

Does Immigration Induce Urban Sprawl?

A Dynamic Demographic Analysis for the U.S.

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This article, utilizing U.S. Census data from 1980 and 1990, probes the relationship between immigration and urban sprawl. The preliminary findings reveal that native-born and foreign-born populations are very different regarding their household behaviors. Population growth caused by immigration is not likely the major causal factor to urban sprawl. The residential pattern of native-borns is more prone to inducing urban sprawl, since native-borns have a much higher growth rate in the number of households, owner-occupied housing, suburban residency, and demand for new housing. The article also shows that household behavior is a critical factor in causing urban sprawl. Household growth rather than population growth has a stronger causal linkage with urban sprawl. Future research on implementing microdata is necessary to better untangle the complex relationship.

“Nobody denies that there is a relationship between population growth and urban sprawl. Furthermore, nobody disputes that immigration is the single largest factor in U.S. population growth. Therefore, it is essential that immigration policies be evaluated when we try to deal with urban sprawl.”

– Dan Stein, Executive Director of the Federation for American Immigration Reform (F.A.I.R. 2000).

Immigration and urban sprawl have typically been pursued as two fairly distinct research and policy endeavors. Their relationship had rarely been discussed until recently, when controversial advertisements claimed that immigration directly contributed to urban sprawl (*USA Today* 2000a). Recent debates in the *New York Times* indicate that the relationship between immigration and urban sprawl has become a centerpiece of public discussion (Krugman 2001; Stein 2001). These discussions become increasingly relevant given that foreign-born population has reached its largest share over the past several decades. The first objective of this study is to explore what we know so far about the relationship between immigration and urban sprawl through a brief review of the literature.

The general perception is that immigration causes population growth, and therefore, urban sprawl.¹ Debate over this supposed link is typically grounded on the assumption that native-borns and foreign-borns have similar household behaviors, such as household formations, tenure choices, and preferences of residential location. Therefore, the second objective is to test this underlying assumption through a demographic analysis. The third objective is to specifically investigate whether there is any causal linkage between immigration-generated population growth and urban sprawl. In lieu of the forthcoming Census 2000 microdata,² it also presents a framework of implementing dynamic demographic analysis in the study of urban form.

The preliminary findings do not substantiate the perceived relationship between immigration-generated population growth and urban sprawl. Native-born and foreign-born populations have very different residential patterns. Consequently, growth of foreign-born population does not necessarily cause urban sprawl. Household growth rather than population growth has a much stronger causal linkage with urban sprawl. Accumulating evidence suggests that the household behavior of native-born population is more prone to inducing urban sprawl.

Public Discussions

The relationship between immigration and urban sprawl has captured increasing public attention because of the rapidly growing foreign-born population. According to the Census 2000 Supplementary Survey, about 44 percent of the nation’s 30.5 million foreign-born residents – 13.3 million people – arrived here in the 1990s (U.S. Bureau of Census 2001). Immigrants make up 11 percent of the country’s population, the largest share since the 1930s (Fields 2001).

Because of such dynamic population changes in recent decades, people start to ponder the impact of immigration on American society in general, and urban development in particular (*USA Today* 2000b; Glasser 2001). Some people argue for stricter immigration regulations, insisting current immigration policies have introduced too many new immigrants in a short time. Recently those people have begun to contend that immigrants have generated unchecked population growth, and therefore, induced urban sprawl and dragged down the quality of life of all American people. They suggest that fewer immigrants would help curtail population growth to ameliorate sprawl (*USA Today* 2000b; Fields 2001; F.A.I.R. 2001). Their logic

follows conventional wisdom, which holds that everything else constant, a growing population induces more houses, more cars, and increased demand for land. Therefore, there has to be suburban expansion or urban sprawl to accommodate these new demands. Without rigorous examination, this perception is widely accepted among immigration restrictionists and growth-control advocates (F.A.I.R. 2001; Sierra Club 2001).

Contesting this notion, Paul Krugman, in a recent *New York Times* column, argues that population growth is the secondary contributor to current dispersed land-use patterns. Mismanagement, rather than population growth, he said, is more likely responsible for the sprawl problems, such as those in Atlanta and Houston (Krugman 2001). Gordon and Richardson (2000) suggest that the linkage between immigration and urban sprawl cannot withstand serious scrutiny. They claim that, instead of population growth, increased development is the primary cause of sprawl. Demand for new development is a reflection of consumer preference and more accessible residential mortgages. In addition, recent surveys show that Americans are less concerned about population growth than they were twenty-five years ago. The general public does not connect environmental problems to population growth (Maher 1997). Despite such intense public debates, there is scant research that substantiates either side of the argument.

Policy Implications and Definitions of Urban Sprawl

Is the connection between immigration and urban sprawl justifiable? If so, remedies may be necessary to uphold the quality of life of the general public. If the allegations were misguided, public policy aimed at curbing immigration would not curtail urban sprawl or ameliorate urban decay. The social ills that immigration restrictionists and growth-control advocates fought against would still be prevalent and the American labor force would lose a key dynamic component – new immigrants. Therefore, this issue is important to urban planners and policy makers because of the significant implications for the nation's immigration policy, urban landscape, and economic activity.

