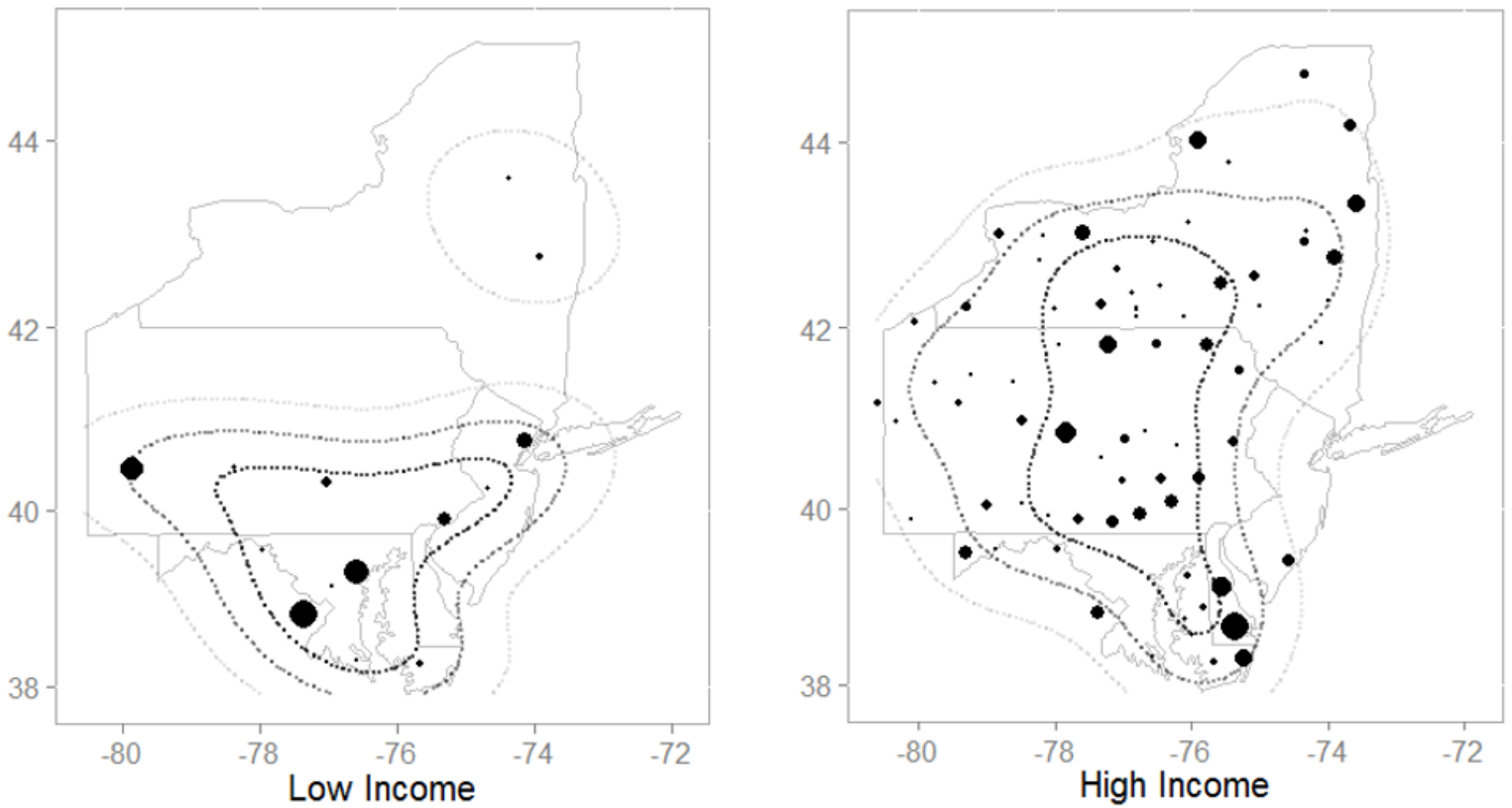


Figure 12. Average net centrality of LMAs in Mideast Region, 2006–2010. Contours indicate clustering of positive net centrality values. X and y axes are longitude and latitude, respectively.

Table 5

Average Net Centrality Rankings by Income Group and Region, 2006–2010

	Low income		High income	
	LMA	NC	LMA	NC
New England	Boston-Cambridge-Quincy, MA-NH	.091	Portland-South Portland-Biddeford, ME	0.158
	Presque Isle, ME*	.079	Manchester-Nashua, NH	0.115
	Burlington-South Burlington, VT	.050	Presque Isle, ME*	0.112
	Bangor, ME	.047	Lebanon, NH-VT	0.062
	Nantucket, MA	.018	Keene, NH	0.031
Mideast	Washington-Arlington-Alexandria, DC-VA-MD-WV	.524	Seaford, DE	0.229
	Baltimore-Towson, MD	.394	State College, PA	0.123
	Pittsburgh, PA	.325	Dover, DE	0.117
	New York-Northern New Jersey-Long Island, NY-NJ-PA	.174	Ocean Pines, MD	0.093
	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	.140	Tioga, PA	0.091
Great Lakes	Chicago-Joliet-Naperville, IL-IN-WI	.312	Indianapolis-Carmel, IN*	0.271
	Indianapolis-Carmel, IN*	.296	St. Louis, MO-IL	0.199
	Madison, WI	.220	Minneapolis-St. Paul-Bloomington, MN-WI*	0.185
	Minneapolis-St. Paul-Bloomington, MN-WI*	.209	Traverse City, MI	0.121
	Ann Arbor, MI	.148	Cincinnati-Middletown, OH-KY-IN	0.116
Plains	Des Moines-West Des Moines, IA*	.387	Sioux Falls, SD	0.217
	Kansas City, MO-KS	.298	Omaha-Council Bluffs, NE-IA*	0.092
	Fargo, ND-MN	.267	Lincoln, NE*	0.079
	Lincoln, NE*	.209	Springfield, MO	0.077
	Omaha-Council Bluffs, NE-IA*	.192	Des Moines-West Des Moines, IA*	0.075
Southeast	Nashville-Davidson-Murfreesboro-Franklin, TN	.455	Huntsville, AL	0.290
	Atlanta-Sandy Springs-Marietta, GA	.305	Asheville, NC	0.287
	Charlotte-Gastonia-Rock Hill, NC-SC	.278	Greenville-Mauldin-Easley, SC	0.268
	Raleigh-Cary, NC	.247	Daphne-Fairhope-Foley, AL	0.254
	Greensboro-High Point, NC	.159	The Villages, FL	0.232
Southwest	Houston-Sugar Land-Baytown, TX	.231	San Antonio-New Braunfels, TX	0.202
	Austin-Round Rock-San Marcos, TX	.200	Dallas-Fort Worth-Arlington, TX*	0.122
	Albuquerque, NM	.096	Tyler, TX	0.115

	Low income		High income	
	LMA	NC	LMA	NC
	Dallas-Fort Worth-Arlington, TX*	.090	Granbury, TX	0.112
	Tucson, AZ	.086	Oklahoma City, OK	0.109
Rocky Mountains	Denver-Aurora-Broomfield, CO	.250	Grand Junction, CO	0.289
	Salt Lake City, UT	.136	St. George, UT	0.173
	Colorado Springs, CO	.115	Missoula, MT	0.127
	Boise City-Nampa, ID	.099	Cheyenne, WY	0.089
	Logan, UT-ID	.068	Coeur d'Alene, ID	0.075
Far West	San Francisco-Oakland-Fremont, CA	.310	Bend, OR	0.483
	Los Angeles-Long Beach-Santa Ana, CA	.297	Spokane, WA	0.374
	San Diego-Carlsbad-San Marcos, CA	.293	Port Angeles, WA	0.322
	Seattle-Tacoma-Bellevue, WA	.131	Bellingham, WA	0.306
	Albany-Lebanon, OR	.116	Medford, OR	0.304
National	Los Angeles-Long Beach-Santa Ana, CA	.577	Cape Coral-Fort Myers, FL	0.459
	Houston-Sugar Land-Baytown, TX	.508	Tucson, AZ	0.437
	San Francisco-Oakland-Fremont, CA	.354	Austin-Round Rock-San Marcos, TX	0.417
	Dallas-Fort Worth-Arlington, TX	.353	The Villages, FL	0.407
	Portland-Vancouver-Hillsboro, OR-WA	.329	Phoenix-Mesa-Glendale, AZ	0.348

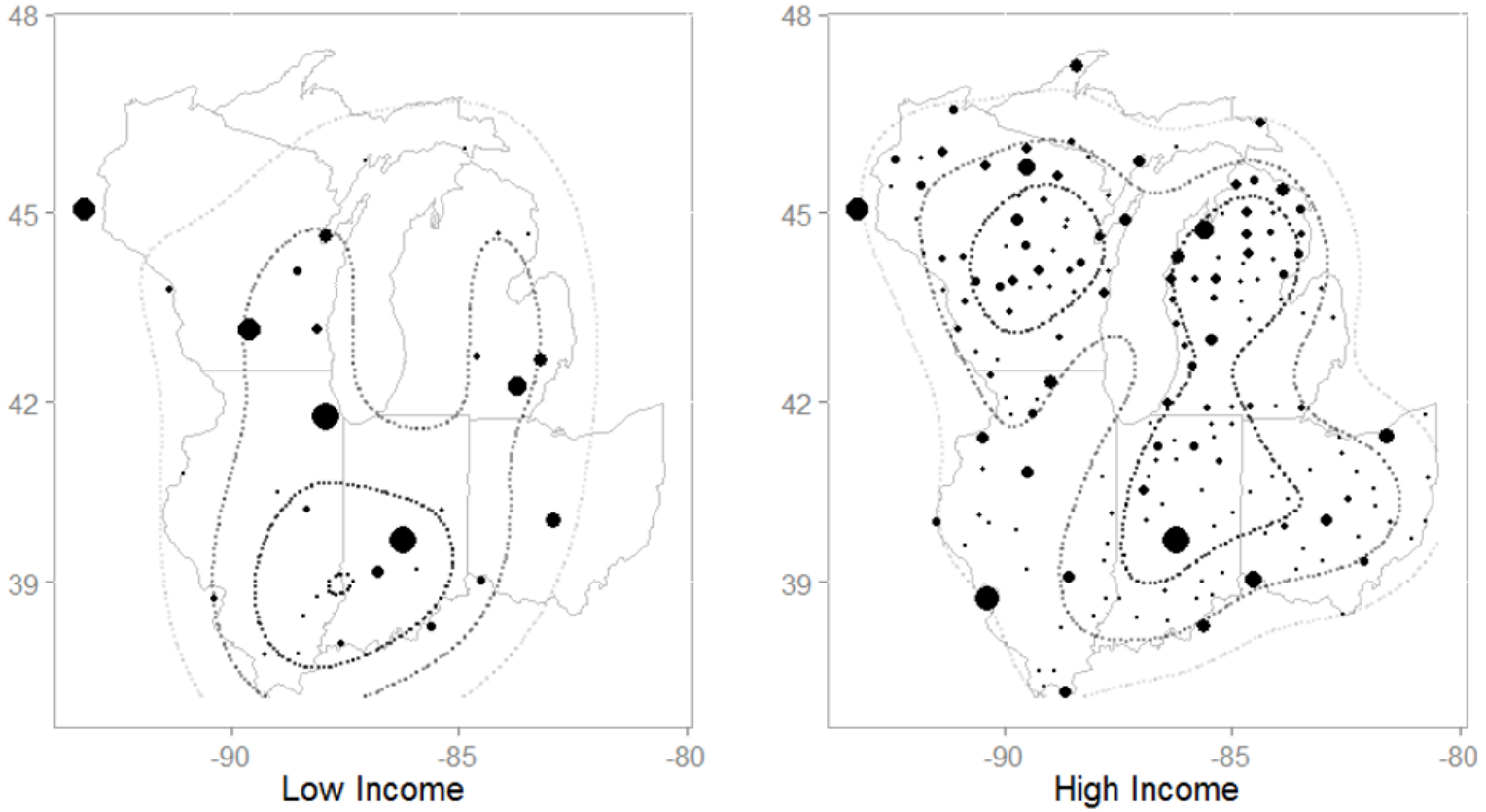


Figure 13. Average net centrality of LMAs in Great Lakes Region, 2006–2010. Contours indicate clustering of positive net centrality values. X and y axes are longitude and latitude, respectively.

