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Access to Employment for Adults in Poverty in the Buffalo–Niagara Region

Daniel Baldwin Hess

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Summary. This study extends the spatial mismatch literature by examining access to employment for the low-income population in Erie and Niagara Counties in western New York State. The analysis uses geographical information systems (GIS) to map residence and employment locations and calculate measures of employment and transport access. Throughout the two-county region, two-thirds of adults in poverty live within close proximity to a reasonable number of low-wage jobs. The ratio of the number of jobs accessible within a 30-minute commute by automobile versus public transit varies only slightly across neighbourhoods with high poverty rates. The close proximity of the suburbs to the central city and the network of grid and radial streets connecting the two places make suburban job access reasonable. Thus, despite higher numbers of low-wage jobs in the suburbs, job access in the city is superior to job access in the suburbs due to higher densities of employment opportunities and the existence of developed transport networks. While poverty is highly centralised in the cities of Buffalo and Niagara Falls, the analysis suggests that, based on the spatial distribution of low-wage employment and concentrations of poverty, central-city locations have significant advantages in terms of proximity to jobs. However, Black/African American adults in poverty have poorer access to automobiles than Whites, and, as a result, they may be able to search for jobs only within a smaller area. This study recommends enhancements to public transit in places with large concentrations of low-wage jobs and increased access to reliable automobiles in places with small concentrations of low-wage jobs. Above all, unemployment rates in low-income neighbourhoods suggest a need to enhance programmes to improve job readiness, placement and support services.

Introduction

In 1996, US Congress established the Personal Responsibility and Work Opportunity Reconciliation Act, also known as the welfare reform act, which replaced the Aid to Families with Dependent Children (AFDC) with the Temporary Assistance for Needy Families (TANF) block grant programme. This new law dramatically changed the federal assistance policies for eligible families by curtailing lengthy benefit periods and it put in place a new system of time-limited benefits that required active participation in the labour force. As a result, many unemployed individuals whose benefits expired began actively seeking employment.

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For those attempting to free themselves of poverty, finding and maintaining employment poses many challenges. The transport barriers faced by low-income workers and potential workers prevent many from finding a job. There is a large body of research suggesting that adequate transport is a key factor in securing and maintaining employment (Allard and Danziger, 2003; Blumenberg, 2002; Blumenberg and Ong, 1998; Cervero *et al.*, 2002; Danziger *et al.*, 2000; Holzer, 1988; Katz and Allen, 1999; Ong, 1996, 2002; Ong and Blumenberg, 1998; Pugh, 1998; Shen, 1998). The disadvantages of relying on public transit for both job search and commuting, particularly for low-income workers (especially women with children), may include long headways, limited service hours, costs, difficulties in making multiple stops on the way to or from work and safety issues, particularly after dark (Blumenberg and Ong, 2001; Bullard and Johnson, 1997; Hanson and Pratt, 1995).

Further complicating the physical separation between home and work is the notion of a 'spatial mismatch', a hypothesis which was first examined by John Kain (1968, 1992) and which asserts that employment access for low-income city residents—and especially minorities—decreased due to a shift of jobs from cities to suburbs (Holzer, 1991; Ihlandfeldt, 1992). Kain argued that residential segregation confines low-income families to distressed inner-city neighbourhoods where, owing to lower automobile ownership rates, they are less able to reach job opportunities in the suburbs and are therefore more likely to be unemployed (Kasarda, 1980; Wilson, 1987). As a result, poor and minority households usually devote a larger share of their incomes to transport-related expenses. The journey-to-work for low-income individuals is further challenged by low automobile ownership rates and often deteriorating public transit systems.

Contrary to evidence of spatial mismatches in other metropolitan areas, however, the findings here suggest that both poverty and low-wage employment are concentrated in the cities of Buffalo and Niagara Falls. As a result, the greatest access to low-wage employment occurs in centrally located neighbourhoods. However, adults in poverty have limited access to automobiles which restricts their employment opportunities.

Background

Over the years, the spatial mismatch has received a great deal of attention in academic literature. More recently, the underlying premise of the spatial mismatch hypothesis has been used in the study of welfare-to-work transport. To assess whether low-wage workers face a spatial mismatch, researchers have performed a variety of socio-spatial analyses to identify the locations of low-wage workers and low-wage jobs and evaluate the transport networks that link them (Bania *et al.*, 2000; Jeskey, 2000; US Department of Transportation, 1998). The previous studies summarised in Table 1 highlight the diverse findings by researchers that describe the severity of spatial mismatch in US metropolitan areas where the phenomenon has been studied (Table 1 is adapted from Blumenberg and Hess (2003) and Blumenberg *et al.* (2002)).

Many of these studies do indeed find that certain low-wage workers face a spatial mismatch, although not necessarily a mismatch between central city and suburb as was originally described by Kain (Allard and Danziger, 2003; Bania *et al.*, 1999; Lacombe, 1998; Pawasarat and Stetzer, 1998; Pugh, 1998; Rich, 1999; Sawicki and Moody, 2000). The findings of other studies, however, differ (Cohn and Fossett, 1996; Jencks and Mayer, 1990; Laube *et al.*, 1997). Most cities, though, have some places with high unemployment rates and low concentrations of jobs. In these places, low-wage workers often live far from employment opportunities, even if these employment opportunities are located in central cities. The body of research suggests that the spatial mismatch is more prevalent in highly segregated metropolitan areas[1] where reverse commuting is difficult and less relevant in smaller

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Table 1. Previous studies of welfare recipients' access to employment

City-region (reference)	Spatial mismatch	Type of spatial mismatch	Access to public transit
Atlanta, GA			
(Rich, 1999; Sawicki and Moody, 2000)	High	Central city–suburb; Suburb-to-suburb	Low
Boston, MA			
(Lacombe, 1998)	High	Central city–suburb	Low
(Shen, 2001)	Variable	Neighbourhood	N/A
(Cohn and Fossett, 1996)	Low	Neighbourhood	High
Chicago, IL			
(Pugh, 1998; Thakuriah *et al.*, 1999)	Medium	Central city–suburb	High
Cleveland, OH			
(Bania *et al.*, 1998)	High	Central city–suburb	Low
Detroit, MI			
(Allard and Danziger, 2003; Laube *et al.*, 1997)	High	Central city–suburb; Suburb-to-suburb	Low
Houston, TX			
(Cohn and Fossett, 1996)	Low	Central city–suburb; Suburb-to-suburb	Low
Los Angeles, CA			
(Blumenberg and Ong, 2001)	Variable	Neighbourhood	Varies
(Blumenberg and Hess, 2003)	Medium	Neighbourhood	Varies
Milwaukee, WI			
(Pugh, 1998; Pawasarat and Stetzer, 1998)	High	Central city–suburb	Low
Oakland, CA			
(Cervero *et al.*, 2002)	Variable	Variable	Variable
(Blumenberg and Hess, 2003)	Medium	Variable	Variable
Philadelphia, PA			
(Pugh, 1998)	Medium	Neighbourhood; Inner-city gaps	Low
St. Louis, MI			
(Laube *et al.*, 1997)	Low	1.9 jobs in the city for every employed city resident	N/A

metropolitan areas where commutes are less burdensome (Ihlandfeldt and Sjoquist, 1998).

Table 1 also reveals that in some metropolitan areas, such as Detroit, the poor experience a distinct mismatch between central-city residential neighbourhoods and suburban job opportunities. In other places, the spatial mismatch is less extreme; for example, the poor experience more localised or neighbourhood-level mismatches in Los Angeles and Philadelphia. It is difficult to distil common findings from this body of research because the studies rely on varying data sources and methodologies and were conducted at different points in time. However, the research suggests that some low-income adults in every metropolitan area studied experience spatial isolation from employment and suffer from poor access to public transit.

Description of Research

Despite the growing number of studies on this topic, relatively little research has systematically compared low-wage workers' access to jobs and public transit across areas with

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highly differentiated urban structures. Blumenberg and Hess (2003) examined welfare recipients' access to jobs and transport in three diverse California counties—Alameda, Fresno and Los Angeles—and found that, although the majority of welfare recipients live in job-rich areas, there remain neighbourhoods in all three counties in which welfare recipients are spatially isolated from jobs and, if employed, must sustain long commutes to distant locations. Job-poor neighbourhoods are not unique to inner cities—they are also part of older, inner-ring suburbs as well as non-urbanised areas (Blumenberg and Hess, 2003).