To check the relationship between immigration and urban sprawl, a clear definition of the issue is essential. One of the greatest challenges in dealing with urban sprawl is that the definition of urban sprawl has been vague. Urban sprawl could have various connotations to different people. Growth-control advocates usually articulate *urban sprawl* pejoratively. For instance, according to the Sierra Club (2001), "suburban sprawl is irresponsible, poorly planned development that destroys green space, increases traffic, crowds schools, and



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drives up taxes.” This normative definition is less constructive in academic research since it leaves less room for further discussion about specific characteristics of urban sprawl. Some other researchers define the term vaguely. Jan Brueckner (2000) identifies urban sprawl as “excessive spatial growth of cities.” However, it is difficult to reach consensus on what constitutes “excessive.” Enrico Marcelli (2001) implies that any suburban growth constitutes urban sprawl. Under this definition, the causes of sprawl become almost irrelevant. This definition is not in accordance with the mainstream sprawl discussion. In current academic research, urban sprawl is broadly referred to as dispersed development occurring on the urban fringe. For instance, Edwin Mills (1999) suggests the proportion of metropolitan residents who live and work outside the central city as a way to measure sprawl. This development is usually characterized as low density (Peiser 1989; Audirac, Shernyen, and Smith 1990; Ewing 1997). There have been attempts to identify other measurements for urban sprawl (Malpezzi 1999; Torrens and Alberti 2000; Galster et al. 2001). Because these alternative measurements are either involved with judgment or difficult to quantify with available data, density is still widely accepted as the standard to gauge sprawl. However, the meaning of low density and scattered development varies by region. For example, even experts on this topic could not agree on whether or not Los Angeles is an example of sprawl, because of the disagreement on density (Ewing 1997; Gordon and Richardson 1997a, 1997b; Myers and Kitsuse 1999). The disagreement is primarily caused by their different understandings of urban areas. This paper uses the Metropolitan Area, provided by the U.S. Census Bureau, as the geographical boundary of an urban area. The method of defining sprawl refers to land resources consumed to accommodate new urbanization or suburban expansion. As a dynamic process, urban sprawl denotes a faster urban land expansion than respective population growth.³ The process of urban sprawl is characterized as decreasing density in urban areas over a period of time.

Relevant Research

Excessive suburban expansion is evident in many U.S. metropolitan areas. During the last two decades the amount of urbanized built-up land in the United States grew by more than 40 percent, which is 2.5 times faster than the population growth in the same period (Fulton et al. 2001). The rate of suburban expansion is accelerating. More than half of the suburban growth took place between 1992 and 1997. More than one-hundred thousand new homes were built in twenty-one metropolitan areas between 1990 and 1997 (Wasserman 2000). More than 80 percent of new housing construction took place in suburbs (von Hoffman 1999). Some people argue that excessive suburban expansion, often defined as “urban sprawl,” has caused fragmented land development, environmental degradation, social inequity, heavy reliance on the automobile, and economic inefficiency. Unchecked sprawl is both socially and financially burdensome to the society (Freilich and Peshoff 1997; Burchell 1997). Some researchers argue that sprawl is a byproduct of public subsidies and market deficiencies, rather than representing a market equilibrium condition (Ewing 1997). More specifically, the concerns include traffic congestion, encroachment of open space, air pollution, excessive dependence on non-renewable energy, and disproportionate service costs for new suburban development (Downs 1998; Stoel 1999; Ciscel 2001; Sierra Club 2001). Compared with urban sprawl, contained development or managed growth could reduce land consumption and be more cost beneficial to the region in the long run (Burchell 1997). Past research also shows a positive association between managed growth and economic performance (Nelson and David 2000).

Rebutting the previous assessment on urban sprawl, some urban economists argue

that, given the condition of urban land markets, sprawl reflects human needs and an efficient equilibrium condition. They suggest that better pricing policies for public services should be given preference over governmental regulations. In the long run, higher density development will eventually occupy infill land parcels through the operation of market forces. In other words, any interference with the market mechanism would only hinder the efficiency of the economic system (Peiser 1989; Gordon and Richardson 1989; Mills 1999; Gordon and Richardson 2000). Previous research also finds that traffic congestion is more closely associated with economic performance rather than urban form (Cervero 2001). In addition, urban researchers provide ambivalent results over the claim that higher-density urban forms promote social equity and stronger social ties (Burton 2000; Freeman 2001). It is also inconclusive whether urban sprawl, by encroaching on farmland, has an adverse impact on the environment or the economy as a whole (Knaap 2000). Furthermore, Downs suggests that sprawl has little or no impact on urban decline (Downs 1999). Past research also indicates that urban containment policies may have an unintended consequence on housing affordability as cities approach their limits and land prices appreciate faster than they would otherwise (Brueckner 2000; Kahn 2001; Knaap and Hopkins 2001).