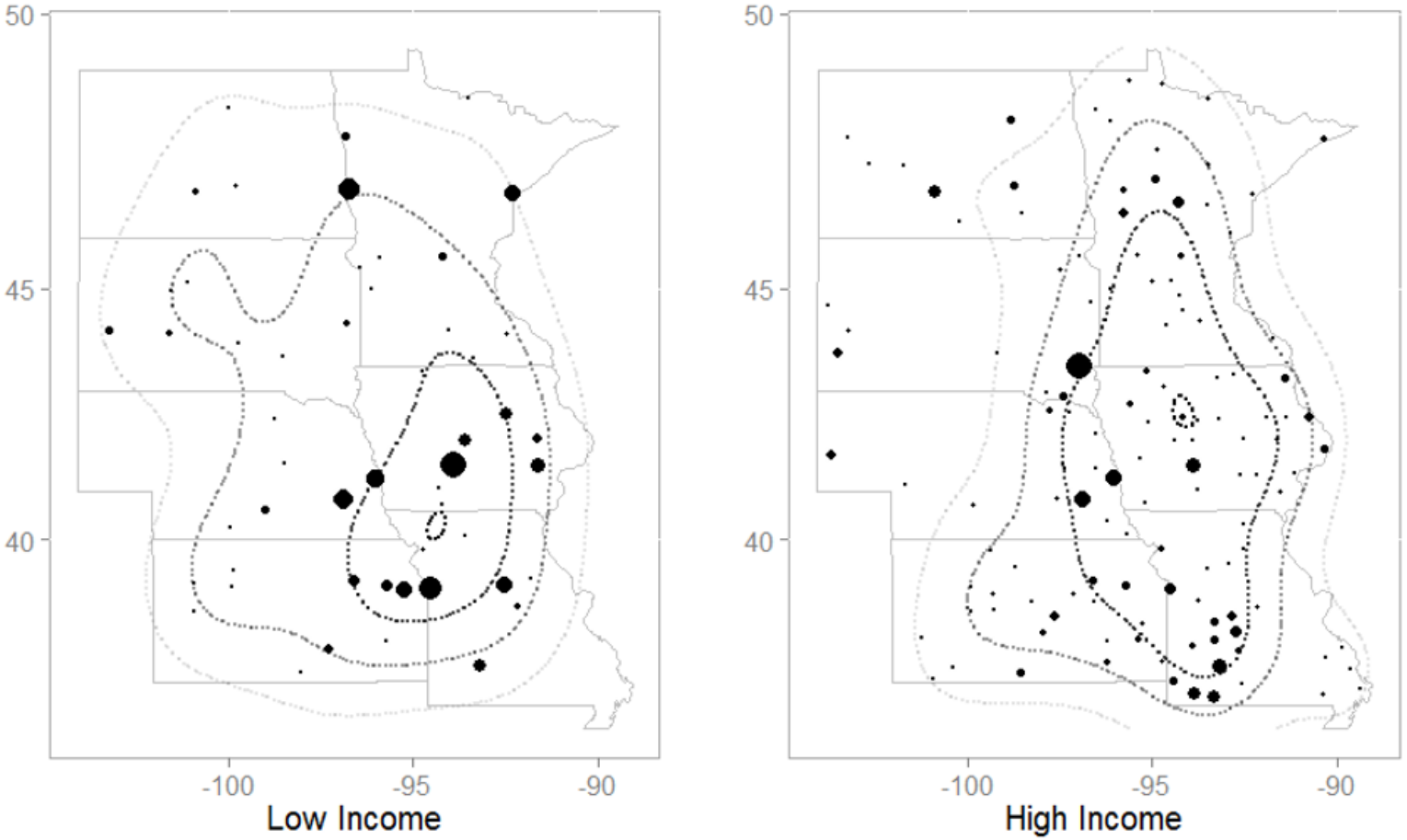


Figure 14. Average net centrality of LMAs in plains region, 2006–2010. Contours indicate clustering of positive net centrality values. X and y axes are longitude and latitude, respectively.

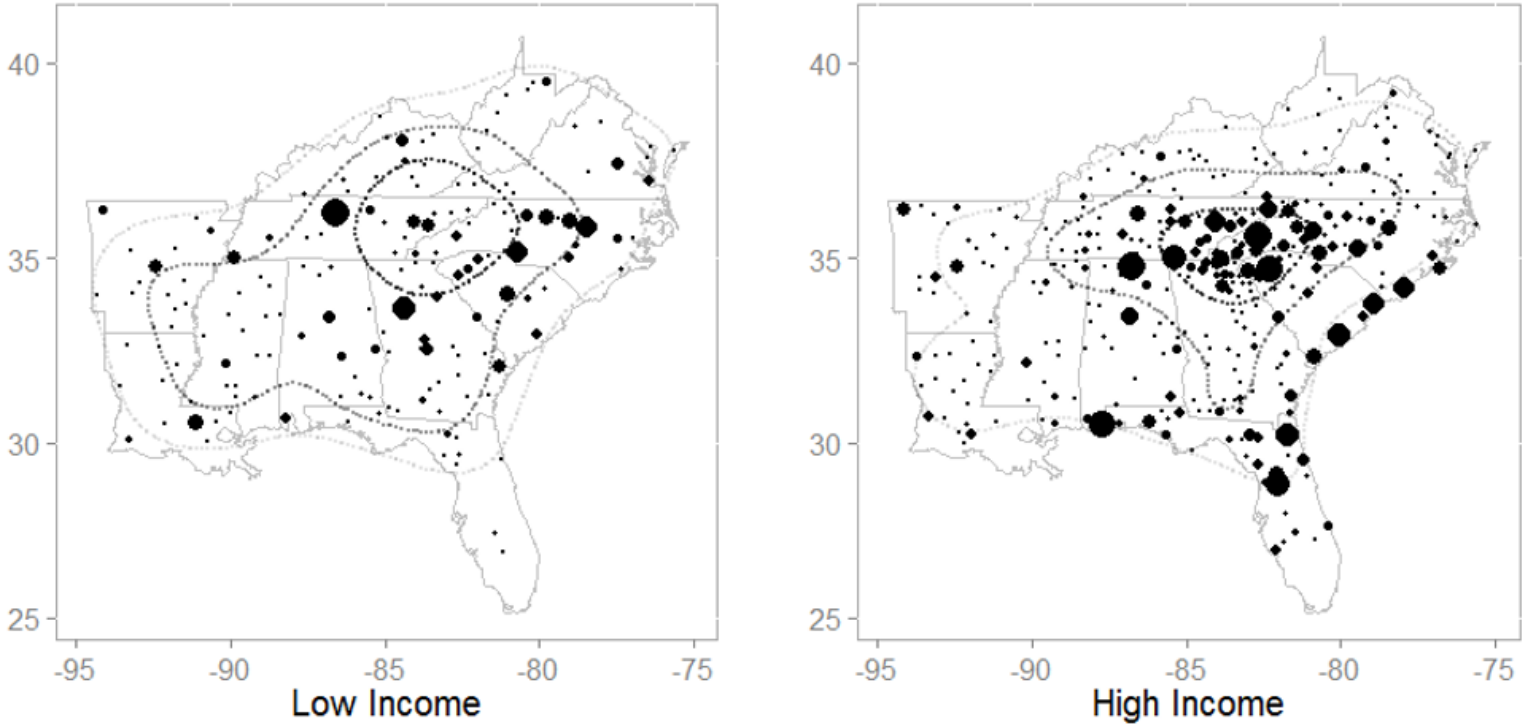


Figure 15. Average net centrality of LMAs in Southeast Region, 2006–2010. Contours indicate clustering of positive net centrality values. X and y axes are longitude and latitude, respectively.

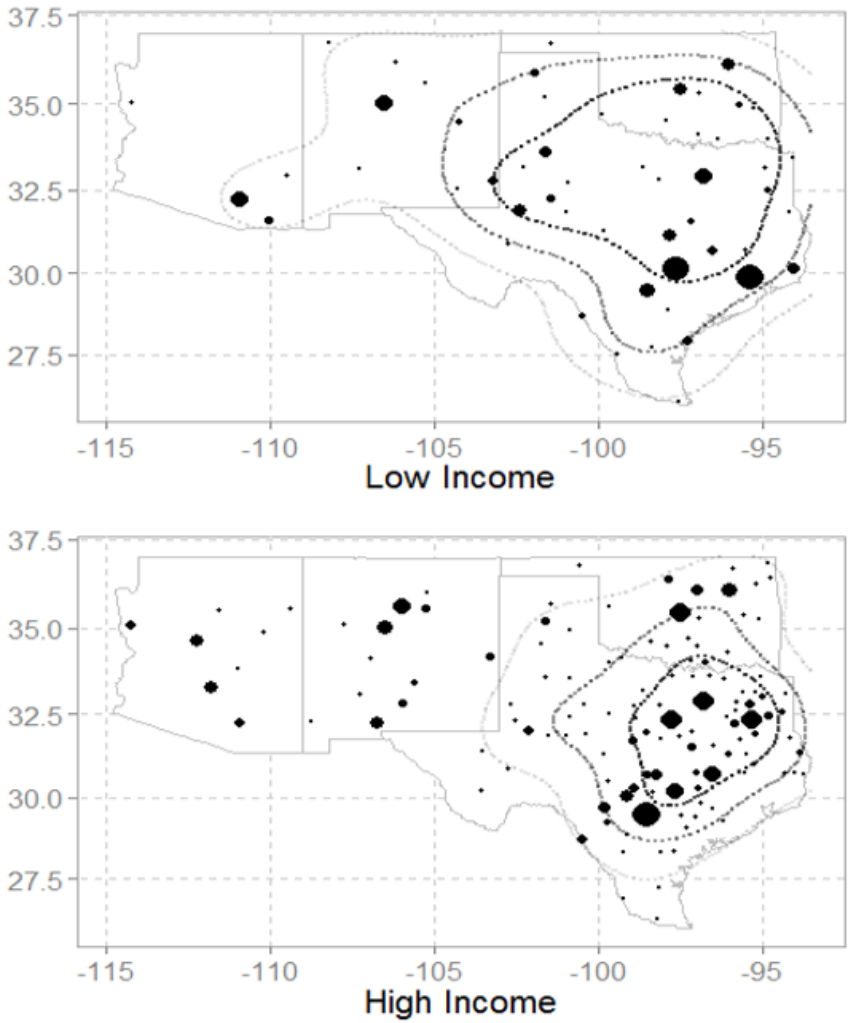


Figure 16. Average net centrality of LMAs in Southwest Region, 2006–2010. Contours indicate clustering of positive net centrality values. X and y axes are longitude and latitude, respectively.