To extend the research of the California study and explore the relationship between urban structure and job access in a different metropolitan setting, this study examines the nature of access and mobility challenges for the low-income population in Erie and Niagara Counties, two adjacent counties in western New York State that together constitute the Buffalo–Niagara Falls metropolitan area.[2] The hypothesis is that low-wage employment access varies considerably both within counties (because of neighbourhood characteristics) and between counties.

The Study Area

The Buffalo–Niagara Falls metropolitan statistical area, shown in Figure 1, is comprised of Erie County (population 950 300) and Niagara County (population 219 800) which borders Erie County to the north (US Bureau of the Census, 2000).

The largest city in Erie County, Buffalo is a prototypical medium-sized city in the Great Lakes region with a central core and inner-ring suburbs surrounded by outer-ring suburbs. Population density is high in the central city but, owing to dispersion and declining population, not as high as it was in the middle part of the 20th century. Distances between suburbs and the central city are, for the most part, relatively short—the average travel time to work for residents of both the city and suburbs is 21 minutes, one of the shortest average commutes among medium- and large-sized metropolitan areas and shorter than the nation-wide average commute time of 25.5 minutes (US Bureau of the Census, 2000). Both city and suburbs are well-served by a network of grid and radial streets, highways and expressways, and transit routes (Ernst, 1999).

Niagara Falls, the urban centre of Niagara County, is the second-largest city in the Buffalo–Niagara metropolitan area. The city has fewer inner-ring suburbs and is instead surrounded by industrial areas and rural land. The streets are arranged in a grid and, although there is less transit service than in Erie County, average travel time to work is slightly shorter than the travel time in Buffalo.

Since the 1950s, the region's population has exhibited decline and abandonment in the central cities and slow growth in surrounding areas (Goldman, 1983, 1990). The population of the City of Buffalo declined 50 per cent between 1950 and 2000, while the population of Erie County increased 6 per cent during the same 50-year period, although the county reached a peak population in 1970 that exceeds today's population (US Bureau of the Census, 2000). During the second half of the 20th century, the region's dwindling population left both Buffalo and Niagara Falls and their inner-ring suburbs and sprawled outward to suburban towns such as Clarence, Lancaster, Lockport, Orchard Park and beyond (Cervantes, 2000).

Similar trends continue today. The population in Buffalo fell by 11 per cent between 1990 and 2000, while it increased 3 per cent in the suburbs. In a region that is not experiencing growth (in fact, the metropolitan area lost about 2 per cent of its population during the decade), suburban growth comes at the expense of prosperity in the urban core (US Bureau of the Census, 1990, 2000). Niagara County mirrors Erie County's pattern of city and suburban growth and decline. The population in Niagara Falls fell by 10 per cent during the past decade, while it also increased 3 per cent in the suburbs.

Like many ageing places, the Buffalo–Niagara metropolitan area has experienced suburban sprawl and a shift of jobs and residences outside the central city. Nevertheless,

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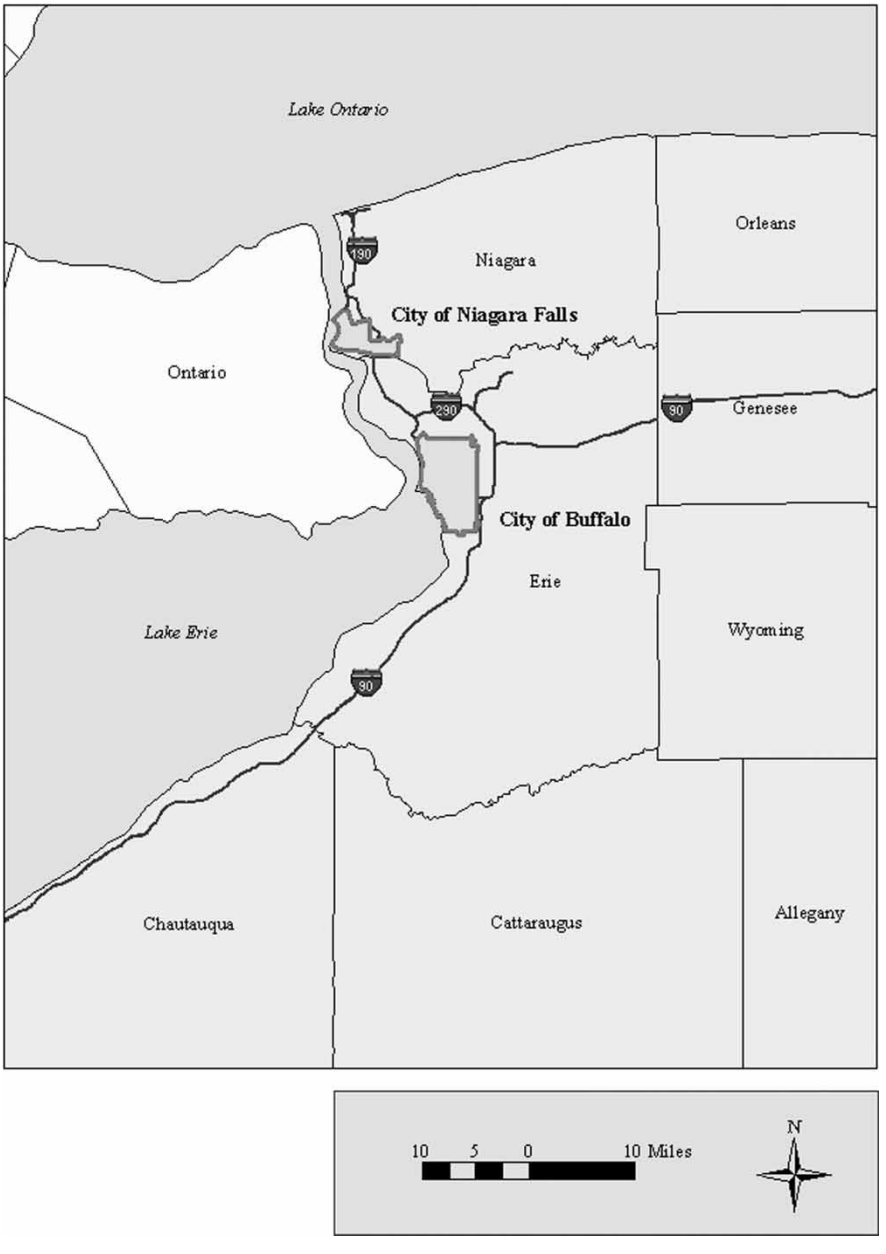

Figure 1. The study area.

Buffalo and Niagara Falls have large transit-dependent populations needing access to employment, now more spatially diffuse. An increasing number of job opportunities (in the retail, service and healthcare fields, for example) are available in suburbs throughout Erie and Niagara counties, although public transit underserves these markets. Traditional fixed-route transit service provided by the Niagara Frontier Transport Authority (NFTA) is, for the most part, oriented towards commuting to the city centre; low population densities in the suburbs understandably make frequent transit service there impractical.

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Data Sources

This analysis uses geographical information systems (GIS) to map residence and employment locations and calculate measures of employment and transport access for the two counties. Data from the 2000 US Census is used: to analyse the spatial distribution of low-income neighbourhoods as well as their population characteristics (race/ethnicity, age, household structure and education); and, to develop profiles of the population of low-income working-age adults and their relative access to low-wage jobs and public transit (US Bureau of the Census, 2000). The data describing low-wage jobs, which come from a directory of employment in both the private and public sectors provided by American Business Information (2000),[3] serve as a surrogate for the jobs that adults in poverty would seek (Blumenberg, 2004; Blumenberg and Ong, 2001). This approach is consistent with research examining the probability of employment by poor people (Deka, 2002; Sharpe and Abdel-Ghany, 1994).

Job access was measured by examining low-wage workers' relative access to low-wage jobs assuming dependence on existing transport networks. The NFTA provided spatially referenced data on transit routes, light rail stations and bus stops. The Greater Buffalo–Niagara Frontier Transport Council (GBNRTC) provided travel-time information for the street and transit networks in Erie and Niagara Counties. These data allowed a calculation of the distance low-wage workers could travel by either auto or public transit within 30 minutes; job access was measured by combining these travel distances with the number of low-wage jobs available within a 30-minute radius from neighbourhoods with high concentrations of low-wage workers.

Key Characteristics of Cities and Suburbs

Table 2 presents key characteristics of the two counties' cities and suburbs. Racial minorities are concentrated in the two cities but absent in large numbers in the suburbs: Whites constitute 56 per cent of the population of the City of Buffalo and 94 per cent of the population of its suburbs and Blacks/African Americans constitute 35 per cent of the population of the city and 2 per cent of the population of the suburbs (Lewis Mumford Center, 2003; US Bureau of the Census, 2000). Both Buffalo and Niagara Falls are more racially diverse than their suburbs; the contrast is starkest between Buffalo (54 per cent White) and its suburbs (95 per cent White). The cities of Buffalo and Niagara Falls have higher shares than their suburbs of racial minorities and low-income families.