Despite such debates on whether urban sprawl is a negative form of urban development, there is seldom disagreement on the notion that population growth is the major contributor to urban sprawl (Mieszkowski and Mills 1993; Ewing 1997; Levine 1997; Downs 1998). Anthony Downs (1997) describes that population growth caused U.S. metropolitan areas to grow rapidly after 1940, while many large older cities also experienced a decline in population. Thurston and Yezer find that suburbanization of the residential population is enhanced by rising income and suburbanization of employment. Suburbanization of the population promotes decentralization of the service and retail sectors (Thurston and Yezer 1994). Furthermore, Jan Brueckner (2000) considers population growth one of the three fundamental forces of urban sprawl, in addition to the rise in household incomes and the decline in the cost of commuting. Through an economic analysis, Brueckner (2001) reaffirms his argument



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that population growth is responsible for excessive urban expansion. Since immigration has been the main source of recent population growth, it is consequential to establish a causal relation between immigration and urban sprawl. Furthermore, a recent Bank of America report identifies that population growth in California has fueled the traditional suburban development patterns, namely urban sprawl. The report implies that, as a main source of population growth, immigration should be blamed as one contributor of such unchecked development (Bank of America 1995). It is residential development characterized as lowered density on the urban fringe that causes urban sprawl. Therefore, these arguments are based on the assumption that population growth was a direct contributor to the household growth on the urban fringe. One unique study suggests that the relation is rather complex between population growth and changes in density (Fonseca and Wong 2000). Their study finds that the most densely populated states and places have become even more densely populated. Population growth has caused densification in very few highly populated areas.

Most of the research connecting population growth with urban sprawl is also based on the assumption that the population is similar in its residential patterns. The following demographic analysis strives to check whether such similarities exist among different groups of people. The research hypothesis is that there is a significant heterogeneity between native-born and foreign-born populations in terms of their household behaviors. Therefore, immigrants who have been the major contributor to population growth may not have induced urban sprawl. Without carefully analyzing the demographic components of population growth, it is risky to draw any causal connection between immigration and urban sprawl.

Our knowledge of the determinants of urban sprawl is rather limited. Most studies on urban sprawl have viewed this phenomenon as a consequence of industrial restructuring, rising household income, and advancement of transportation technology. Very few researchers have implemented demographic analysis in the study of urban form. Instead of implementing direct measurement of the physical urban forms, demographic analysis focuses on the people and their changes in urban development. Dowell Myers (1999) suggests that demographic changes have not been properly recognized in urban theory and policy. Contrasting with previous studies treating sprawl as a snapshot of time, this analysis considers it as a dynamic process. The dynamic demographic analysis concerning a changing population is particularly relevant to the study of urban sprawl, a process-oriented phenomenon.

Presented in the following section, this study incorporates a dynamic demographic analysis, probing the general relation between immigration and urban sprawl through a macro level study of the United States.

Data Sources, Definitions, and Geography

Primarily based on the Census PUMS (Public Use Micro Sample)⁴ data from 1980 and 1990, this demographic analysis intends to reveal the changes between 1980 and 1990 and to check the underlying assumption of similar household behaviors between native-born and foreign-born populations. This analysis also examines whether immigration-generated population growth is connected with urban sprawl. Specifically, this paper looks at population and household growth, household formation, tenure choice, occupancy of new residential development, and choices of residential location.

This analysis breaks down the primary residential location into three major groups: those who reside (a) inside the central city, (b) outside the central city but inside the metropolitan area, and (c) outside the metropolitan area. This analysis focuses on the nation as a whole and uses the Metropolitan Area (MA)⁵ geographic construct instead of the

Urbanized Area (UA)⁶ construct to define the metropolitan boundary. This is because the metropolitan area boundaries are much more consistent between 1980 and 1990 and provide a much better comparability of areas over time than the urban area boundaries (Myers 1992; Kasarda et al. 1997). Rural area is referred to as the region outside the metropolitan area boundary. One part in the following section analysis also utilizes the central city construct.⁷

The subsequent analysis employs two methods to analyze the changes between 1980 and 1990. The first follows a “cohort approach” to compare settled immigrants in 1990 with all (settled plus recent) immigrants in 1980. Immigrant cohorts are fixed in membership, defined by the members’ immigration status or recency of arrival, such as arrived in the United States before 1980 or after 1980. This is to discover the longitudinal progress of the immigrant cohort that arrived in the United States before 1980 in the 10-year period between 1980 and 1990, as well as to examine how the newly arrived immigrant cohort behaved in 1990.⁸ The second approach is called “immigrant group approach,” which compares the settled immigrants in 1980 with the settled immigrants in 1990. This approach also compares new immigrants from 1980 and new immigrants from 1990. This comparison shows the compositional changes of immigrants between 1980 and 1990. The two approaches will also capture the changes of U.S.-borns in the 10-year period between 1980 and 1990. The two methods treat U.S.-borns in the same way, since the membership and immigration status of U.S.-borns remained the same between 1980 and 1990 except for aging. The two approaches look at different perspectives of the changes and form various contrasts.⁹ To be consistent with previous research, the household status in this analysis is dependent on the immigration status of the householder.¹⁰

Demographic Analysis

Population and Number of Households

Population growth and housing development, two primary factors driving urban growth, are mutually supported. Myers suggests that, at the national or regional level, population growth precedes housing development. And the population growth is encouraged by regional employment growth (Myers 1992). However, it is unclear whether household growth was proportional to population growth between 1980 and 1990.

The population growth rate of U.S.-borns was lower than that of immigrants. Because of their large base number, U.S.-borns generated about three-fifths of the total population growth. (See table 1.) The total population in the U.S. increased from 227 million in 1980 to 248 million in 1990, or by 10 percent.