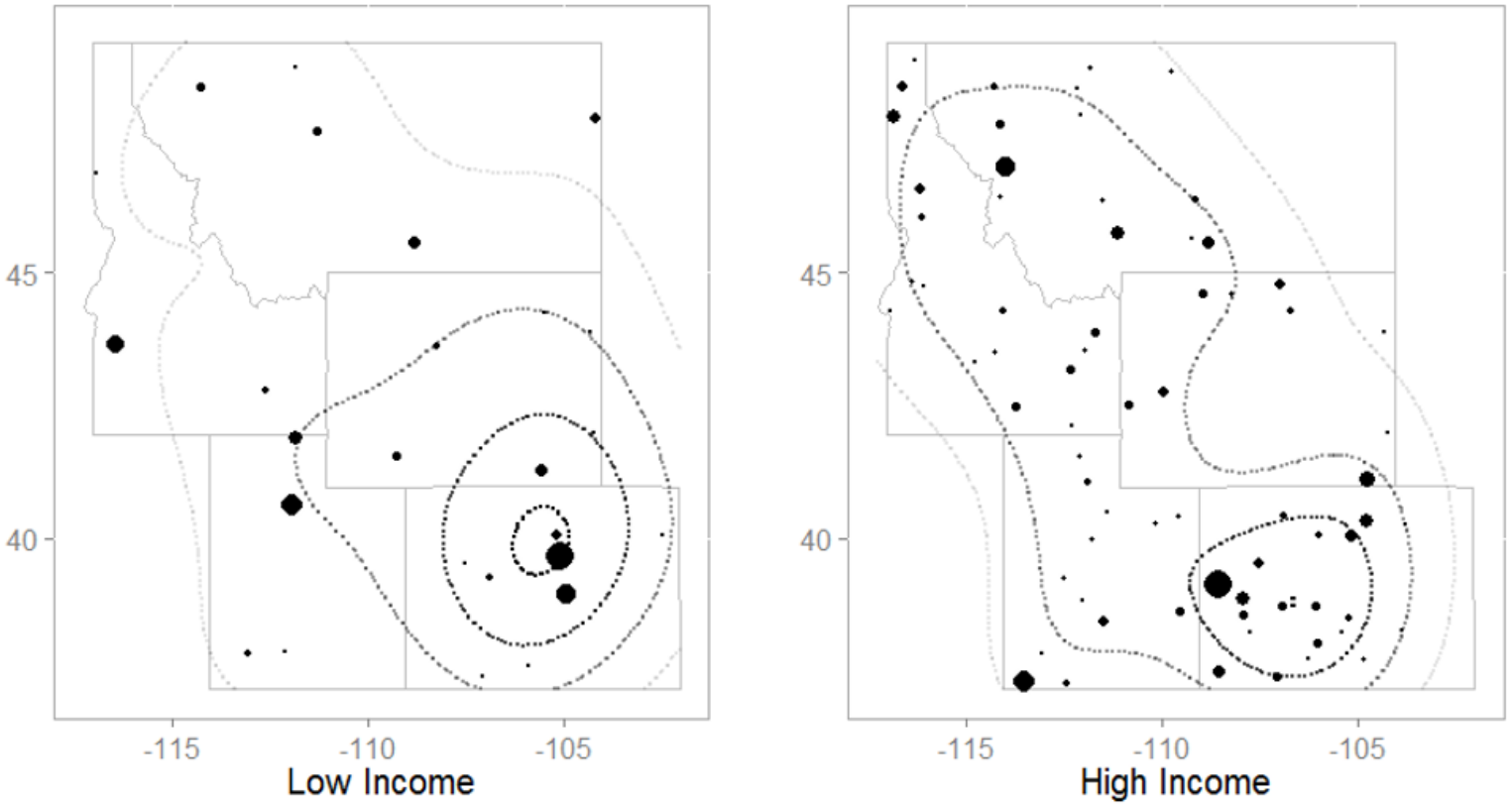


Figure 17. Average Net Centrality of LMAs in Rocky Mountains Region, 2006-2010. Contours indicate clustering of positive net centrality values. X and y axes are longitude and latitude, respectively.

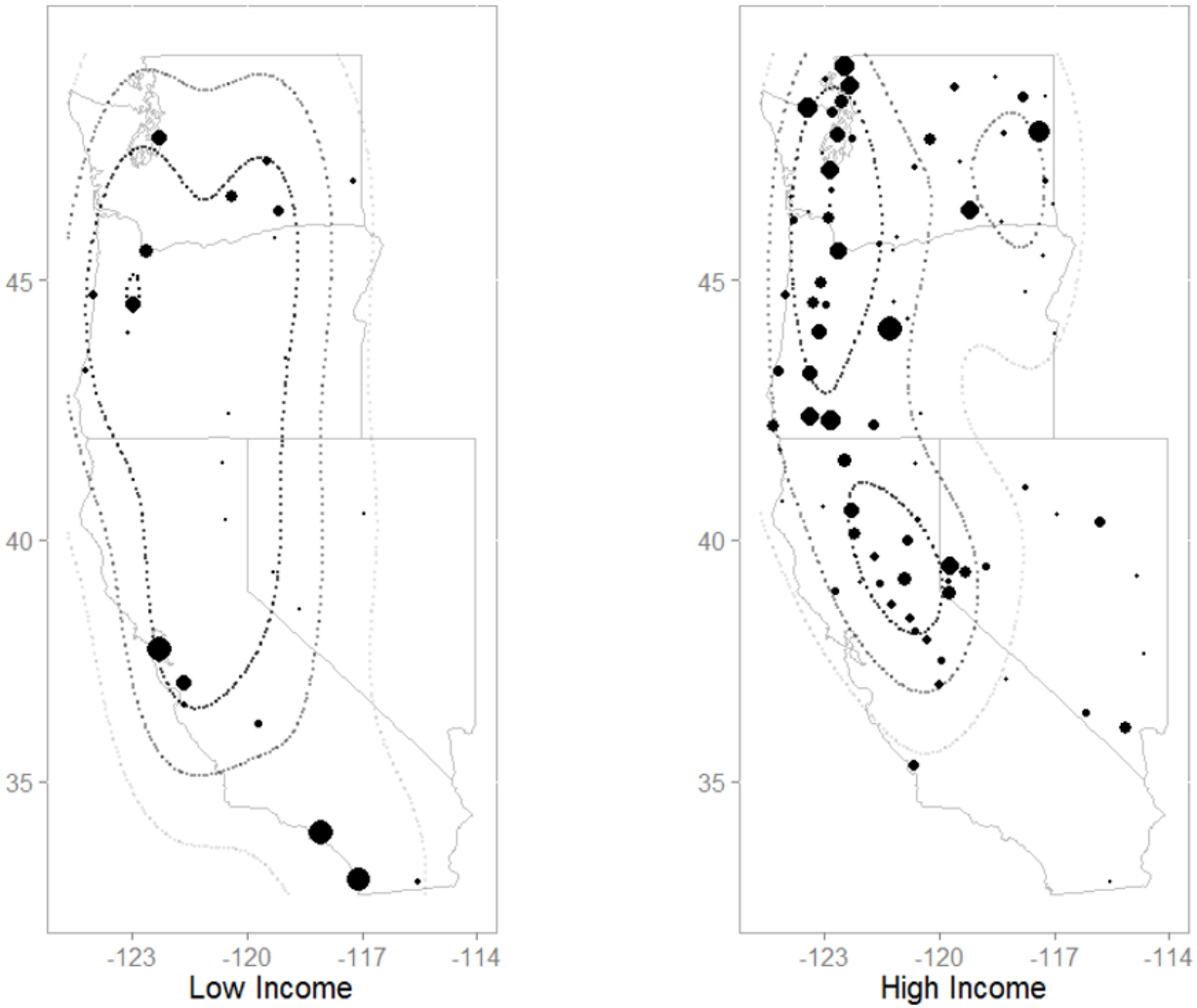
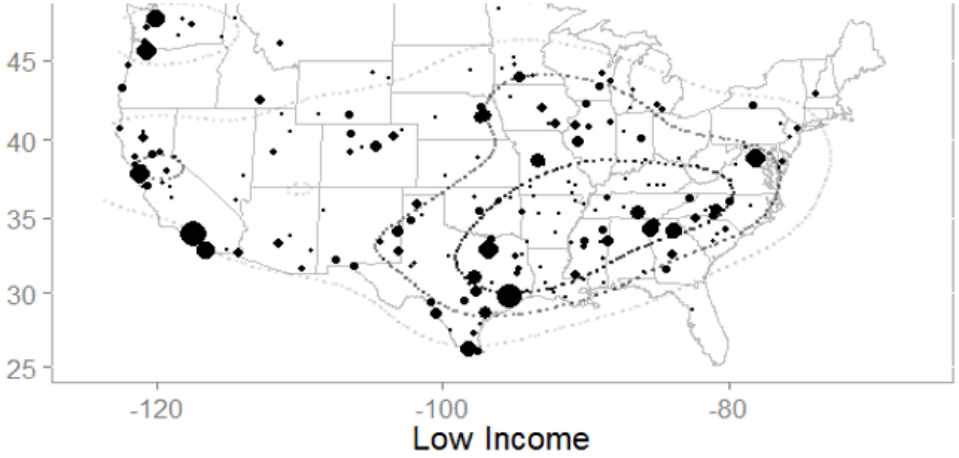


Figure 18. Average net centrality of LMAs in Far West Region, 2006–2010. Contours indicate clustering of positive net centrality values. X and y axes are longitude and latitude, respectively.



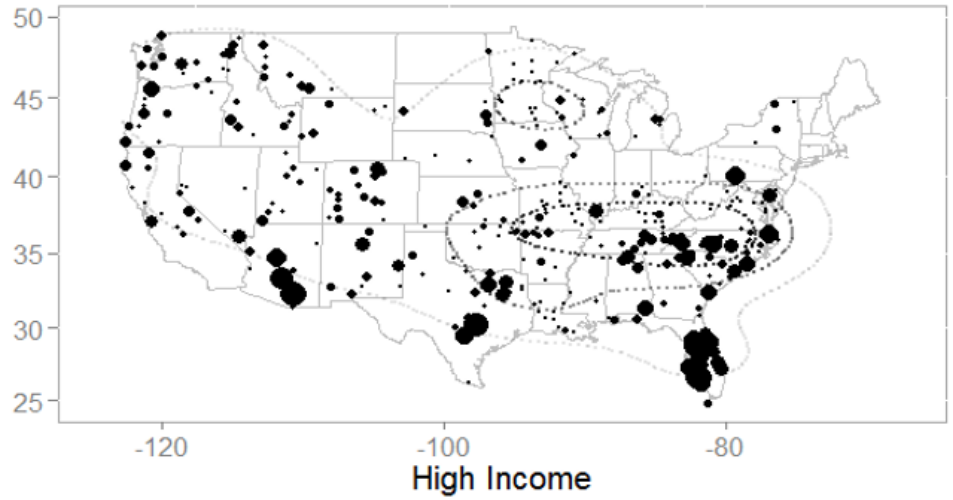


Figure 19. Average net centrality of LMAs, interregional, 2006–2010. Contours indicate clustering of positive net centrality values. X and y axes are longitude and latitude, respectively.