Perhaps not surprisingly, the cities of Buffalo and Niagara Falls have lower incomes than their suburbs, higher unemployment rates and thus higher poverty rates.[4] In Buffalo, 21 per cent of working-age adults live below the poverty level. Among all Blacks/African Americans, 37 per cent in the city but only 2 per cent in the suburbs live below poverty. (Nation-wide, just under 11 per cent of all adults 18 years of age and over live in poverty (2000 US Census).) Throughout the Buffalo–Niagara region, approximately 60 per cent of adults in poverty are female and 40 per cent of adults in poverty are male. The data suggest that there is a greater degree of non-urban poverty in Niagara County than in Erie County.

The Journey to Work

Residents of cities and suburbs throughout the region experience typical urban travel conditions along a mix of highways, arterials and local streets. Comparable with metropolitan areas in its peer group (including Cleveland, Detroit, Pittsburgh and St Louis), the Buffalo metropolitan area has shorter commute times and lower levels of automobile use for commuting (Institute for Local Governance and Regional Growth, 2000). In Buffalo, a striking 31 per cent of *all* households are without vehicles.[5] Nevertheless, the majority of workers commute to work by automobile, although 18 per cent combined ride transit and walk to work. In the City of Niagara Falls, 23 per cent of households are without vehicles and 8 per cent

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Table 2. Key characteristics of cities and suburbs

Characteristic	City of Buffalo (1)	Rest of Erie County (2)	Erie County total (3) = (1) + (2)	City of Niagara Falls (4)	Rest of Niagara County (5)	Niagara County (6) = (4) + (5)
Population						
Number of persons (2000)	292 600	640 400	950 300	55 700	158 900	219 800
Population change (1990–2000) (percentage)	−10.8	+2.7	−1.9	−9.9	+3.3	−0.4
Employment and earnings						
Median annual household income (1999) ($)	24 500	na	38 600	26 800	na	38 100
Households on public assistance (1999) (percentage)	10.3	1.7	4.5	7.0	2.8	4.0
Unemployment rate (percentage)	12.0	5.3	7.3	10.1	4.9	6.1
Poverty rate among working-age adults (percentage)	20.6	5.1	9.7	15.9	8.2	8.5
Demographic						
White (percentage)	54.4	94.5	82.2	76.2	95.6	90.7
Black/African American (percentage)	37.2	2.2	13.0	18.7	1.9	6.1
Transport to work						
Drove (carpool/single occupancy) (percentage)	79.9	94.3	90.6	89.1	94.9	93.6
Transit (percentage)	12.3	1.2	4.1	3.1	0.5	1.1
Walked (percentage)	5.3	1.7	2.7	5.2	2.2	2.8
Households without vehicle (percentage)	31.4	7.0	15.1	22.5	6.4	11.1
Mean travel time to work (minutes)	21.2	na	21.3	17.1	na	20.1
Work location						
Job in city (percentage)	60.2	26.7	35.5	54.9	17.6	25.8
Job in suburbs (percentage)	38.2	70.3	61.9	44.3	79.2	71.5

Source: US Bureau of the Census (1990 and 2000, Summary Files 1, 2, and 3).

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travel to work by transit and walking. In fact, Buffalo routinely ranks among the top 10 US cities for the highest share of people who walk to work (Niagara Frontier Transportation Committee, 1997). In 2000, 7.3 per cent of all work trips in Buffalo were made on foot and 5.6 per cent of all work trips in the region were made on foot (GBNRTC, 2003). Nation-wide, less than 3 per cent of work trips were made on foot (2000 US Census). A comparative lack of affluence in the city helps to increase the walk share mode.

In both counties, most city residents work in the cities and most suburban residents work in the suburbs. However, the 2000 census reported that fewer than 35 per cent of residents in the two-county region who worked had jobs in the two largest cities (Buffalo or Niagara Falls), while approximately 65 per cent worked in the suburbs. In Erie County, more people work in the suburbs (62 per cent) versus the city (36 per cent); in Niagara County, 72 per cent work in the suburbs and 26 per cent work in the city. Perhaps not surprisingly, the largest group of workers in Erie County lives in one suburb and works in another (Schulman, 1998), reflecting the well-documented national trend of increasing suburb-to-suburb commuting (Pisarski, 1996).

Analysis

Spatial Distribution of Adults in Poverty

Like low-income residents in many US cities, low-income residents in Erie and Niagara Counties are more spatially concentrated in the two central cities than in suburbs and outlying areas. In Erie County, 65 per cent of all adults in poverty live in the City of Buffalo, while in Niagara County 47 per cent of all adults in poverty live in the City of Niagara Falls. The data from the US Census Bureau presented in Figure 2 suggest that Erie County generally shows a higher degree than Niagara County of spatial concentration of adults in poverty, although adults in poverty in Niagara County are spatially concentrated within about 3 miles (5 km) of the Niagara

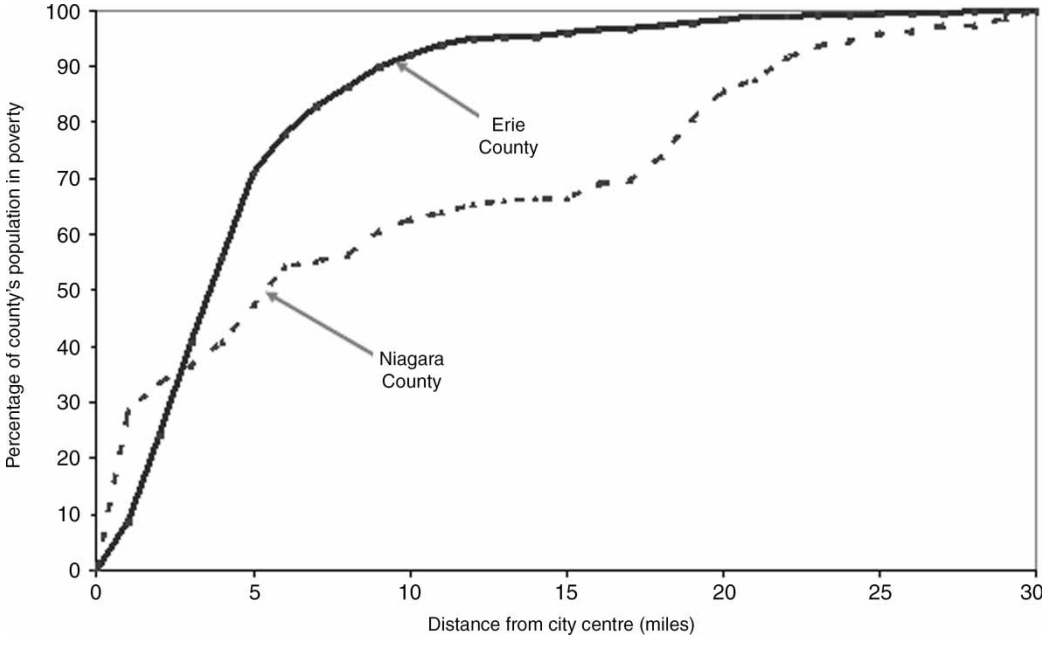

Figure 2. Spatial distribution of the population in poverty. *Note*: 1 mile = 1.6 km. *Source*: US Bureau of the Census (2000, Summary File 1).

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Falls' downtown (US Bureau of the Census, 2000). In Niagara County, more than 50 per cent of adults in poverty live within 6 miles (10 km) of downtown Niagara Falls, while in Erie County, more than 70 per cent of adults in poverty live within 6 miles (10 km) of downtown Buffalo (US Bureau of the Census, 2000).

Key characteristics of impoverished neighbourhoods are shown in Table 3 and the locations of the neighbourhoods are mapped in Figure 3. The neighbourhoods selected for this study comprise *all* individual census block groups or combinations of adjacent census block groups with more than 350 adults and more than 40 per cent of working-age adults (18 years of age or more) living in poverty (Jargowsky, 1997; Jargowsky and Bane, 1991).[6] Of the 11 high-poverty neighbourhoods in Erie County, 10 are located within the boundaries of the City of Buffalo and only one—Lackawanna First Ward—is located along the city's southern boundary in a first-ring suburb. All three high-poverty neighbourhoods in Niagara County are located in the City of Niagara Falls.