Table 1. Population by Immigration Status in 1980 and 1990

Group	Population		Change	% Distribution of the Change
	1980	1990	1980-90	1980-90
Total	226,662,400	248,107,628	21,245,229	100.0
Born in the U.S.	212,782,940	225,200,798	12,417,858	58.5
Settled Immigrants	8,499,580	13,168,217	4,668,637	22.0
Immigrants Arrived Last Ten Years	5,579,880	9,738,613	4,148,733	19.6

Source: U.S. Bureau of the Census (1980 and 1990 PUMS 1% data).

Household growth outpaced population growth. U.S.-borns contributed about three-fourths of the total household growth, outgrowing immigrants. The total number of households increased from 80.5 million in 1980 to 91.8 million in 1990 by a total of 11.3 million, or by 14 percent. (See table 2.) For the same period, the rate of household growth was four percentage points higher than the rate of population growth. Therefore, household size on average became smaller in the 1980s. With increasing population and decreasing average household size, there has to be more new housing to accommodate the expanding housing demand.

Compared with population growth, household growth has a much stronger relationship with urban sprawl. This is because household growth is directly linked to new housing development. New housing is usually characterized as bigger lot size and lower density than old housing (Clark and Dieleman 1996), which has a strong implication in urban sprawl.

Population and household growth indicates distinctive pattern between native-borns and foreign-borns. Compared with foreign-borns, native-borns had a much higher growth rate in the number of households relative to population growth. (See table 3 and figure 1.) Disregarding factors such as income and age profile, had native-borns behaved like foreign-borns in household formation, native-borns would have added only 4.0 million instead of 8.5 million households, or less than half of the actual household growth.¹¹ Native-borns had a stronger influence on urban form than foreign-borns given the fact that, with the same rate of population growth, the household growth rate among native-borns was much higher than that of their immigrant counterparts. Because of the differences between native-borns and

Table 2. Number of Households by Immigration Status in 1980 and 1990

Group	Population		Change 1980-90	% Distribution of the Change 1980-90
	1980	1990		
Total	90,467,000	91,770,958	11,303,958	100.0
Born in the U.S.	74,529,140	83,014,908	8,485,768	75.1
Settled Immigrants	4,347,120	6,296,296	1,949,176	17.2
Immigrants Arrived Last Ten Years	1,590,740	2,459,754	869,014	7.7

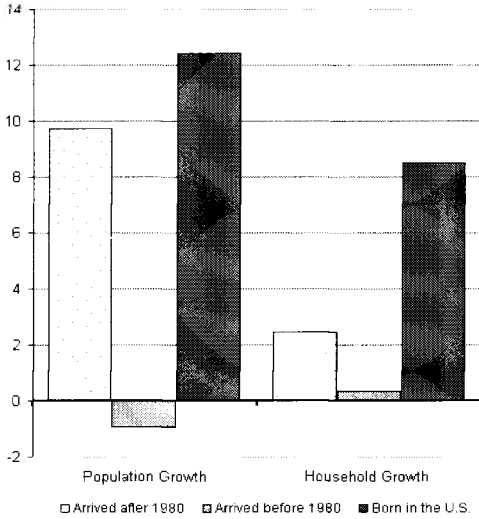
Source: U.S. Bureau of the Census (1980 and 1990 PUMS 5% data).

Table 3. Population and Household Growth by Immigration Status between 1980 and 1990

Group	Population Growth		Household Growth	
	Number	% of Total	Number	% of Total
Total	21,245,228	100.0	11,303,958	100.0
Born in the U.S.	12,417,858	58.5	8,485,768	75.1
Immigrants arrived before 1980	-911,243	-4.3	358,436	3.2
Immigrants Arrived Last Ten Years	9,738,613	45.8	2,459,754	21.8

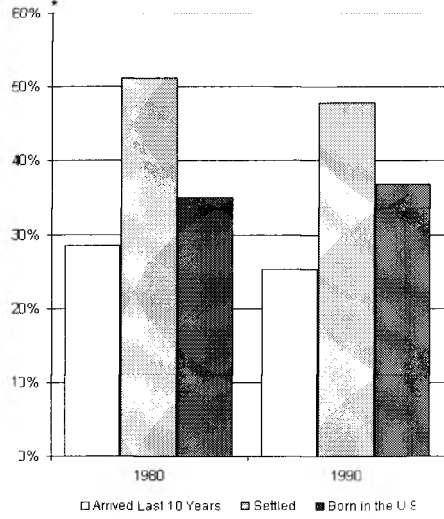
Source: U.S. Bureau of the Census (1980 and 1990 PUMS 5% data).

Figure 1. Absolute Growth In Population and Households Among the Three Groups from 1980 to 1990.*



* Cohort approach - fixed in membership. Growth in population and households contributed by immigrants arrived in last ten years are counted directly as growth.

Figure 2. Headship Rates** Among the Three Groups in 1980 and 1990.



**Headship Rate denotes % of total population in a group of people who are householders (owners plus renters).

Source: U.S. Bureau of the Census (1980 and 1990 PUMS 5% data).

foreign-borns in generating household growth, the connection between population and household growth is not consistent.