The extent to which net centrality scores are clustered within regional and interregional patterns was analyzed with Moran's I and Geary's C test statistics. Both distance (*k*-nearest neighbor, set to include the 4 and 8 nearest LMAs as neighbors) and graph-based criteria (Sphere of Influence and Gabriel graphs, as described in the previous chapter) were used to define neighboring LMAs, as well as binary (B) and row-standardized (W) weights in order to account for regional variation in LMA connectivity. High-income centrality values were found to be significantly clustered in all regions and interregionally (Table 6). Significant clustering of low-income net centrality values, on the other hand, was only evident in the interregional migration pattern.

Local Labor and Housing Markets

Finally, the relationship between income-differentiated LMA centrality measures and local labor and housing market characteristics was analyzed by estimating mixed-effects models with high- and low-income net centrality as dependent variables. Joint-models with high- and low-income net centrality scores grouped by LMA were used to allow for the comparison of coefficients between groups. The model can be written in general as:

$$NC_{ij} = \beta_0 + \beta_k X_{ij} + \beta G + \beta_k G X_{ij} + u_j + \varepsilon_{tij}$$

where net centrality, *NC*, for LMA *i* in region *j* is predicted by an intercept, β_0, and coefficients, β_k, for independent variables, X_{ij}, a dummy-variable, *G*, interacted with each of the independent variables to allow coefficients to freely differ across groups, region-specific intercepts, u_j, which summarize the effects of unmeasured regional factors affecting LMAs, and the residual, ε_{ij}, associated with LMAs within regions.

Table 6

Spatial Autocorrelation of Average Net Centrality Values (2006–2010) by Pattern Type

			Low income		High income	
	Neighbors	Weights	Moran's I	Geary's C	Moran's I	Geary's C
Regional	k = 4	W	.006	.918†	.289***	.68***
		B	.006	.918†	.289***	.68***
	k = 8	W	.004	.963	.266***	.681***
		B	.004	.963	.266***	.681***
	SoI	W	-.036	1.032	.317***	.732***
		B	-.014	.852**	.261***	.557***
	Gabriel	W	-.035	1.058	.264***	.729***
		B	-.021	.983	.24***	.577***
National	k = 4	W	.066**	.764***	.319***	.647***
		B	.066**	.764***	.319***	.647***
	k = 8	W	.082***	.838**	.319***	.658***
		B	.082***	.838**	.319***	.658***
	SoI	W	.06**	.865**	.309***	.662***
		B	.073***	.783**	.287***	.625***
	Gabriel	W	.064**	.908**	.295***	.686***
		B	.059**	.911	.276***	.681***

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 7

GLS & Mixed-Effects Models of Association Between LMAs High- and Low-Income Net Centrality and Local Labor and Housing Market Characteristics in 2000

	Regional			National		
Fixed effects	β	*SE*	t value	β	*SE*	*t* value
Intercept	-.013	.002	-5.24***	-.043	.025	-1.73†
Population	.020	.001	16.47***	-.028	.003	-10.71***
Federal govt	.001	.001	1.12	-.002	.004	-.65
State/local govt	-.002	.001	-1.59	-.002	.004	-.63
Natural resources	-.001	.001	-1.23	.005	.004	1.42
Construction	-.001	.001	-.64	-.007	.005	-1.39
Manufacturing	.001	.001	.80	-.006	.005	-1.23
Trade/transport	.002	.001	1.63	.004	.004	.93
Information	.001	.001	.61	.001	.005	.28
Finance	.002	.001	1.61	.007	.005	1.28
Professional/business	.000	.001	.11	.003	.005	.64
Education/health	-.004	.001	-3.31***	-.006	.006	-1.11
Leisure/hospitality	.000	.001	.36	.006	.004	1.48
Unemployment	-.002	.001	-1.57	.004	.004	.99
Educational heterogeneity	-.005	.001	-4.71***	.007	.003	2.16*
Housing burden, rent	.001	.001	1.06	-.017	.004	-4.39***
Housing burden, mortgage	-.001	.001	-.90	.001	.004	.32
Natural amenities	-.003	.001	-2.68**	-.004	.004	-1.09
High	.021	.003	7.80***	.011	.006	1.77†
High:Population	-.033	.002	-18.35***	-.011	.004	-2.96**
High:Federal govt	.001	.002	.55	.008	.005	1.51
High:State/local govt	.002	.002	1.25	.000	.005	-.01
High:Natural resources	.002	.002	1.30	-.004	.005	-.80
High:Construction	.000	.002	.10	.007	.008	.86
High:Manufacturing	-.005	.002	-2.66**	.000	.007	-.07
High:Trade/transport	-.003	.002	-2.20*	-.007	.006	-1.17
High:Information	-.003	.002	-1.90†	-.019	.008	-2.49*
High:Finance	-.002	.002	-.93	-.013	.008	-1.69†
High:Professional/ business	-.001	.001	-.59	-.011	.007	-1.44
High:Education/health	.007	.002	3.68***	.020	.008	2.56*
High:Leisure/hospitality	.004	.002	2.23*	.004	.006	.61
High:Unemployment	-.001	.002	-.71	-.006	.005	-1.23
High:Educational heterogeneity	.005	.002	3.30***	-.007	.005	-1.55
High:Housing burden, rent	.002	.002	1.04	.023	.005	4.24***
High:Housing burden, mortgage	.002	.002	1.00	-.008	.006	-1.22
High:Natural amenities	.006	.002	3.13**	.024	.005	4.95***

Note. N = 2,053. Residual maximum likelihood estimation (REML) was used for each model. Centrality scores reflect four-year average, 2001-2004. Additionally, estimates were obtained with a spherical correlation structure to correct for the effects of spatial autocorrelation.

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Regression results are shown in Table 7. Independent variables are identical across models and represent LMA labor and housing market characteristics for the year 2000. In addition to LMA population, variables include average wages for employees in two-digit sectors, as defined by the North American Industry Classification System (NAICS), including federal government, state and local government, natural resources and mining, construction, manufacturing, trade, transportation, and utilities, information, financial activities, professional and business services, education and health services, and leisure and hospitality. Also included in the set of labor market variables are LMA unemployment rate and level of educational heterogeneity. Housing market variables include the percentage of renters and mortgagers in each LMA paying more than 30% of their income for housing. Favorable physical characteristics related to climate, topography, and water area that enhance an LMA's attractiveness are indicated by Natural Amenities Scale scores. The dependent variable in each model, net centrality, is the average centrality score for the four year period from 2001 to 2004. This period was selected using the Akaike Information Criteria (AIC) measure to select between numerous time frames the period that best fit the model.

Overall, interaction terms indicate differences in LMAs' high- and low-income centrality scores in regional and national patterns (β = .021, p < .001, and β = .011, p < .10), although the interaction term in the national pattern is not at a conventional level of significance. Positive coefficients in both cases are consistent with the findings above concerning migration effectiveness, where higher net centrality scores indicate that in-degree centrality is offset to a lesser degree by out-degree centrality in high-income patterns.

Population. Within regions, high- and low-income migration patterns are most differentiated on the basis of LMA population, with the latter centered on more populated areas

(β = .02, p < .001), and the former on less populated areas (β = -.033, p < .001). National patterns are also differentiated in relation to LMA population. While high- and low-income net centrality scores are both negatively associated with population (β = -.011, p < .001, and β = -.028, p < .001, respectively), the magnitude of the relationship is significantly greater in high-income patterns. These findings are generally consistent with literature describing "counterurbanization" in migration patterns since the 1970s, and, in particular, Plane, Henrie, and Perry's (2005) description of age-differentiated patterns, which attributes counterurbanization specifically to a preference for less populated areas among mid-career, childrearing adults and retirees. Without conflating income and age factors, findings here support the proposition that group-differentiated migration patterns correspond to group differences in locational preference and perceived opportunity.

Labor market characteristics. Where average wages have a significant association with net centrality of either type, more often than not, the direction of the relationship is negative. Within regions, low-income net centrality, for instance, is negatively related to average wages in the education and health services sector (β = -.004, p < .001). High-income net centrality within regions is negatively related to average wages in the manufacturing (β = -.005, p < .01), and trade, transportation and utilities sectors (β = -.003, p < .05). In regional and national patterns, alike, high-income net centrality is negatively associated with average wages in the information sector, although, in the case of regional patterns, the relationship is not significant at conventional levels (β = -.003, p < .10, and β = -.019, p < .05). There are significant positive relationships, however, between high-income net centrality and average wages in the education and health care services sector in both regional and national patterns (β = .007, p < .001, and β = .02, p < .05, respectively), and the leisure and hospitality sector within regions (β = .004, p <

.05). Findings related to high-income patterns, in particular, are consistent with amenity migration, insofar as they indicate a trade-off between the potential for higher wages and amenities related to education, health care, and entertainment. Given the association between low-income net centrality and wages in education and health care services noted above, findings indicate that the sector is not only related to amenity migration, but also to the differentiation of high- and low-income migration patterns. Considering, further, the association between low-income net centrality and educational heterogeneity within regions (β = -.005, p < .001), findings suggest an overall negative relationship between regional low-income migration and factors related to the production of human capital. Again, this is particular to regional migration, as low-income net centrality in the national pattern is positively associated with educational heterogeneity (β = .007, p < .05). The group interaction effect related to educational heterogeneity in regional migration patterns is significant, (β = .005, p < .001), although the sum of coefficients for the main effect and interaction term is close to zero.

Housing market characteristics. National migration patterns are differentiated in relation to housing affordability. Rent burden, in particular, is negatively associated with low-income net centrality (β = -.017, p < .001), but positively associated with high-income net centrality (β = .023, p < .001). These findings are consistent with results from the Current Population Survey indicating that low-income migration is more likely than high-income migration to be motivated by the search for affordable housing.

Natural amenities. Findings related to natural amenities keep with the between-group differences related to amenity migration presented above. High-income net centrality scores in both regional and national patterns are positively associated with natural amenity scores (β =

.006, $p < .01$, and $\beta = .024$, $p < .001$). Natural amenities, however, are negatively associated with low-income net centrality in regional patterns ($\beta = -.003$, $p < .01$).

Income Inequality and Segregation

Income Migration

To gain perspective on the magnitude of income represented by migration patterns, aggregate incomes for regional and interregional migrants are shown in Table 8. While the billions of dollars in household income that move between and within regions in a given year account for only a small percentage of each region's total income, high- and low-income migration patterns represent, in every case except New England, a level of aggregate income larger than at least 75% of each region's LMAs. This suggests that through population redistribution, there is considerable potential for income redistribution given the negative relationship between population and high-income net centrality described in the previous section.

Typology of Relative Incomes

The types of exchanges presented in Figure 20 suggest that migration patterns not only affect LMA average income per household, but also the overall distribution, or dispersion of income over households. Low-income patterns can be expected, in nearly every case, to impact the lower tail of LMAs' income distributions. While there is more variability in the types of exchanges affected by high-income patterns, the majority of LMAs in each area, with the exception of the Plains and Rocky Mountain regions, will be impacted at the higher tail of the income distribution.