In Erie County, a few impoverished neighbourhoods have particularly distressing characteristics. In the Perry neighbourhood

Table 3. Characteristics of neighbourhoods with high concentrations of poverty

Neighbourhood	Distance to CBD (miles)	Number of adults	Adult poverty rate (percentage)	Households without automobiles (percentage)	Median annual household income ($)	Largest race group (percentage)
Erie County						
Bailey Delavan	5.1	570	56	63	9 750	Black/African American 90
Best Street	1.4	912	53	50	11 860	Black/African American 94
Broadway Fillmore	2.5	3 614	49	63	12 260	Black/African American 59
Downtown Buffalo	0	371	54	49	9 580	Black/African American 78
Grant Ferry	2.3	511	58	43	11 700	White 46, Hispanic/ Latino 32
Hinman	4.8	432	51	54	11 229	White 50
Jefferson Ave	1.2	1 669	49	67	10 430	Black/African American 96
Kenfield	4.9	956	54	61	10 660	Black/African American 93
Lackawanna First Ward	4.3	589	60	73	8 910	Black/African American 82
Lower West Side	1.1	3 669	50	60	10 780	Black/African American 41, Hispanic/Latino 50
Perry	0.9	673	65	77	7 110	Black/African American 65
Niagara County						
Niagara Falls downtown	0.5	554	44	57	15 682	Black/African American 51
Niagara Falls mid-city	1.2	544	44	45	15 938	Black/African American 62
Highland Ave	2.6	384	64	53	8 470	Black/African American 89

Source: US Bureau of the Census (2000, Summary Files 1 and 3).

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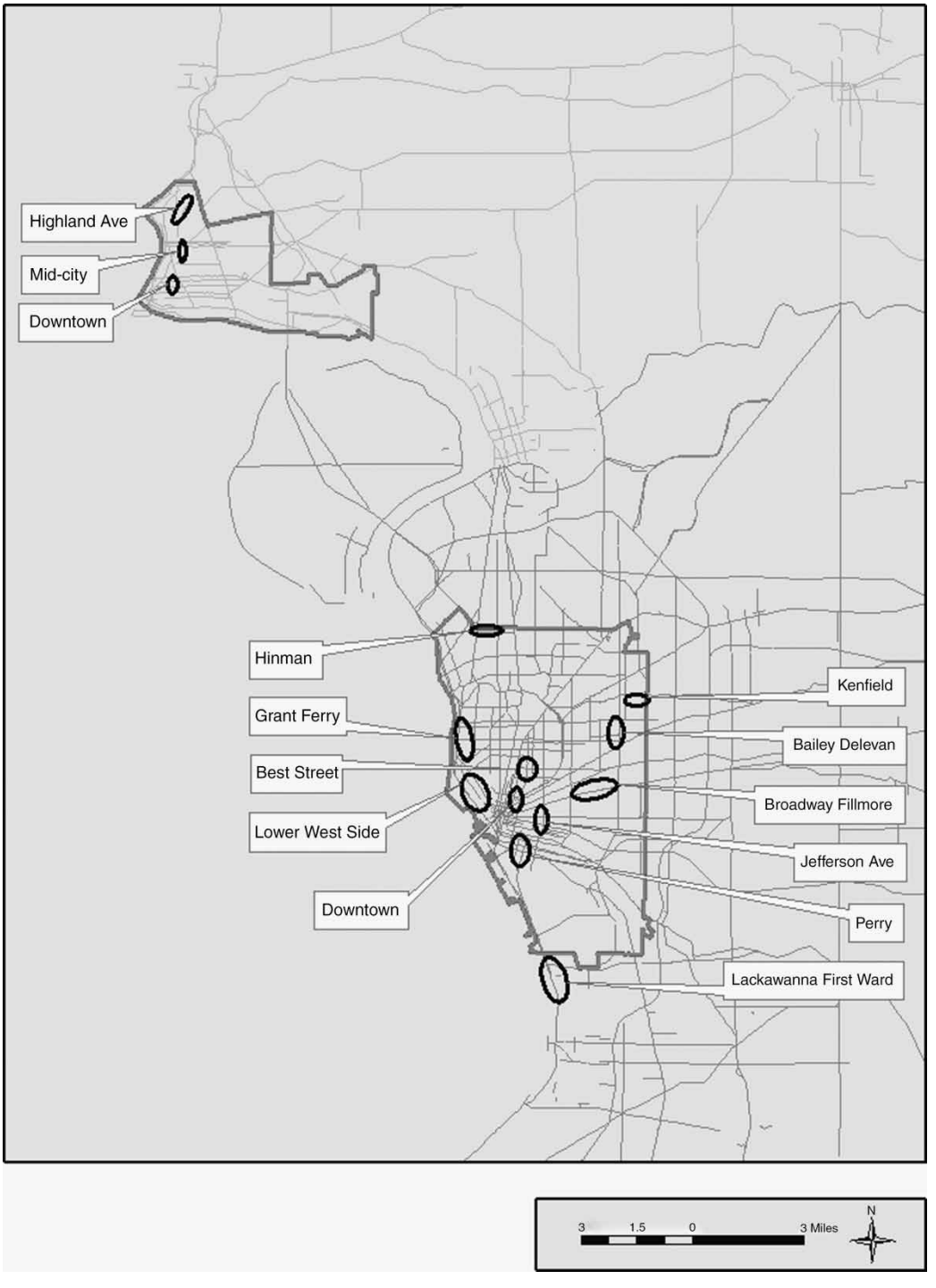

Figure 3. Concentrations of adults in poverty in Erie and Niagara Counties. *Note*: 1 mile = 1.6 km.

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near downtown Buffalo, 77 per cent of households do not own vehicles, which is perhaps explained by the median annual household income of just over $7100 and proximity to numerous transit routes. The median annual household income in the Lackawanna First Ward is $8910. The highest median annual household income ($12 260) in these high-poverty neighbourhoods occurs in the Broadway–Fillmore neighbourhood, where 63 per cent of households do not own automobiles.

Also listed is the dominant racial group for each neighbourhood, and the data reveal obvious racial segregation. High-poverty neighbourhoods in Erie County, with the exception of 3, are more than 60 per cent Black/African American; one neighbourhood (Jefferson Ave) is 90 per cent Black/African American. In Niagara County, the downtown neighbourhood is more racially mixed than the other two high-poverty neighbourhoods, which have high shares of Black/African Americans.

Spatial Distribution of Low-wage Employment

The identification of low-wage employment is based on previous research examining employment suitable for welfare recipients (Blumenberg *et al.*, 2002; Blumenberg and Hess, 2003).[7] Because most welfare recipients are low-skilled women, they are most likely to obtain low-wage jobs in traditionally feminised occupations in the service, retail and manufacturing sectors (Blumenberg, 2004).[8] Throughout the Buffalo–Niagara region, the share of low-wage employment ranges from 0 per cent to 50 per cent of all jobs in individual census block groups.[9]

The Buffalo–Niagara Falls metropolitan area has undisputedly experienced sluggish job growth in the past decade (Institute for Local Governance and Regional Growth, 2000). The two industrial sectors experiencing the *largest* declines in the number of jobs—government and trade industries (wholesale and retail combined) and manufacturing—are sectors in which low-wage workers may seek jobs. During the same time-period, however, the metropolitan area gained jobs in three important sectors: finance/insurance/real estate, construction and services. The latter two industrial sectors may suit low-wage job seekers. Regardless, workers in the region had lower weekly earnings than did workers on average across New York State and they earned less in 1997 than they did 20 years earlier. In general, earnings in the region failed to keep pace with inflation (Institute for Local Governance and Regional Growth, 2000).

Employment growth in recent decades has been more rapid in suburbs than in central cities, especially in the industrial Northeast (Katz, 1998; Muller, 1997). Despite suburban job growth, the central cities in Buffalo and Niagara Falls are not job-poor and both have job openings suitable for low-wage workers. A large share of low-wage workers are employed in the retail and services sectors (Blumenberg and Hess, 2003) and many of these jobs continue to be located in central cities. Figure 4 shows the percentage of each county's low-wage jobs as a function of distance from the central business district.

In Erie County, 50 per cent of low-wage jobs are located within 6 miles (10 km) of downtown Buffalo and, in Niagara County, 72 per cent of low-wage jobs are located within 6 miles (10 km) of downtown Niagara Falls. Compared with Erie County, low-wage jobs in Niagara County are more dispersed. Still, many employment opportunities remain downtown or in its immediate surroundings. The curves in Figure 4 mirror the spatial distribution of adults in poverty in Figure 2. In Niagara County, low-wage employment is *more* concentrated than are adults in poverty, but in Erie County low-wage employment is *less* concentrated than its adults in poverty.