The analysis in this section demonstrates that population growth and household growth are very different between native-borns and foreign-borns. With the same population growth, native-borns would create a higher rate of household growth than foreign-borns and therefore have stronger implications for urban form.¹²

Household Formation

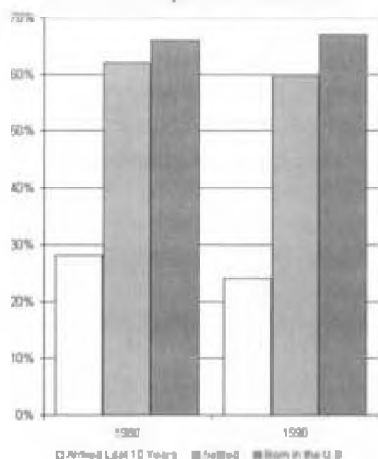
There is a distinctive pattern between native-borns and foreign-borns in household formations. Native-borns formed new households at a faster pace than their population growth. Headship rates¹³ among immigrants decreased in the 1980s,¹⁴ which clearly indicates that household size among immigrants both new and settled increased during that period of time. (See figure 2.) In other words, household growth rate was smaller than population growth rate among foreign-borns. On the other hand, the headship rate among native-borns increased in the 1980s, which shows that the household size among native-borns shrank.

Household's Tenure Choice

The changes in homeownership rates were also different among native-born population, settled immigrants, and recent arrivals. Native-born population created a higher proportional demand for owner-occupied housing. Both settled immigrants and recent arrivals had experienced a downturn in homeownership attainment between 1980 and 1990, even as native-borns still enjoyed rising homeownership rates. (See figure 3.)

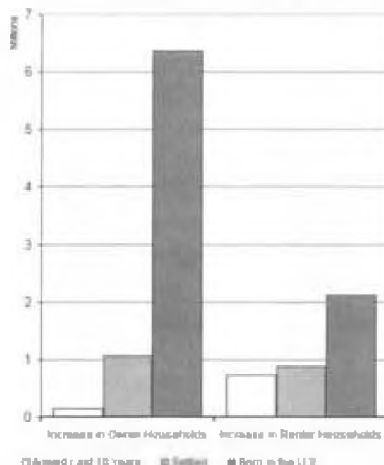
Household growth among native-borns was primarily among owner households while new immigrant households are mostly renter households. Although the absolute household growth of native-borns was two times faster than that of foreign-borns, the absolute growth of owner households among native-borns was four times faster than that of foreign-borns.

Figure 3. Homeownership Rates* Among the Three Groups in 1980 and 1990**



*Homeownership Rate denotes percent of total households in a group who are owner householders in 2000.

Figure 4. Absolute Owner and Renter Household Growth Among the Three Groups from 1980 to 1990**



**Immigrant Group Approach - fixed in immigration status. Settled immigrants in 1980 is compared with settled immigrants in 1990, same as the new immigrants in 1980 and 1990.

Source: U.S. Bureau of the Census (1980 and 1990 PUMS 5% data).

(See figure 4 and table 4.) At the same time, the absolute renter household growth was almost the same between native-borns and foreign-borns. Compared with native-borns, foreign-born households had a weaker impact on urban sprawl with the same growth of number of households, because foreign-born households were more likely to be renters. Rental units are mostly multifamily housing located in higher density regions.

Residential Location

Native-borns and foreign-borns are different in patterns of population and household growth, household formation, and tenure choices. Their choices of residential locations are also distinctive.

Native-borns were primarily responsible for the substantial growth in the suburbs, because a large number of native-borns moved to the suburbs from the central cities and the rural areas. (See figures 5 and 6.) Residential locations of native-borns changed significantly between 1980 and 1990.

Table 4. Growth in Owner and Renter Households between 1980 and 1990

Group	Increase in Owner Households		Increase in Renter Households	
	Number	% of Total	Number	% of Total
Total	7,578,033	100.0	3,725,925	100.0
Born in the U.S.	6,372,665	84.1	2,113,083	56.7
Settled Immigrants	1,062,908	14.0	686,268	23.8
Immigrants Arrived Last Ten Years	142,440	1.9	726,574	19.5

Source: U.S. Bureau of the Census (1980 and 1990 PUMS 5% data).

The growth patterns between native-borns and foreign-borns were considerably different in the suburbs. The native-born population in the suburbs increased substantially in the 1980s. Although the rate of population growth among native-borns was only 40 percent higher than that of the foreign-born population, native-borns contributed four times more population to the suburbs than that of the immigrants in the 1980s. (See table 5.) In other words, native-borns generated 80 percent of the population growth in the suburbs. Among the three groups of people, only new immigrants added population in the central cities. Almost half of all the absolute population growth among new immigrants took place in the central cities.

Native-born household growth significantly outpaced foreign-born household growth in the suburbs. Native-borns generated 5.7 times more households than foreign-borns in the suburbs. In other words, native-borns contributed to 87 percent of all the absolute growth in the number of households in the suburbs from 1980 to 1990. (See table 6.)

While the native-born population was the main contributor to the suburban residential growth, new immigrants had a disproportionate presence in the central cities. There was a substantial increase in the number of households in the suburbs along with a considerable decrease in the central cities between 1980 and 1990. At the same time, new immigrants filled up the central cities left behind by the native-borns. Therefore, foreign-borns were less likely to induce urban sprawl.