Table 8

Aggregate Income of High- and Low-Income Migrating Households by Region

	1994–1995	1999–2000	2004–2005	2009–2010
New England				
High Income	1.50	1.97	1.95	1.34
Low Income	1.04	1.56	1.49	1.10
Total as % of area income	0.87	0.90	0.89	0.65
Q_3, LMA Income	16.43	22.60	23.51	23.04
Mideast				
High Income	5.31	7.15	7.77	5.73
Low Income	3.88	4.75	4.70	4.00
Total as % of area income	0.94	0.95	0.99	0.77
Q_3, LMA Income	2.22	2.57	2.90	2.97
Great Lakes				
High Income	6.95	8.50	7.23	5.22
Low Income	5.31	6.96	5.72	4.77
Total as % of area income	1.26	1.25	1.09	0.89
Q_3, LMA Income	1.37	1.73	1.63	1.50
Plains				
High Income	1.59	2.11	1.92	1.70
Low Income	0.97	1.26	1.09	1.01
Total as % of area income	1.17	1.22	1.10	0.94
Q_3, LMA Income	0.28	0.34	0.35	0.36
Southeast				
High Income	9.53	12.95	12.64	9.61
Low Income	6.66	9.41	9.20	7.65
Total as % of area income	1.74	1.83	1.74	1.38
Q_3, LMA Income	0.69	0.79	0.83	0.88
Southwest				
High Income	4.57	6.39	5.36	4.84
Low Income	3.12	4.17	3.78	3.65
Total as % of area income	1.83	1.84	1.53	1.33
Q_3, LMA Income	0.40	0.52	0.54	0.58
Rocky Mountains				
High Income	1.39	2.35	1.97	1.78
Low Income	0.81	1.17	1.28	0.96
Total as % of area income	1.64	1.85	1.67	1.32
	0.34	0.49	0.51	0.54
Q_3, LMA Income				
Far West				
High Income	10.78	14.93	14.58	11.00
Low Income	7.58	12.42	11.19	8.36
Total as % of area income	2.51	2.61	2.44	1.87
Q_3, LMA Income	2.32	3.11	3.18	3.25

	1994–1995	1999–2000	2004–2005	2009–2010
National				
High Income	27.88	40.46	35.59	27.10
Low Income	15.36	20.99	20.63	15.54
Total as % of area income	0.91	0.98	0.90	0.68
Q_3, LMA Income	0.70	0.85	0.87	0.87

Note. Figures in billions of 2010 dollars.

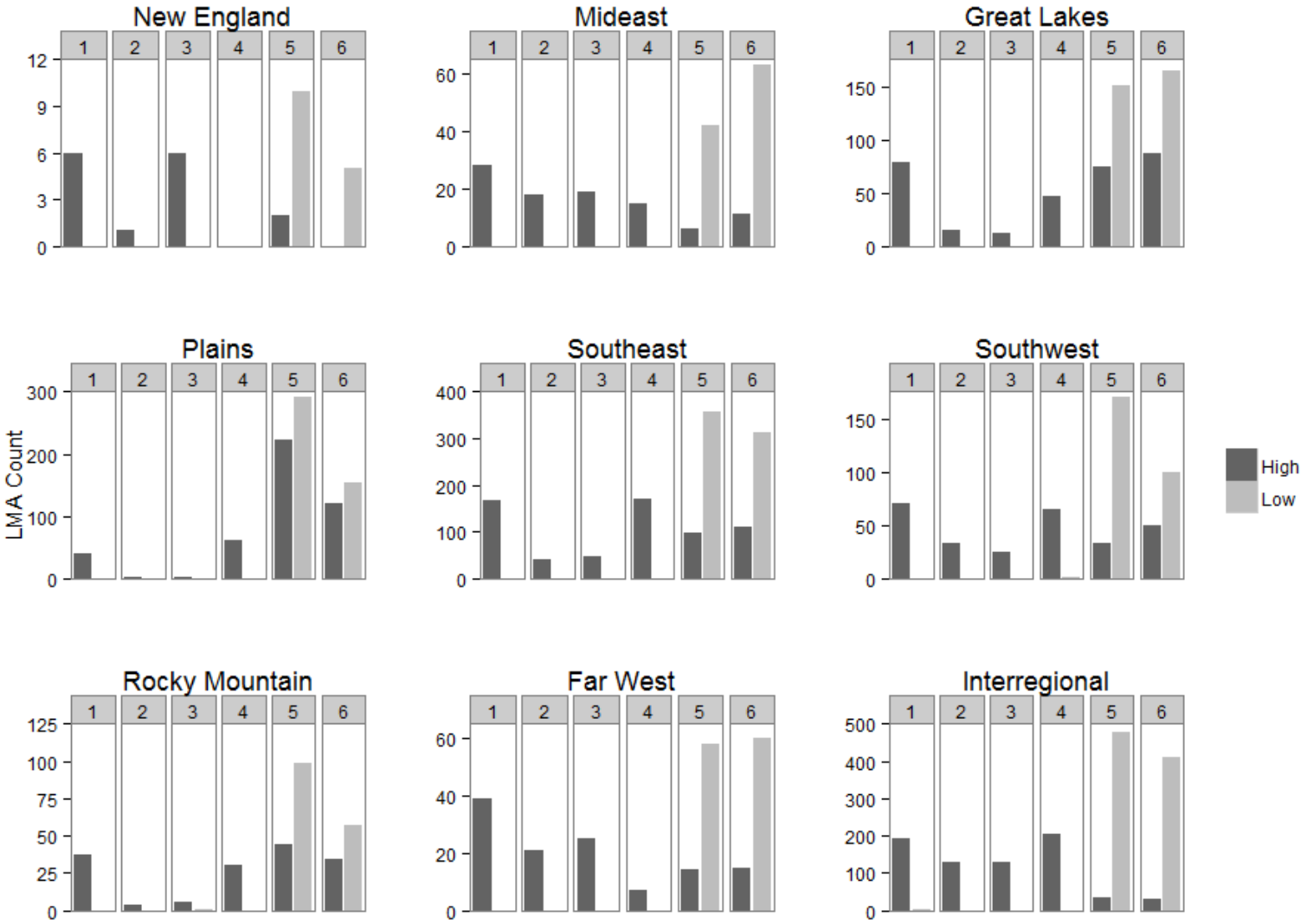


Figure 20. Typology of relative income levels of inmigrants, outmigrants, and nonmigrants for LMAs by income group and region, 2006–2010.

Local Income Inequality

The relationship between migration and household income inequality was analyzed using a multilevel repeated-measures model based on 303 LMAs with observations for three periods (1995, 2000, and 2007-2011). The model was structured with time nested in LMAs nested in regions. Before detailing the composition of the models, there are two rationales for limiting the number of cases included in the analysis. The first is to establish consistency with the analyses related to the final research question. For reasons described in more detail below, these analyses are necessarily limited to LMAs comprised of two or more counties. The second rationale is to minimize the influence of the higher levels of measurement error associated with small areas when drawing data from the American Community Survey (ACS).

The multilevel model is composed of submodels at three levels. The level one equation predicts LMAs' inequality over time, and is in the form

$$y_{tij} = \pi_{0ij} + \pi_{1ij}t00_{tij} + \pi_{2ij}t09_{tij} + \pi_{mij}\left(A_{mtij} - \bar{A}_{mij}\right) + \ldots + \varepsilon_{tij}\,,$$

where inequality at time *t* for LMA *i* in region *j* is predicted by an intercept π_{oij}, time-period effects π_{1ij}, and π_{2ij} (with 1995 as the excluded time period), coefficients (π_{mij}) for LMA mean-centered time-varying independent variables (A_{mtij} - $\bar{A}_{mij}$), and an unstructured error term, ε_{tij}. Here, A_{mtij} represents LMA-level variable A_m measured at time *t* for LMA *i* in region *j*, and $\bar{A}_{mij}$ represents the mean of LMA-level variable A_m for LMAs nested in regions (*ij*) across time periods. The level two equation incorporates LMA means for the for the time-varying variables in equation (1):

$$\pi_{0ij} = \beta_{00j} + \beta_{0mj}\bar{A}_{mij}\,,$$

where π_{oij} is the intercept from equation (1), β_{00j} is the average intercept across LMAs within regions, and β_{0mj} represents the between-LMA effects for the LMA-level variables. Following

Moller, Alderson, and Nielsen (2009), the inclusion, at level one, of mean-centered time-varying variables, and, at level two, LMA means over time allows for a decomposition of total effects into relative longitudinal and cross-sectional effects. The level three equation is in the form

$$\beta_{00j} = \gamma_{000} + \mu_{00j},$$

where β_{00j} is mean inequality across LMAs within regions, γ_{000} is the grand mean inequality across regions, and μ_{00j} is a region-level random effect to account for clustering within regions. Results are presented in Table 9. Controlling for variation in labor market structure and sources of household income between LMAs and within LMAs over time, high-income net centrality was found to have significant longitudinal and cross-sectional effects in relation household income inequality. Longitudinally, household income inequality tended to increase in LMAs that were increasingly central in regional high-income migration patterns (β = .777, p < .01). In any given year, however, income inequality tended to be lower in LMAs that were most central in either regional or national high-income patterns (β = -2.04, p < .05 and β = -1.74, p < .05).

Table 9

Mixed-Effects Repeated Measures Model Predicting LMA Household Income Inequality, 1995, 2000, and 2007–2011

	β	*SE*	*t* value
Intercept	70.631	2.886	24.47***
Longitudinal effects			
2000	0.706	0.136	5.21***
2007–2011	0.972	0.325	3.00**
Median income	-23.917	4.473	-5.35***
(Median income)^2	21.106	3.955	5.34***
Government sector size	-3.859	1.596	-2.42*
Manufacturing sector size	-2.776	1.278	-2.17*
Trade sector size	-0.287	1.958	-0.15
FIRE sector size	-0.602	4.398	-0.14
Unemployment	1.325	2.253	0.59
% Households with self-employment income	-9.191	3.739	-2.46*
% Households with interest, dividends, & rental income	-1.481	1.764	-0.84
% Households with Public Assistance Income	22.834	2.576	8.86***
Low-income net centrality, regional	0.495	0.350	1.41
High-income net centrality, regional	0.777	0.291	2.67**
Low-income net centrality, national	-0.003	0.309	-0.01
High-income net centrality, national	-0.013	0.241	-0.05
Cross-sectional effects			
Median income	-81.269	8.783	-9.25***
(Median income)^2	62.901	8.296	7.58***
Government sector size	-8.102	1.605	-5.05***
Manufacturing sector size	-8.574	1.373	-6.25***
Trade sector size	-10.318	3.307	-3.12**
FIRE sector size	10.982	6.605	1.66†
Unemployment	-7.571	9.710	-0.78
% Households with self-employment income	5.058	4.880	1.04
% Households with interest, dividends, & rental income	-3.187	2.531	-1.26
% Households with public assistance income	12.104	11.942	1.01
Low-income net centrality, regional	1.135	0.897	1.26
High-income net centrality, regional	-2.042	0.872	-2.34*
Low-income net centrality, national	-0.721	0.708	-1.02
High-income net centrality, national	-1.736	0.767	-2.26*
Micropolitan	-0.538	0.230	-2.34*

Note. $N = 303$.