Low-wage jobs are distributed throughout the metropolitan area everywhere that there is employment. However, there are several locations with high concentrations of low-wage employment (see Figure 5). Within the City of Buffalo, low-wage employment centres around downtown, the medical and university districts, and in industrial and

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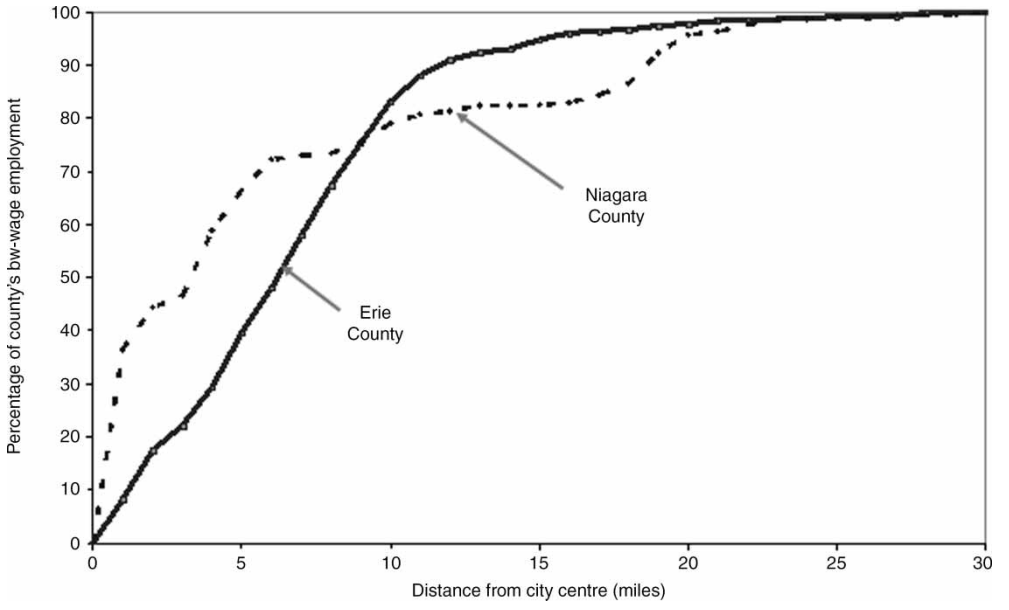

Figure 4. Spatial distribution of low-wage employment. *Note*: 1 mile = 1.6 km. *Source*: American Business Information (2000).

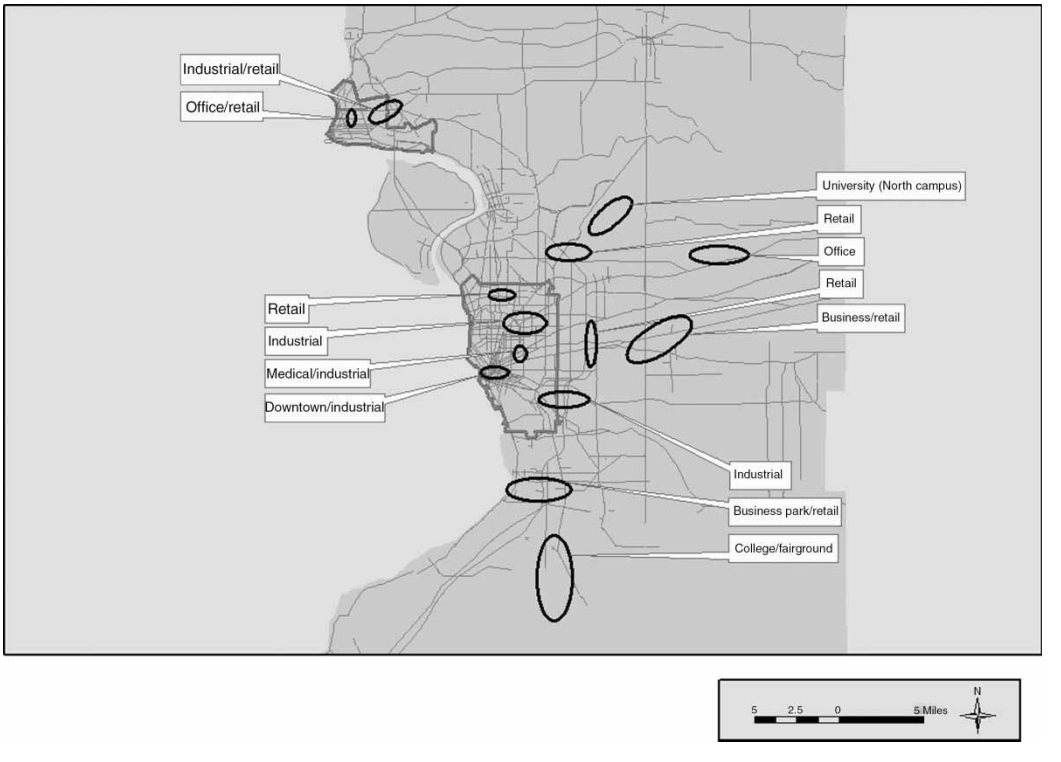

Figure 5. Concentrations of low-wage employment in Erie and Niagara Counties. *Note*: 1 mile = 1.6 km.

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retail districts on the city's north and west sides. Outside Buffalo and within Erie County, smaller concentrations of low-wage jobs can be found along major highways, near office parks and regional shopping malls, and in industrial sectors to the south of Buffalo. In Niagara County, low-wage employment is centred around downtown Niagara Falls and in the industrial and retail area in the eastern part of the city.

Access to Jobs

Low-wage workers' geographical access to employment varies according to their spatial proximity to appropriate job opportunities as well as available travel modes. When great distances separate low-wage workers' residences from job locations, commuters may have to endure lengthy commutes using public transit. The analysis reveals that both Erie County and Niagara County contain neighbourhoods with both jobs and low-income residents. However, both counties also have neighbourhoods in which low-wage workers live at great distances from employment opportunities. The data show that *most* jobs in the metropolitan area, even distant jobs, are accessible within a 45-minute commute in a private vehicle. In contrast, access to employment opportunities among transit-dependent commuters is highly variable and is contingent upon the proximity to employment centres from neighbourhoods in which low-wage workers live.

The Gravity Model

A low-wage job access measure for each census block group was determined using a traditional gravity model (Hansen, 1959) to capture the number of accessible low-wage jobs located within 3 miles (5 km) (Sheppard, 1995).[10] All census block groups possessing zone centroids within a 3-mile (5-km) radius of block group i are identified. Given that the probability of a job seeker finding employment decays with distance, block groups within 1 mile (1.6 km) are weighted by one and block groups beyond 1 mile (1.6 km) are weighted by one divided by the square of the distance between the two centroids. In this way, jobs in closer proximity are modelled as more attractive than jobs at greater distances. The equation for the low-wage job access measure (X) is

$$X_i = \sum_{1}^{n} J_n * \mathrm{f}(d)$$

where, the friction factor[11]

$$\mathrm{f}(d) = \{1 \text{ for } d \leq 1,\ \frac{1}{d^2} \text{ for } 1 < d \leq 3,\ 0 \text{ for } d > 3\}$$

and n = the number of census block groups within a 3-mile (5-km) radius of block group i; d = distance between the centroid of census block group i and the centroid of census block group n; J = the number of low-wage jobs in census block group n.