There is a debate whether immigrants have "pushed out" native-borns from the cities to the suburbs or immigrants have taken over the dilapidated cities left behind by native-borns (Frey 1995b; Farley 1996). If it were the first case, immigrants could be partially responsible for the suburban expansion triggered by the out-migration among native-borns. Accumulating evidence, however, suggests that it is immigrants who have taken over the

Figure 5. Aggregate Population Growth by Locations from 1980 to 1990.*

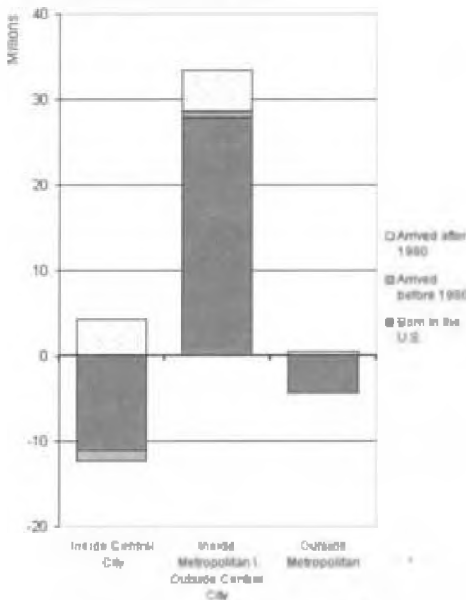
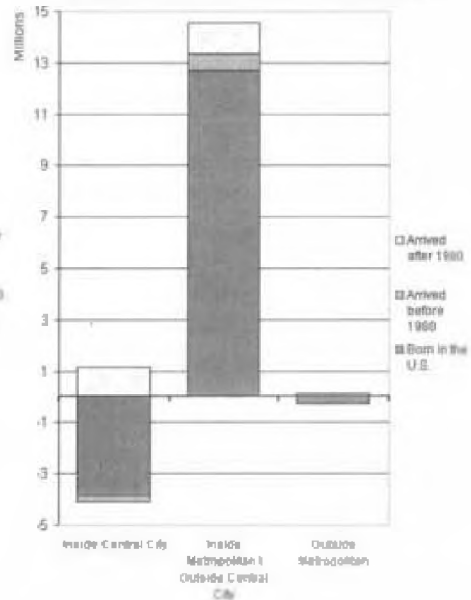


Figure 6. Aggregate Growth in Number of Households by Locations from 1980 to 1990.*



*Cohort Approach fixed in membership.

Source: U.S. Bureau of the Census (1980 and 1990 PUMS 1% metro data).

Table 5. Geographic Distribution of Population by Immigration Status in 1980 and 1990

Group / Location	Population		Change	% Distribution of the Change
	1980	1990		
Total	226,662,400	248,107,628	21,392,018	100.0
Born in the U.S.				
Inside Central City	49,076,400	38,031,449	-11,044,951	-51.6
Inside Metropolitan/ Outside Central City	107,391,300	135,254,454	27,863,154	130.3
Outside Metropolitan	56,053,400	51,882,904	-4,170,496	-19.5
Settled Immigrants				
Inside Central City	3,318,000	4,709,501	1,391,501	6.5
Inside Metropolitan/ Outside Central City	4,422,600	7,579,825	3,157,225	14.8
Outside Metropolitan	790,600	885,650	95,050	0.4
Immigrants Arrived Last Ten Years				
Inside Central City	2,772,500	4,322,671	1,550,171	7.2
Inside Metropolitan/ Outside Central City	2,520,000	4,962,859	2,442,859	11.4
Outside Metropolitan	387,200	494,705	107,505	0.5

Source: U.S. Bureau of the Census (1980 and 1990 PUMS 1% data).

Table 6. Geographic Distribution of Household by Immigration Status in 1980 and 1990

Group / Location	Population		Change	% Distribution of the Change
	1980	1990		
Total	90,461,500	91,822,548	11,361,048	100.0
Born in the U.S.				
Inside Central City	18,250,600	14,398,659	-3,851,941	-39.9
Inside Metropolitan/ Outside Central City	36,788,600	49,452,967	12,664,867	111.5
Outside Metropolitan	19,436,000	19,199,780	19,199,780	-2.1
Settled Immigrants				
Inside Central City	1,781,800	2,352,538	2,352,638	5.0
Inside Metropolitan/ Outside Central City	2,190,700	3,364,544	3,664,544	12.0
Outside Metropolitan	383,000	356,559	355,558	0.1
Immigrants Arrived Last Ten Years				
Inside Central City	847,600	1,148,991	1,148,991	2.7
Inside Metropolitan/ Outside C	693,600	1,214,786	1,214,786	4.6
Outside Metropolitan	90,100	90,100	109,624	0.2

Source: U.S. Bureau of the Census (1980 and 1990 PUMS 1% data).