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Income Segregation

Variation in LMA income segregation was analyzed using a procedure similar to that described above. Following a preliminary analysis which found insufficient variation in income segregation between regions, models were structured with time nested in LMAs (see Table 10). Controlling for income inequality as indicated by the Gini index, racial heterogeneity, and county-to-county movement within LMAs, the national migration patterns of high-income households had significant longitudinal effects (β = .424, p < .05). LMAs that were increasingly central in the national high-income migration pattern tended to be increasingly segregated by household income. This finding is consistent with research indicating that increases in local income segregation result from increased concentrations of affluence over poverty (Reardon & Bischoff, 2011). Cross-sectionally, income segregation was significantly higher in LMAs that were most central in regional low-income migration patterns (β = 5.16, p < .001) but lower in LMAs that most central in national low-income migration patterns (β = -4.39, p < .001).

Calculating the rank-order information theory index using block-group data from the 2007-2011 ACS offers a more refined measure of income segregation than the census-tract based measures used above. Additionally, the ACS provides counts of in-migrating households with delineated places of origin allowing for a more refined estimate of intra-LMA movement than that provided by county-to-county migration data. Table 11 presents results for the regression of block-group based estimates of income segregation on measures of income dispersion, racial heterogeneity, intra-LMA movement, and net centrality in migration patterns. Findings are generally consistent with those above, with high- and low-income net centrality within regions being positively associated with income-segregation (β = .21, p < .01, and β = .26, p < .001, respectively), and high- and low-income net centrality nationally being negatively associated with income segregation (β = -.54, p < .001, and β = -.28, p < .01).

Table 10

Mixed Effects Repeated Measures Model Predicting LMA Income Segregation, 1995, 2000, and 2007–2011

	Model 1		
	β	*SE*	*t* value
Intercept	2.689	2.203	1.22
Longitudinal effects			
2000	-.328	.045	-7.23***
2007–2011	.548	.107	5.14***
Gini index	.190	.030	6.25***
Racial heterogeneity	2.405	1.159	2.08*
Intra-LMA movement, low-income	2.911	8.866	.33
Intra-LMA movement, high-income	13.496	11.439	1.18
Low-income net centrality, regional	.080	.337	.24
High-income net centrality, regional	.299	.268	1.12
Low-income net centrality, national	-.296	.293	-1.01
High-income net centrality, national	.424	.213	2.00*
Cross-sectional effects			
Gini index	.065	.053	1.24
Racial heterogeneity	5.073	.835	6.08***
Intra-LMA movement, low-income	-20.744	13.179	-1.57
Intra-LMA movement, high-income	132.369	26.202	5.05***
Low-income net centrality, regional	5.158	1.277	4.04***
High-income net centrality, regional	.539	1.297	.42
Low-income net centrality, national	-4.385	.929	-4.72***
High-income net centrality, national	-.708	1.054	-.67
Micropolitan	-3.289	.284	-11.59***

Note. $N = 303$.

*$p < .05$. ***$p < .001$.

Table 11

Generalized Least Squares regression predicting LMA income segregation, 2007–2011

	β	*SE*	*t* value
Intercept	12.175	0.172	70.64***
Gini index	0.379	0.132	2.87**
Racial heterogeneity	0.945	0.143	6.61***
Intra-LMA Movement	0.906	0.138	6.55***
Low-income net centrality, regional	0.256	0.067	3.82***
High-income net centrality, regional	0.212	0.080	2.66**
Low-income net centrality, national	-0.280	0.107	-2.63**
High-income net centrality, national	-0.544	0.118	-4.61***
Micropolitan	-2.562	0.314	-8.17***

Note. $N = 303$.

**$p < .01$. ***$p < .001$.

CHAPTER IV

DISCUSSION

Despite declining migration rates, household mobility remains a significant feature of the US landscape. Although the population cannot be characterized, as it once may have been, as "rootless," there are groups for whom mobility is a matter of perennial concern (Fischer, 2002). Among low-income households, for instance, hypermobility based on the search for safe and affordable housing is routine (DeLuca, Rosenblatt, & Wood, 2011; Foulkes & Schafft, 2010), and persistent (Current Population Survey, 2013). Municipal and regional governments also have a heightened interest in mobility, as locales are impacted by the aggregate effects of household migration. Here, the concern extends beyond migration's impact on population change into the domain of economic growth, as city and regional growth have been increasingly contingent on local governments' ability to attract and retain affluent and skilled households (Brenner & Theodore, 2002; Markusen, 2004; Scott, 2008). Mobility remains significant as a process of distinction, differentiating not only migrants from nonmigrants, but groups of migrants as well. Between groups, each with distinct stakes in the migration process, mobility is a resource differentially accessed and distributed (Cresswell, 2010).

Income-differentiated mobility is, in fact, a set of fundamentally distinct processes. Distinct opportunity structures are evident, for instance, when a low-income household moves in search of safe, affordable housing and a high-income household moves to follow a job transfer (Bogue, 2009; Geist & McManus, 2008). Distinct social and organizational networks are evident when "discouraged migrants'" (Davanzo & Morrison, 1981; Newbold, 2001) prematurely return to their places of origin, while "empowered migrants" affect lasting planning and development

policy change in their new communities (Lloyd, 2011; Pattillo, 2007; Salamon, 2003). Distinct approaches to governance are evident when low-income mobility is sanctioned (Bailey & Rom; 2004; Peterson & Rom, 1990), and high-income mobility is incentivized. There are several reasons that a household may decide to move, but the decision is not theirs alone. Moving is a multilevel decision – a confluence of household choices, community conditions, and policy objectives – fragmented on the basis of household income.

This study relates decisional to spatial differences, as income-differentiated households move through, and settle in structurally distinct spatial systems. These systems constitute a heretofore unexplored space of inequality - inequality between places - which impacts inequality and segregation within places. This concluding chapter revisits the study's two guiding questions: to what extent do income differentiated households migrate in structurally distinct patterns, and how do those patterns affect locales? Key findings related to each question are presented along with a discussion of their theoretical and practical implications. Findings are then considered in light of the study's limitations, and discussed in terms of future research.

Income-Differentiated Migration Patterns

The study examines differences between high- and low- income migration patterns through two sets of analyses. The first set adopts a systems perspective that considers migration in terms of the places that households move to and from, as well as the connections between places affected by that movement. The systems perspective is illustrated in Figure 4, which presents, high- and low-income migration patterns feeding into a single LMA over the course of a year. The focus shifts to LMAs in the second set of analyses given the understanding that LMAs are situated in multiple migration systems, as also illustrated in Figure 4. Findings indicate that high- and low-income migration patterns are categorically distinct structures,

centered on distinct types of geographic units, with distinct, but not disjointed, relationships to local labor and housing markets. Theoretical and practical implications are discussed below following a brief overview of key findings related to the distinction between high- and low-income migration patterns.

Key Findings

Income-differentiated migration patterns are understood as spatial systems, and analyzed in three ways: first, in terms of pattern structures, second, in terms of LMAs' centrality within those structures, and, finally, in terms of patterns' differential responses to labor and housing market characteristics.

Pattern structure. The first set of analyses, including the QAP correlation of migration patterns, and significance tests related to the average distances of pattern ties, and LMAs' effectiveness in redistributing population, each indicate that income differentiated patterns are structurally dissimilar. The overall composition of high- and low-income patterns tend to be weakly correlated; distances traveled by high-income movers are greater, on average, than distances traveled by low-income movers; and patterns of high-income movement tend to more effectively redistribute population than low-income patterns. In sum, this set of analyses finds that high- and low-income migration patterns are categorically distinct spatial systems.

LMA centrality. The study introduces the measure, net centrality, to situate and indicate LMAs' relative popularity within multiple migration systems (i.e., regional, national, high- and low-income). Approaching income differentiation in terms of the relative prominence, or centrality, of LMAs, tests for spatial autocorrelation of net centrality scores indicate that centrality scores are clustered in high-income patterns to a much greater degree than in low-income patterns. In other words, where low-income patterns tend to be centered on specific labor

market areas, centrality in high-income patterns is much more diffuse, as represented by sub-regional clusters of central LMAs.

Labor and housing market characteristics. The last set of analyses examine the relationship between LMA labor and housing market characteristics in the year 2000, and subsequent LMA centrality scores. Findings indicate that migration patterns are differentiated on the basis of how they responded to local labor and housing market characteristics. In 2000, for instance, higher wages in education, and health care and social services pulled places towards centrality in regional high-income migration patterns, while pulling places away from centrality in regional low-income patterns.

Theoretical and Practical Implications

This study draws on a theoretical contribution from Marxian geography whereby social fragmentation, whether represented by the division of labor, the distribution of income, or segregated residential patterns, is understood in its local contexts as a function of a locales' position, or prominence, in broader systems of production. Locales, in other words, are seen as relational rather than atomistic, and are constituted by distributions, or flows of capital, which are directed with the objective of mitigating crises of production. Spatial shifts in production, investment, or the locational decisions of firms or households, do not affect equilibrium between places, but rather perpetuate a cycle of uneven development in an ever-shifting geography of core and peripheral places.

Key findings related to income-differentiated migration support the following implications: 1) inasmuch as it is affected by income inequality in the population of migrating households, *social* fragmentation is better understood as *sociospatial* fragmentation, 2) income differentiation not only affects sociospatial fragmentation, but also constitutes distinct types of

territory, and 3) income-differentiated migration patterns are illustrative of economic production as "spatial intervention" (Brenner, 2000; Lefebvre, 1970).

Sociospatial fragmentation. The study demonstrates, first and foremost, that US domestic migration patterns are fragmented on the basis of household income. There is more to migration than reflected in researchers' traditional interest in "'*the*' migration decision and '*the*' migrant" (Plane, Henrie, & Perry, 2005, p. 15318, italics added). Migrating households do not simply move from one place to another. Rather, they affect sociospatial fragmentation at a regional and national scale. Geographical perspectives on social fragmentation are not lacking, but are overly represented by the discourse of political partisanship (e.g., Bishop, 2008), and the familiar trope of a citizenry divided into red and blue states. This study is in line with research finding that concerns over ideological divisions are, perhaps, overstated. Although ideology was not measured in this study, these findings support the assertion that an ideological focus masks the degree to which fragmentation is affected by income inequality (Fischer and Mattson, 2009; Gelman, 2008)

Class and territory. Migration patterns are not only fragmented, but constitutive of distinct forms of territory. On this point, the study advances a basic tenet of Marxian geography that class distinctions have their correlate in distinct types of space. Castells (2000), for instance, distinguishes the "space of places," from the "space of flows," with the movement of poor households confined to the former, and the movement of the kinetic elite constituting the latter. This specific typology is developed here with the finding that low-income migration is not so much confined to, as it is centered on places, while high-income patterns tend to be more spatially diffuse across sub-regional clusters of places.

Implications related to territory, in a more general sense, serve to broaden geographic perspectives on inequality, which, otherwise, tend to be limited to the metropolitan and national scales (Lobao & Hooks, 2007). Inequality, as represented here by income-differentiated migration patterns, is multiscalar, and a function of household movement within and between labor market areas situated in distinct regional and national migration patterns. Where Lichter and Brown (2011), in their review of literature addressing the collapse of the traditional distinction between urban and rural, identify migration as "the heart of (America's) changing spatial and cultural boundaries" (p. 571), findings here suggest that, between high- and low-income migration, there are different "hearts" affecting distinct spatial and cultural boundaries.