Low-wage Employment Access

The gravity model is used to assign a low-wage accessibility measure to each census block group and all census block groups in the two-county region are ranked from greatest to least accessibility. Next, four accessibility quartiles are defined. Relative job-richness for Erie County census block groups is shown in Figure 6;[12] the quartile of census block groups with the highest low-wage job access, shown in the darkest shade, includes most of Buffalo. The second quartile (medium–high job access) includes the inner-ring suburbs largely to the north and east of Buffalo; the third quartile (medium–low job access) includes suburban areas; and the fourth quartile (low job access) includes the furthest areas where job densities are low. Figure 7 shows low-wage job access for Niagara County; the highest access occurs within and to the east of the City of Niagara Falls and in the City of Lockport in the centre of the county. Job access in Erie County reduces following obvious concentric rings as distance from the centre increases. Concentric rings of access are not as evident in Niagara County as they are in Erie

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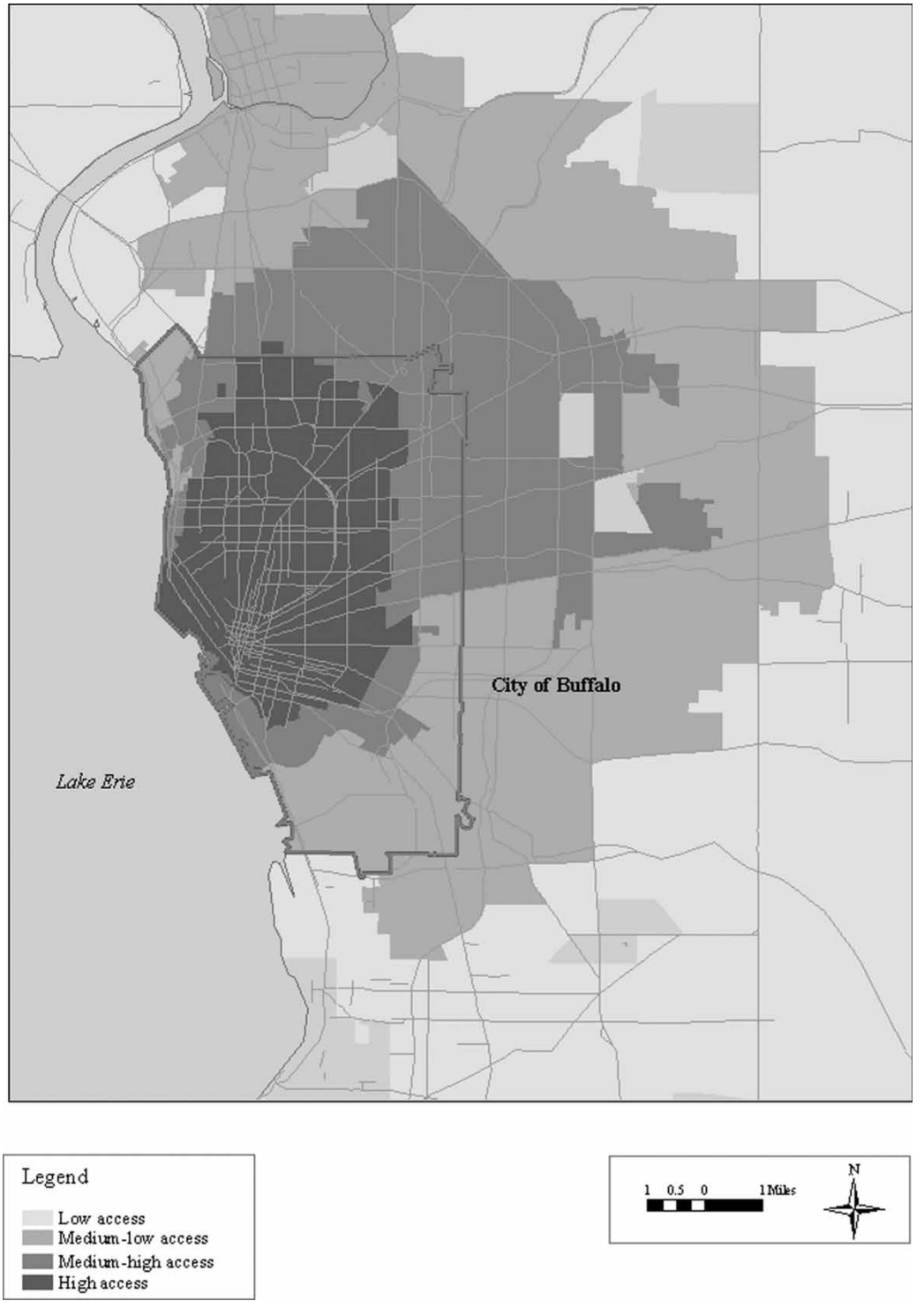

Figure 6. Low-wage job access within 3 miles (5 km) in Erie County. *Note*: 1 mile = 1.6 km.

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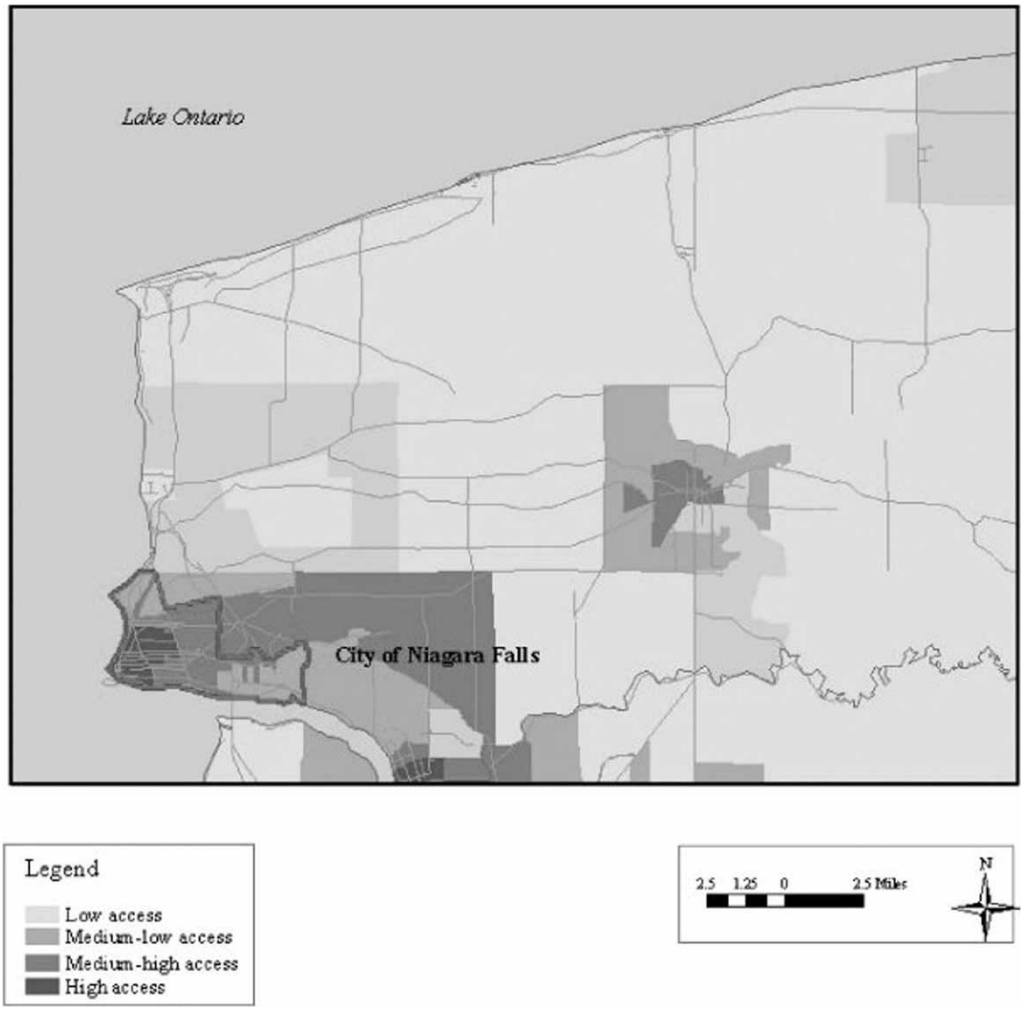

Figure 7. Low-wage job access within 3 miles (5 km) in Niagara County. *Note*: 1 mile = 1.6 km.

County and the highest job access is evident in Niagara Falls (and to a lesser degree, the City of Lockport) while the majority of the rural county has relatively poorer access.

Next, the population in poverty (and the population *not* in poverty) is summed for each quartile. Table 4 shows the share of low-income population in neighbourhoods with varying job-richness. The share of the population in poverty and the share of the population not in poverty have inverse gradients along the employment accessibility quartiles. In general, the data show that most low-wage workers in both counties live in neighbourhoods that fall within the top two quartiles of job-richness while the population not in poverty is concentrated in the two quartiles with the poorest employment access. In Erie and Niagara counties, 72 and 67 per cent of the population in poverty, respectively, live in neighbourhoods with high and medium-high access to low-wage jobs.