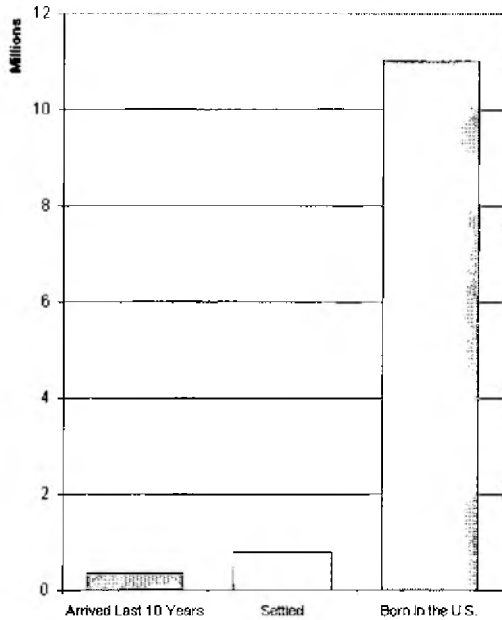
cities left by the native-born population. Since the early 1900s, people have contended that immigrants have been the demographic fuel sustaining cities (Park et al. 1925; Burgess 1926).¹⁵

Previous research is still inconclusive regarding the claim that recent immigration has caused natives to migrate (Frey 1995; Wright, Ellis, and Reibel 1997; White and Liang 1998; Kritz and Gurak 2001). At the same time, research shows that households with higher income levels are more likely to move to the suburbs (Thurston and Yezer 1994; Kasarda et al. 1997). Native-borns in general have a higher level of household income and more accumulated

family wealth. Therefore, they have higher residential mobility than their foreign-born counterparts. Concurrently, the foreign-born population is more constrained by their limited access to the capital, transportation and market at large. They are more likely to be lower bidders in the market and tend to be more price inelastic in the housing consumption and residential location choice: (Hansen, Formby, and Smith 1996; Ihlanfeldt 1981). Therefore, it is more likely the case that immigrants take over the neighborhood left behind by native-borns. Previous studies also show that many more cities would have experienced a decline in population, were there no immigrants to refill the cities (Farley 1996; Myers 1999).

New residential development is the main contributor to urban sprawl, since most of the new housing construction takes place on the urban fringe. The native-born population in 1990 occupied more than 90 percent of the suburban housing constructed in the last ten years while immigrants took only 10 percent of the new housing stock. (See figure 7.) Housing permit data also reveal that new suburban homes made up approximately 82 percent of all homes built in metropolitan areas in 1998 (von Hoffman 1999). In addition, housing is one of the most durable goods, which limits the availability of land in older neighborhoods. New housing developments on the urban fringe do not face the same land constraints that older neighborhoods do. With the steadily rising household income over the past decades, consumers in general have stronger demands for housing with larger space and higher quality. Since more native-borns take over most new residential development on the urban fringe, they are more responsible for urban sprawl.

Figure 7. Absolute growth in Number of Households who Live in Newly Built Suburban Housing, 1980 to 1990*



* Immigrant group approach - fixed immigration status
 Source: U.S. Bureau of the Census (1990 PUMS 1% data).

Conclusions

The relationship between immigration and urban sprawl has drawn considerable policy discussions, albeit little research substantiates either side of the argument. This research empirically analyzes the relationship, addressing two logically connected research concerns: first, whether population growth fueled by immigration was the major contributor to the dispersed land-use pattern defined as urban sprawl in the 1980s; second, whether native-borns and foreign-borns were similar in population and household growth, household formation, housing tenure choice, occupancy of new housing development, and preference of residential locations.

To conclude, the preliminary results of the demographic analysis presented here indicate that there could be a relationship between immigration and urban sprawl in the metropolitan areas where long-term immigrants were experiencing upward mobility triggered by increasing

household income, enlarged family size, and stronger tendency for homeownership. However, immigrants who experienced upward mobility and who relocated to the suburban areas were more likely to take over trickle-down housing instead of new structures on the urban fringe, as shown in figure 7. Immigrants in general are more likely constrained by budget, thus more price-sensitive. Furthermore, native-borns instead of foreign-borns generated most of the growth in the number of households, owner-occupied housing, suburban residency, and new suburban residential development. Therefore, the accumulating evidence appears in favor of Krugman's notion that immigration is not the main contributing factor to current dispersed land-use patterns. This idea is further strengthened by the fact that most metropolitan areas experiencing a faster expanding pace than their population growth are not the high immigrant recipient regions (Wim, Joseph, and Mark 1999; Fulton et al. 2001). In addition, most of the regions with significant sprawl have experienced low population growth (Fonseca and Wong 2000). In other words, population growth by itself is not likely to be a major cause of urban sprawl. No strong evidence supports the perceived causal relationship between immigration and urban sprawl.

The demographic analysis clearly demonstrates that there was a substantial heterogeneity between native-borns and foreign-borns. Almost all the existing evidence suggests that it is not appropriate to assume that native-born and foreign-born populations were similar in their residential patterns. Because of the diverse population growth, the linkage is weakened between population growth and urban sprawl. In addition, it is important to realize that households, not individuals, make residential and locational choices. Therefore, household behavior is a critical factor in causing urban sprawl. Household growth has a much stronger causal relationship with urban sprawl than population growth.

The policy implications of this study are straightforward. Based on this analysis, and the way it defines urban sprawl, limiting immigration is not expected to curtail the current suburban dispersed development pattern. Rather than targeting immigration in general, public policy should focus on the specific characteristics of development that lead to particular negative consequences and determine who bears the costs.