Spatial intervention. The study illustrates an understanding of uneven development as a product of interventions that both drive and remediate the consequences of sociospatial fragmentation (Brenner, 2000; Lefebvre, 1970). Considering, in particular, the differential effect of relative wages in education and health services on high- and low-income centrality (Table 7), the findings suggest that "intervention" refers to two processes that, while interrelated, operate at cross-purposes. In the first sense, efforts to attract, or grow, the education and health services industry ("Eds and Meds", Adams, 2003) in a given locale are interventions affecting economic development. On the other hand, intervention can also refer to efforts meant to remediate the effects of displacement of low-income households, or to improve households' access to education and health services-related resources. The actual practices comprising either type of intervention are, of course, hypothetical in the present discussion. The study's findings, however, reasonably illustrate the tension between economic growth and social equity, and, more importantly, the tension's spatial and temporal contexts. Interventions meant to remediate sociospatial fragmentation affected by economic growth are predicated on the same.

The implication, then, is that intervention toward social equity cannot be limited to addressing the sociospatial fragmentation affected by growth, but must also target the temporal, regulatory process that operates prior to the implementation of a growth strategy. This is an approach to intervention described by Benner and Pastor (2012) as "just growth," which is characterized by regulation at the metropolitan and regional scale that represents "not just the 'usual suspects' of urban growth coalitions but a broader constellation of community interests and perspectives" (p. 8).

Income Migration, Inequality, and Segregation

After establishing that migration patterns are differentiated on the basis of household income, and that LMAs are, thus, situated in multiple interlocal migration systems, the study shifts to the question of how these distinct migration patterns may affect different locales. Specifically, the study analyzes the relationship between LMA position in high- and low-income migration patterns, and changes in local income inequality and segregation over time.

Key Findings

Comparing income-differentiated migration patterns in reference to a typology of the relative incomes of inmigrants, outmigrants, and nonmigrants indicates that high- and low-income migration patterns tend to be linked to the upper and lower tails, respectively, of local income distributions. This is almost always the case with low-income migration patterns, as their average household income is typically less than that of nonmigrants. In high-income patterns, migrants' average household income is often higher than nonmigrant income, although the frequency varies across regions

An analysis of the impact that migration patterns have on local income distributions finds a significant positive association between income inequality and locale's centrality in regional high-income migration patterns. As LMAs become increasingly central in regional high-income systems, their income distributions tend to be increasingly unequal. LMAs that were already particularly central in regional high income systems, however, tended to have lower levels of income inequality.

Similarly, with regards to income segregation, increasing centrality in national high-income patterns was found to be associated with locales becoming increasingly segregated by income over time. The association between net centrality and income segregation differed between regional and national patterns, suggesting that while regional migration patterns may exacerbate local income segregation, national migration patterns tend to be centered on locales that are already relatively less segregated.

Theoretical and Practical Implications

The aggregate impact of household migration over time can significantly affect local income inequality and segregation. High-income migration is particularly noteworthy for two reasons. First, as a matter of being in agreement with previous research, the study's findings regarding high-income migration are consistent with the consensus that increases in income inequality have been affected, nationally, by increasing shares of income among the wealthiest households, and that increasing income segregation reflects growing concentrations of affluence. Second, findings indicate that increases in local income inequality and segregation may, in part, be an outcome of growth strategies targeting affluent and skilled households. While the study does not directly account for the implementation of class-biased growth strategies, the income-differentiated patterns examined here do give an indication of household preferences over time.

Following these preferences, as indicated by migration patterns, increases in income inequality and segregation are associated, in part, with a locale's increasing popularity among high income migrants.

The longitudinal association between high-income centrality and inequality calls into question the benefits of public investment in growth strategies that singularly target high-income households. "Creative city" strategies adopting Richard Florida's (2010) direction to invest in cultural amenities that will, in turn, attract affluent and skilled households, are widely implemented, for instance, but also associated with comparatively high levels of income inequality. As Florida (2010) describes it, "The list of unequal metros reads like a who's who of Creative Class centers" (p. 359). The strategic dimension of the creative city thesis – its "selling point," in other words – is not implicated, though, insofar as inequality can be attributed to historical institutional factors such as skill-based technical change and concentrated, multigenerational poverty.

Findings here, however, indicate that adherents to creative city strategies – namely, local governments, real estate interests, and arts and cultural institutions (Catungal & Leslie, 2009; Grodach, 2011) – cannot dismiss increasing income inequality and segregation as issues beyond the scope of local intervention. Increasing income inequality and segregation can, in fact, be counted among the returns on local public investments in attracting affluent and skilled households. This is a finding recently supported by none other than Florida (2013), who has demonstrated that the local economic benefits of talent clustering are not broadly shared, but rather, accrue to skilled labor.

Illustrating Migration's Impact on Income Distributions

A comparison of longitudinal and cross-sectional effects suggests that migration's impact on local distributions of income over households varies based on the trajectory of LMAs' centrality within regional high-income migration systems. In this section, implications are illuminated with a more detailed assessment of the relative incomes of migrants and nonmigrants in three select LMAs in Texas, New York, and North Carolina. San Antonio-New Braunfels, TX illustrates the impact of income migration in an LMA making a particularly large shift over time toward centrality in regional high income patterns; Glens Falls, NY illustrates the impact of income migration in an LMA with a relatively high and stable ranking in regional high income centrality; Durham-Chapel Hill, NC illustrates the impact of income migration in an LMA recognized as adept in attracting skilled labor. Figure 21 presents changes in high- and low-income centrality, income inequality, and income segregation in each case from 2000 to 2007-2011.

San Antonio–New Braunfels, TX. Described as "the most recession-proof city in America" (Thompson, 2010), the San Antonio area was increasingly central in both regional high- and low-income patterns, and increasingly unequal and segregated. Migration patterns' relationship to local income distributions is evident in Figure 22, where high-income inmigrants tended to have higher incomes on average than both outmigrants and nonmigrants. High-income migration patterns, in other words, are feeding into the upper tail of San Antonio's income distribution. Low-income patterns, on the other hand, are feeding into the lower tail of the local income distribution, although low-income inmigrants tend to have slightly higher incomes on average than low-income outmigrants. High- and low-income migration patterns, then, can be described as having a polarizing effect on the San Antonio-New Braunfels area's income distribution.

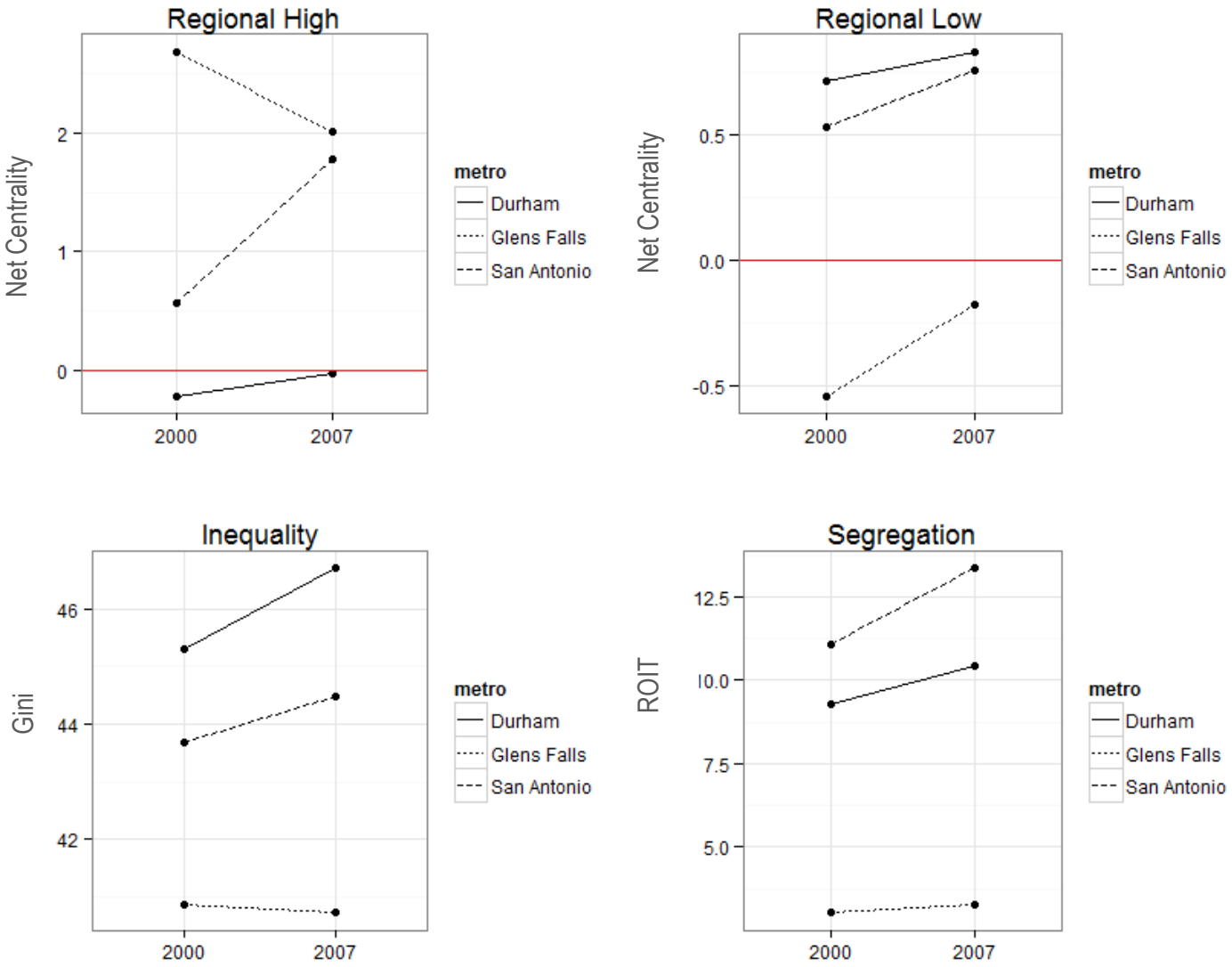


Figure 21. High- and low-income net centrality, income inequality, and income segregation in select LMAs, 2000–2007/2011.