Both counties, however, have neighbourhoods in which adults in poverty are isolated from employment. Niagara County has more adults in poverty (27 per cent) living in such isolated, job-poor neighbourhoods, while Erie County has 17 per cent living in places at the bottom quartile of low-wage job richness. This difference may be explained by: higher

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Table 4. Relative proximity to employment

	Erie County Percentage share of adult population		Niagara County Percentage share of adult population	
Low-wage employment access	In poverty	Not in poverty	In poverty	Not in poverty
Low access	17	40	27	46
Medium–low access	18	25	15	20
Medium–high access	31	23	23	17
High access	34	12	35	17

low-wage job access in Erie County owing to the density of residence and employment locations and the structure of the transport network; and, higher non-urban poverty in Niagara County which is more remote from employment opportunities. For adults in poverty living in these job-poor areas, nearby jobs are in short supply and workers often commute to job sites in other, sometimes distant, neighbourhoods. For example, various communities on Buffalo's West Side, located 2–5 miles (3–8 km) north and west of downtown, have high shares of adults in poverty but relatively few jobs and commuting to the more job-rich East Side can take longer than 30 minutes during peak periods. Travel on public transit across the Buffalo metropolitan area (for example, from the northern suburbs to the East Side) or from the city to the suburbs can take over an hour and involve at least one transfer (Rey, 2004). Because there is limited transit service *between* Buffalo and Niagara Falls, daily commuting on public transit between the two cities would be burdensome. Nevertheless, it is not unrealistic that an unemployed person may cast his or her geographical job search over the entire metropolitan area due to its relatively small size, although access to vehicles and proximity to public transit strongly influence the ease of job search.

Many suburban neighbourhoods in the metropolitan area are also job-poor. Although employment is growing faster in the suburbs than in the central city, suburban jobs are, in general, highly dispersed. In Niagara County, many job-poor neighbourhoods are located outside the urbanised area.[13] Naturally, job densities tend to be much lower in these rural areas than in the urbanised area. In places where jobs are spatially isolated, low-wage workers with access to automobiles have advantages (both in spatial reach and travel time) over those who travel by public transit. However, for those who are transit-dependent, long-distance commutes may limit their chances to find and sustain employment.

Commuting by Automobile versus Transit

Low-wage employment access was measured by combining travel distances from impoverished neighbourhoods with the number of accessible low-wage jobs. To conduct this analysis, 30-minute travel buffers for automobile and public transit travel were defined from the centroids of each neighbourhood using the transport networks. The number of low-wage jobs was then summed for all census block groups that fell within the travel buffers. For transit travel, the travel buffers emanate from the zone centroids along transit routes assuming either travel on one transit route or travel on two transit routes (including a transfer between routes).[14] For automobile travel, the travel buffers emanate in all directions from zone centroids along the street and highway networks assuming realistic average travel speeds on highways, arterials and local streets.[15] Table 5 shows the ratio of the number of low-wage jobs available within a 30-minute commute by automobile versus public transit from impoverished neighbourhoods in Erie and Niagara Counties.

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Table 5. Automobile and transit access to low-wage jobs from neighbourhoods with high concentrations of poverty

Neighbourhood	Ratio of automobile to public transit job accessibility
Erie County	
Bailey Delavan	2.6
Best Street	2.5
Broadway Fillmore	2.0
Downtown Buffalo	3.0
Grant Ferry	2.7
Hinman	2.4
Jefferson Ave	2.5
Kenfield	2.1
Lackawanna First Ward	8.2
Lower West Side	3.1
Old First Ward	3.3
Niagara County	
Niagara Falls downtown	2.4
Niagara Falls mid-city	1.9
Highland Ave	1.7

In all cases, commuting by private vehicle versus travelling by public transit gives residents access to a greater number of low-wage jobs. Interestingly, the ratio varies only slightly across neighbourhoods. Only one neighbourhood is distinguished for its high ratio. In the Lackawanna First Ward, immediately south of the City of Buffalo's boundary, eight times as many jobs are accessible by automobile as are accessible by public transit. This is likely to be due to the neighbourhood's geographical isolation along the Lake Erie shore, its proximity to only one north-south arterial and its somewhat limited transit service. Apart from the Lackawanna neighbourhood, all other neighbourhoods in Erie County have two or more jobs accessible by automobile for every job accessible by public transit. In Niagara County, automobiles provide slightly less of an advantage in reaching low-wage jobs in the two neighbourhoods away from downtown.[16] Interestingly, workers living in downtown Buffalo can reach three times as many jobs by automobile as public transit and workers in downtown Niagara Falls can reach 2.4 times as many jobs by automobile as public transit. This perhaps reflects an overall reduction in transit service over the past several decades that has lessened the locational advantage of living in a city's core.

In neighbourhoods closer to employment, the advantage of having a car reduces with shorter travel distances and less burdensome transit trips. For example, in Erie County, low-income residents living in a few neighbourhoods on Buffalo's East Side—Best Street, Broadway–Fillmore, Kenfield and Jefferson Avenue—can reach a large number of jobs within a 30-minute commute on public transit. As Table 5 shows, the prospects are even better for low-income residents living in two neighbourhoods in Niagara County where the ratio of job access by automobile to that of public transit is less than two to one. While it is obvious that many low-wage workers living in these neighbourhoods commute by automobile, public transit commuting is certainly reasonable.

The existence of only one suburban low-income neighbourhood within the entire Buffalo–Niagara region is surprising since suburban pockets of poverty have become more prevalent throughout other US metropolitan areas (Alba and Nee, 2003; Frey, 2001; Logan, 2003; Mask, 2003). There are few suburban neighbourhoods with concentrated poverty and those that do exist are not isolated but instead are in first-ring suburbs (such as Cheektowaga and Lackawanna). Today, Buffalo's East and West Sides are home to Latinos and other immigrant groups, but outside the central city, only Lackawanna is notable for its strong community of Arab immigrants (Institute for Local Governance and Regional Growth, 2000; Williams and McNeil, 2004) although Amherst and Kenmore also show rises in their immigrant populations (especially Russian and Indian). The city's solid housing stock easily satisfies the housing demand of newcomers to the area and this phenomenon serves to propagate the image of the city rather than the suburbs as the home to the low-income population.[17]

Conclusion

This study reveals that jobs throughout the metropolitan region are centralised in the

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cities of Buffalo and Niagara Falls and that poverty is centralised in Niagara Falls and highly centralised in Buffalo, more centralised than the general population. Perhaps not surprisingly, the greatest access to low-wage employment is unmistakably found in centrally located neighbourhoods. The spatial distribution of low-wage employment and poverty, and the developed transit networks suggest that most central-city neighbourhoods have superior access rather than inferior access to employment (shown in Figures 6 and 7), especially when focusing on low-wage employment. This conclusion echoes similar findings in recent years in other places. For example, Black/African Americans in Boston (Cohn and Fossett, 1996), Houston (Cohn and Fossett, 1996) and Cleveland (Gottlieb and Lentnek, 2001) are not disadvantaged relative to Whites with regard to spatial access to employment.

In the Buffalo–Niagara region, residential segregation does not appear to spatially isolate poverty from jobs. On the contrary, segregation restricts many adults in poverty to the central city where the poor experience comparatively good access to entry-level and low-wage employment.[18] Despite racial segregation (Buffalo is 37 per cent Black/African American, while its suburbs are 2 per cent Black/African American) the spatial mismatch is far less pronounced than in other metropolitan areas (Massey and Denton, 1993). Nor is job growth occurring disproportionately in far-flung suburbs, like it is in high-growth cities like Atlanta (Sawicki and Moody, 1997, 2000) where the spatial mismatch between economically depressed, largely Black/African American neighbourhoods and economically vibrant White suburbs is obvious. However, Black/African American adults in poverty in the Buffalo-Niagara region clearly have poorer access to automobiles than Whites (see Tables 2 and 3) and, as a result, they may search for jobs, because of the time and out-of-pocket cost, only within an area bounded by a smaller radius (Stoll, 1999). These findings are consistent with previous research that detected less pronounced spatial mismatch in smaller as opposed to larger metropolitan areas (Ihlandfeldt, 1992; Sawicki and Moody, 2000).

Adults in poverty in Buffalo may have an advantage over suburbanites in spatial proximity to employment, but unemployment rates (see Table 2) suggest that many adults in impoverished neighbourhoods fail to secure and maintain jobs (Wilson, 1990, 1996). Some low-wage workers are disadvantaged in securing employment since they often have multiple employment barriers that individually and in combination reduce their ability to compete successfully for employment and maintain positions once they are found (Blumenberg, 2002; Danziger *et al.*, 2000; Olson and Pavetti, 1996).

The cities of Buffalo and Niagara Falls carry a greater burden than the suburbs of the region's jobless and unemployment rates are higher in impoverished neighbourhoods than in economically vital ones. However, the evidence from this study suggests that a spatial mismatch does not play a major role. What explains persistent poverty in certain inner cities? A number of circumstances in concert may contribute to high unemployment rates and concentrated poverty. In the Buffalo–Niagara region, declining demand for low-skill labour driven by deindustrialisation and changes in the economy (resulting in jobs with higher educational requirements) seems to play only a minor role (Kasarda, 1980; Institute for Regional Governance and Local Growth, 2000; Stoll and Raphael, 2000). Perhaps other forces are more centrally at work here (Tietz and Chapple, 1998), including lower automobile ownership rates (Raphael and Stoll, 2001; Taylor and Ong, 1995), skills mismatch (Glaeser and Kahn, 2001), a lack of job readiness and skills to sustain employment (Wilson, 1996), as well as employer discrimination (Kirschenman and Neckerman, 1991) and housing discrimination (Downs, 1981; Massey and Denton, 1993).