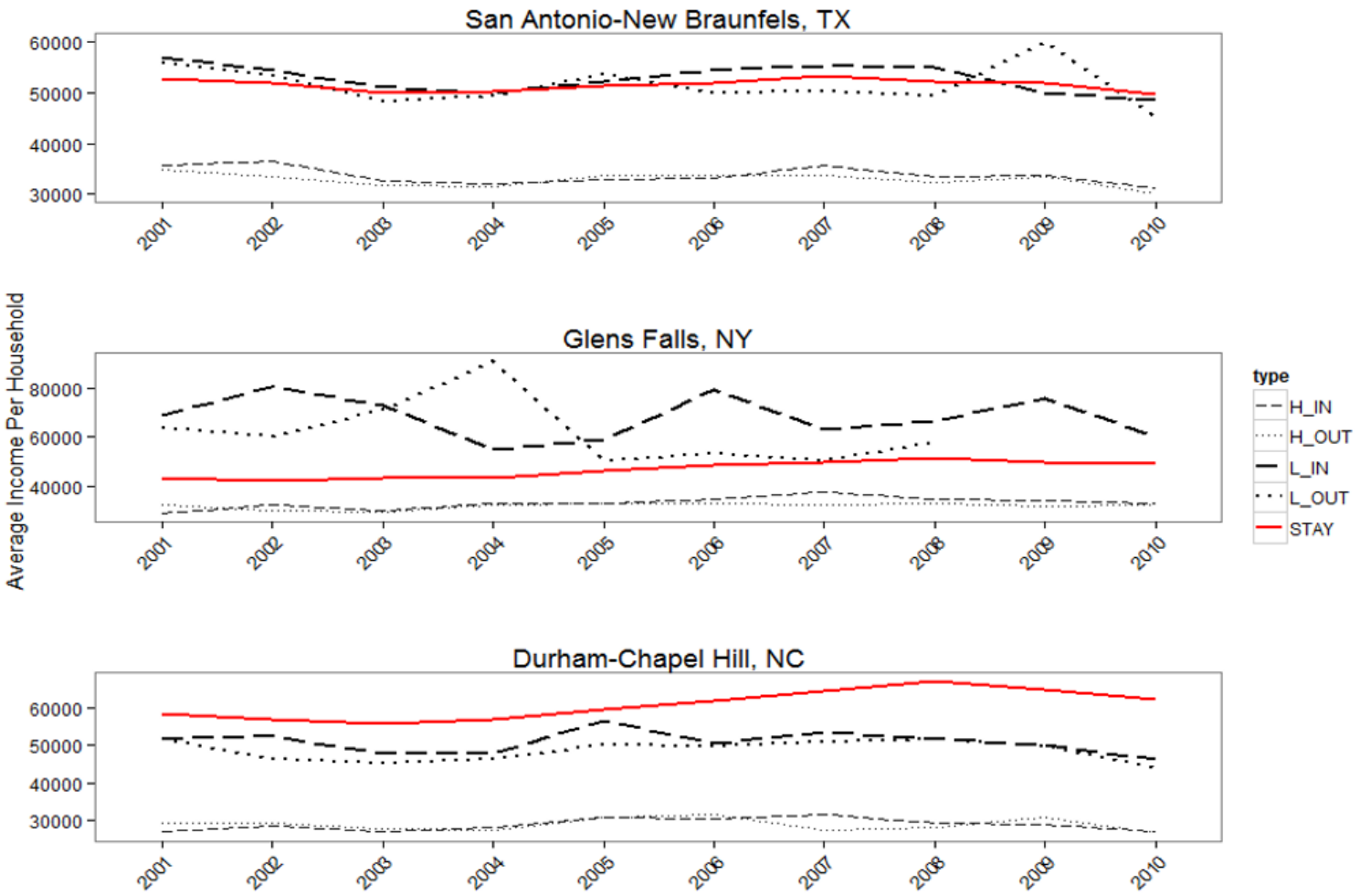


Figure 22. Relative incomes of inmigrants, outmigrants, and nonmigrants in select metro areas, 2001–2009.

Glens Falls, NY. Alternatively, in Glens Falls, NY – included among Sperling's (2005) "Best Places to Live," and recently ranked 12th in Forbes' (2012) "Best Small Cities for Jobs – had a slight shift away from regional high income centrality between 2001 and 2010, but still retained a relatively high ranking in both years. While becoming increasingly central in regional low-income migration patterns, the area tended to have net losses of low-income population year-by-year. The area's distribution of income over households is characterized by decreasing inequality with a slight increase in segregation. As with San Antonio-New Braunfels, TX, regional high-income migration is feeding into the upper tail of the income distribution in Glens Falls. Regional low-income patterns, however, are having a homogenizing effect on the income distribution, increasing the area's average income per household through their departure.

Durham–Chapel Hill, NC. The metropolitan area of Durham-Chapel Hill, NC is selected as a case representing a city adept in the interlocal competition, topping the list of "creative cities" in 2012 (Creative Cities, 2012), and recognized as a particularly competitive area since the publication of *The Rise of The Creative Class* in 2002. While Durham-Chapel Hill has presented net losses in high-income migration over the past 10 years, the magnitude of the loss was diminishing up until 2009, as the area became increasingly central in regional high-income patterns. With in- and out-migrants, alike, having lower incomes, on average, than the area's nonmigrants, the effect of high-income migration patterns on the area's increasingly unequal and segregated income distribution can primarily be characterized as hollowing out the income distribution. In-migration, however, is likely feeding into the upper tail of the income distribution, albeit to a small degree, given the tendency for high-income inmigrants to have slightly higher incomes, on average, than high-income outmigrants.

Limitations

The study's limitations are considered here in relation to its objectives. Addressing the extent to which migration patterns are differentiated on the basis of household income is limited by the IRS migration data, and the somewhat arbitrary delimitation of income groups. The data, as described earlier, account for roughly 80 percent of actual migrating households, and it is likely that extremely high- and low-income households are underrepresented. These limitations likely affect the precision of the estimated pattern shapes used to measure the correlations between high- and low-income patterns, and the rankings of LMA centrality within both pattern types. Similarly, measurements of pattern shapes and LMA positionality are likely impacted by the inability to account for other demographic factors influencing the migration process. It is possible that if the IRS migration data were broken down by age cohort, for example, that income-based distinctions would be muted relative to age-based distinctions. Alternatively, as Conway and Houtenville's (2003) analysis of the distinctions between the migration patterns of older and younger elderly would seem to indicate, the study likely underestimates household income's impact on differential migration. In any case, given the limitations of the data, pattern differentiation must be interpreted as being coincidental to, rather than caused by differences in household income.

The study's second objective – to relate the distribution of income over migrating households to the distribution of income within locales – is limited by the means available to calculate inequality in both migrating and non-migrating populations. Given the data used to represent these two distributions, namely the IRS migration data, the decennial census, and American Communities Survey, any attempt to research their relationship comes by way of a trade-off between scale and precision. Migrant household-level income data available from the Integrated Public Use Microdata Series, for instance, would offer a more precise estimate than

the IRS data of the distribution of income within a given migration tie. These ties, however, would be between PUMAs rather than labor market areas. While less precise, the proposed research offers a novel approach to gleaning information about the distribution of income over migrating households at a geographic scale where issues of income inequality and income segregation are of greater practical significance.

Conclusion and Future Research

After characterizing inequality research as empirical claims falling to politicized moral debate, Christopher Jencks (2002) argues that income inequality is only as relevant as its consequences. At issue is the ease with which inequality is decontextualized as mathematical abstraction or a timeless, spaceless feature of the human condition. This study has sought to develop inequality research by including divergent trajectories of local and regional development among the consequences of inequality. In doing so, the study contributes a novel, and broadly accessible and applicable method for researching inequality in its spatial contexts.

One of the study's primary objectives was to identify the local effects of national and regional class sorting. By relating local income inequality to inequality within the population of migrating households, the study finds that income dispersion between places does, indeed, affect the dispersion of income within places. This can only be counted as a preliminary finding, however, given the number of possibilities for future research that emerged in the process of the study. This section identifies two major trajectories for future research. The first involves methodological refinement to further unpack population change as a process affecting population and income distribution at multiple scales. The second brings further contextualization to income inequality and segregation by developing the understanding of the political dimensions of income-differentiated migration.

Methodological Development

The relationship between differential migration and local income inequality and segregation is analyzed here primarily in terms of migration patterns parsed according to the distribution of income over migrating households. The simple application of an inequality measure to a widely accessible longitudinal data set makes the method appealing for studying income differentiated migration. The three metropolitan area cases above, however, suggest that the measure might be developed to account for the various types of effects that income-differentiated patterns can have on local income distributions. Three types of effects – polarizing, homogenizing, and hollowing out – are evident in the three cases considered. Further development of a typology of income-differentiated migrations effects on local income distributions is necessary for understanding the local consequences of regional and national income sorting.

Related to typology, the description of inmigrants, outmigrants, and nonmigrants relative incomes in Figure 22 suggests that the Theil measure might also be applied at the local level, measuring income dispersion over nonmigrants, and high- and low-income inmigrants and outmigrants. This measure could be used along with the typology to indicate the magnitude of migration's effect on the distribution of income in a given locale.

Regional and Temporal Variation

The study's use of multilevel analysis models change over time while controlling for regional effects. The study identifies a number of events and regionally specific trends, however, which suggest that historical events and regional variation requires further study. On the subject of class sorting, for instance, the apparent peak in inequality among migrating households evident in 2002 (Figure 3) is a potentially epoch-defining event whose correspondence with the

peak in inequality, generally, cannot be taken for granted. Future research should give specific attention to income-differentiated migration in its historical and institutional contexts. Similarly, the regional variation in the relative incomes of migrants and nonmigrants indicated by Plane's typology in the previous chapter (Figure 20) suggests that the magnitude of class sorting's effect on local income inequality and segregation would likely be more pronounced in the Far West and Mideast regions given the frequency with which the average income of high-income inmigrants exceeds both outmigrants and nonmigrants. A study focusing on these regions at the height of income dispersion among migrating households may bring further insights to understanding income-differentiated migration.

Migration and Governance

The present study's interest in local governments' efforts to attract affluent and skilled migrants is related to a line of research that follows the theoretical contributions of Rusche and Kirchheimer (1939), and later, Foucault (1979), who theorize migration and punishment as interrelated aspects of a mobility regime which disproportionately subjects marginalized populations to state control. Exploring the connections between the prison population boom, economic restricting and demographic shifts beginning in the 1970s, this line of research maintains that current conditions of mobility are subject to a mode of regulation that developed in the US during the monetary crisis of the early 1970s as a strategy to induce the return of upper and middle class households to central cities after two decades of so-called "white flight" (Harvey, 1989; Quercia & Galster, 1997). Inasmuch as these strategies target potentially-mobile elites to affect economic growth, they also target the poor with increased punitiveness (McFarlane, 2006; Simon, 2007). Simon (2007), for instance, argues that state and local economic development and punishment have, together, coalesced around a new "key center of

political mobilization…a political subject that is both taxpayer and (potential) crime victim" (p. 109).

The present study's attention to migration patterns' impact on income inequality and income segregation, and the degree to which high- and low-income migrations are linked to the upper and lower tails of local income distributions, can be extended to contextualize local patterns of criminal sentencing. While the increasing rate of imprisonment has tracked with increasing inequality, empirical support for the claim that inequality has caused increased punitiveness has generally been weak (Western, Kleykamp, & Rosenfeld, 2004). What is certain, though, is that the lower tail of the income distribution has been disproportionately represented in the prison population boom. The mass incarceration of already socially and economically marginalized groups has created a community-level condition where the administration of both prison systems and poor, and largely Black and Hispanic neighborhoods, have become isomorphically equivalent (Wacquant, 2001). In network terms, the strong ties between neighborhoods and prisons, along with deteriorating community-level forms of social control and the destabilizing influence of economic deprivation and high rates of residential turnover, constitute what Rose and Clear (1998) describe as "coercive mobility." Referring to Myrdal's theory of circular and cumulative causation, incarceration, as a type of mobility, serves to not only isolate the incarcerated, but their neighborhoods of origin as well, producing a vicious cycle of imprisonment leading to increased imprisonment (Clear, Rose, Waring & Scully, 2003). The relationship between the various types of mobilities, as they are distributed across high- and low-income households, alike, requires further research.

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