Recommendations

The research suggests that the spatial mismatch hypothesis, which describes the

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mismatch between low-income households in central cities with limited access to suburban employment opportunities, is perhaps too narrowly conceptualised to describe the distribution of the poor in metropolitan areas with varied urban structure. Based on the spatial distribution of low-wage employment and poverty, central-city residents have reasonable access to low-wage employment in Buffalo and superior access in Niagara Falls. In addition, impoverished neighbourhoods in the Buffalo–Niagara region appear to be more heterogeneous than in other metropolitan areas (Pugh, 1998).

In job-rich neighbourhoods with high residential densities where workers can comfortably reach jobsites and other destinations within reasonable travel times, policy-makers should focus on enhancing existing public transit services. Job-rich places are likely to bring greater economic and social returns on transit investments than job-poor places. Enhancements might include adding bus routes where service is limited, increasing capacity by adding additional vehicles and shortening headways, and enhancing off-peak service to better accommodate both non-standard work schedules (especially night and weekend shifts) and non-work travel. Such changes would greatly increase job opportunities for low-income residents in neighbourhoods throughout Buffalo's East Side and in the City of Niagara Falls. Since a large share of workers in Buffalo walk to work, policies should be undertaken to encourage commuters to continue walking. Future changes to the urban form and streetscapes should not reduce the convenience of walking.

The analysis reveals that there are some job-rich places, mostly in the suburbs, that have few low-income workers living nearby. Suburban employment centres such as the University at Buffalo's North Campus and commerce parks provide potential entry-level employment opportunities for job-seekers, but such places are often located great distances from low-income workers' residences and transit travel may be burdensome. Suburban employers can undoubtedly benefit from new, non-traditional services that better accommodate long-distance commutes, such as the NFTA's ambitious HubLink project (Multisystems, 1997). This project, announced in the 1990s but not implemented,[19] was designed to facilitate movement between first- and second-ring communities or using intermodal transfer stations, located mostly in the suburbs for city residents heading to outlying jobs (Collison, 1996, 1997, 1998; Lyons and vanderWilden, 2002).

Perhaps the greater challenge is to increase employment access where low-wage jobs are scarce. For example, in the non-urbanised areas of Niagara County, both jobs and low-income workers are less concentrated and travel is considerably more difficult for those without access to automobiles. The data show that spatial access to employment remains relatively high among low-income workers living in these areas, however, since many have reliable access to personal vehicles. In contrast, transit-dependent commuters living in places where jobs are scarce have only limited access to employment opportunities within a reasonable commute distance. Nonetheless, the principal challenge to policy-makers is how best to serve the transit-dependent rural population who are few in number but widely dispersed. Community-based carpooling, carsharing and vanpooling can be encouraged using a variety of incentives.

In addition to recommendations geared largely to the transport system, other measures can be taken to increase access to low-wage jobs such as local economic development in job-poor areas and workforce development[20] (to improve job readiness, placement and support services) in areas of concentrated poverty.

Notes

1. Thirteen per cent of Erie County's population is Black/African American, and 88 per cent of Black/African Americans live in the City of Buffalo (US Bureau of the Census, 2000), making Buffalo–Niagara the eighth-highest segregated metropolitan area in the US (Williams and McNeil, 2004).

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2. While there are many similarities of people and place between Erie and Niagara counties, there are also significant differences. Erie County has a strong central core (with a wide variety of urban and suburban neighbourhoods) while Niagara County has a smaller core and more rural areas.
3. The American Business Information (currently known as InfoUSA) database provides information on over 10 million businesses and organisations nation-wide (geocoded at a variety of geographical levels including census block groups), including public and private companies, non-profit organisations, hospitals, schools and churches (American Business Information, 2000). Data from American Business Information was verified using the following methodology, which focuses on the spatial distribution of employment throughout the two counties. ABI data for total employment at the block group level were aggregated to zip codes and compared with zip-code-level employment from the US Census Bureau's Zip Code Business Patterns (Zip Code Business Patterns, 2000). The correlation coefficient (r) for the two datasets is 0.73, which suggests a strong association at the zip code level. In fact, the calculated r value is greater than the critical value of r (0.33) for a two-tailed test at the 0.01 significance level; this leads to the conclusion that there is sufficient statistical evidence to reject the null hypothesis that there is no association between the two datasets.
4. The Census Bureau uses the federal government's official definition of poverty

   > Families and persons are classified as *below poverty* if their total family income or unrelated individual income was less than the poverty threshold specified for the applicable family size, age of householder, and number of related children under 18 present (US Bureau of the Census, 2000).

5. Nation-wide, 36 per cent of low-income, single-parent households do not own cars (Murakami and Young, 1997).
6. While census block groups may not be ideal geographical boundaries for defining neighbourhoods, this is nevertheless the prevailing methodology for studies examining low-income neighbourhoods and spatial proximity to employment.
7. The employment data include the number of jobs by industry for census block groups (American Business Information, 2000). Employment is disaggregated into occupational categories with both high-skill requirements (such as executive and managerial, professional and technical support occupations) and low-skill requirements (such as service workers and labourers). Entry-level employment is best suited to low-skill applicants, as these occupations have lower skill and education requirements compared with the professional occupations.
8. The number of jobs was estimated (using employment data from the US Bureau of Labor Statistics and the California Employment Development Department) to measure job-richness in neighbourhoods by census block group. The data used for this procedure identify: shares of males and females within occupations; and, shares of occupational classifications for industries (California Employment Development Department, 2002).
9. On average, 26.5 per cent of jobs (standard deviation 7.34) in each census block group are low-wage.
10. Due to a lack of sufficient data describing travel time across the metropolitan area, travel distance is used in the gravity model as a substitute for travel time.
11. The friction factor was experimented with by varying the exponent in the denominator. When the exponent is increased, the gravity weight reduces and nearby employment is favoured over more distant employment. An exponent of 2 in the denominator of the friction factor was chosen and is consistent with previous research (Blumenberg *et al.*, 2003; Blumenberg and Hess, 2003; Harris, 2001; Baradan and Ramjerdi, 2001; Berglund, 2001).
12. The gravity model was experimented with by varying the 3-mile (5-km) radius for job access in 1-mile (1.6 km) increments up to 8 miles (13 km). While the *number* of jobs varied at different commute lengths (because longer distances predictably captured a greater share of the metropolitan area's jobs), the *relative distribution* of job access for census block groups remained consistent. A distance of 3 miles was used in the analysis because it is a reasonable value for investigating the association between residences and employment locations in the Buffalo–Niagara metropolitan region.
13. Approximately 40 per cent of Niagara County's low-wage jobs are located in the non-urbanised areas of the county, dispersed throughout approximately 470 square miles (1217 square km) of small towns and agricultural land.

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14. Waiting times for buses and transfers are accounted for by including in the travel time one half of the headway, which is assumed to be the average waiting time.
15. The analysis simulates travel conditions during the morning rush, using morning peak transit schedules and estimates of automobile speeds during the morning rush.
16. Similar research in California found ratios of automobile to public transit job accessibility of 70 in Monterey Park east of downtown Los Angeles, 59 in Watts south of downtown Los Angeles and 29 in Pleasanton south-east of Oakland (Blumenberg and Hess, 2003). So, evaluated against other metropolitan areas, public transit job accessibility in the Buffalo–Niagara region compares reasonably well with automobile access.
17. Buffalo's hallmark housing type—two-family 'double' houses with upper and lower flats—provides housing for moderate- and low-income families throughout the city while similar affordable housing may not be as readily available in the suburbs.
18. Despite relatively easy access to jobsites from the central city, low-income workers in cities where studies have been conducted tend to have shorter commutes because they tend to be spatially isolated in their job choice and because they lack reliable transport to more distant jobs (Ong *et al.*, 2001; Stoll and Raphael, 2000).
19. While Hublink has not been implemented, the NFTA has begun three Metrolink routes that provide connector service using smaller transit vehicles (Rey, 2004).
20. Future research should investigate actual job vacancies and compare employment access for males and females, as previous research reveals that women make longer trips than men to reach low-wage jobs (Deka, 2002; Hanson and Pratt, 1995; McLean and Perry, 1994).

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