These findings must of course be considered in light of the limited decennial data set used in the analysis. Current research is based on the census data from 1980 and 1990. Research shows that recent immigrants seem more inclined to settle outside the central cities (Alba, Logan, and Stults 2000; Marcelli 2001). New immigrants are more dispersed in terms of their residential locations in the 1990s (Fields 2001). Since urban sprawl is a fluid and dynamic process, the relationship between immigration and urban sprawl could have shifted somewhat between the 1980s and the 1990s. With the incoming 2000 Census data, we can gain more insights by looking at the trend between 1990 and 2000. The research findings satisfy a necessary but not sufficient condition that there is no direct linkage between immigration and urban sprawl. In addition, an aggregate approach such as a national level demographic analysis could conceal important details on heterogeneity across regions and different immigrant groups. It is necessary to explore factors such as geography, income, age profile, and race-ethnic differences and model specific aspects of the relationship between immigration and urban sprawl by incorporating the microdata and implementing a multivariate statistic method, as so to further disentangle such a complex relationship. Finally, it is important to recognize that urban sprawl is a very complex process and people with different interpretations of the process may disagree over the measurement.

Although immigrants may not have a significant impact on current dispersed land-use patterns, they could induce sprawl in the future if they followed the residential patterns of their domestic counterparts and kept on moving to low-density residential areas. Along

with their upward mobility, rising income tends to provide immigrant households with a higher residential mobility. Their children could also present certain concerns if they adapt to a similar residential pattern as the native-born population when they grow up. Previous research also shows that household behavior has a strong linkage with its demographic profile (Clark and Dieleman 1996). With the aging process of immigrant households, they might have a stronger implication to the urban form in the future. Although immigrants may not have caused urban sprawl, they could still be of concern to local governments. Because of the unique demographic characteristics of immigrants, they usually have different needs than their domestic counterparts, such as public services and infrastructure provision. The mismatch between demand and supply among immigrants could put certain pressure to bear on immigrant receiving areas (Ladd 1992).

Despite these caveats, this paper demonstrates a feasible framework of implementing dynamic demographic analysis in the study of urban form. It provides empirical evidence that may promote more analyses on urban sprawl and further explore whether the fundamental forces underlying urban sprawl have shifted over time.

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About the Author



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Notes

¹ Immigrants and foreign-borns are used interchangeably in this analysis, as are U.S.-borns and native-borns. The term "foreign-borns," instead of "foreign-born population," is used when describing foreign-born population and foreign-born households as a whole. The paper uses definitions from the decennial Census on place of birth and citizenship to classify the population into two categories: native- and foreign-born. Members of the latter group, referred to as immigrants, were not U.S. citizens at birth. Natives were born in the United States or a U.S. island area such as Puerto Rico, or born abroad of at least one parent who was a U.S. citizen. The Census place-of-birth question asked respondents to

report the (U.S.) state, commonwealth, or territory, or the foreign country, in which they were born. Individuals born outside the United States were asked to report their place of birth according to current international boundaries. These data will be reported as immigrant place of birth.

- ² The U.S. Census Bureau will not fully release the 2000 census Public Use Microdata Sample (PUMS) files until the beginning of 2003 at the earliest. The largely released 2000 Census 100 percent data do not include important information on immigration status and certain geography. Produced by the Census Bureau, the Current Population Survey (CPS) and the Census 2000 Supplementary Survey (C2SS) are other data sources for this type of demographic analysis. However, the mechanism of the CPS and C2SS is not exactly the same as the Census PUMS dataset. Therefore, there is some inconsistency between the data sources, which is not suitable for comparative study. Therefore, the 1980 and 1990 PUMS have to be used in this analysis. Since residential patterns are rather stable over time, the 1980s and 1990s should be comparable in this analysis.
- ³ Previous research on urban sprawl largely treats it as a static phenomenon by which the urban form is analyzed at a fixed point in time. In this paper, the author suggests that it may be more meaningful to consider urban sprawl as a process-oriented phenomenon. In other words, it may shed more light on the sprawl discussion by focusing on the transformations of urban form and the changes of density over a period of time.
- ⁴ Both the 1 percent and the 5 percent data will be used in the analysis. PUMS 5 percent data in 1990 does not provide a comparable geography for the central city as that in 1980. Therefore, the 1 percent data will be used in 1980.
- ⁵ According to the Census Bureau, Metropolitan Area (MA) refers to a core area with a large population nucleus, plus adjacent communities having a high degree of economic and social integration with that core. Although the metropolitan area boundaries were fairly consistent between 1980 and 1990, the geographic matching could still be problematic under certain circumstances as observed by Ellis, Reibel, and Wright (1999). They note that, due to the boundary adjustment by the Census Bureau, some metropolitan areas grew larger and some became smaller from 1980 to 1990. Such problems could be significant in smaller areas or rapidly growing regions. At the local level, boundary shifts across metropolitan areas compromise the integrity of the data for comparative urban analysis over time. Ellis, Reibel, and Wright also observe that the mismatch problem is substantial when the research is conducted at the Public Use Microdata Area (PUMA) level. This is a geographic unit within PUMS. The problem could also be significant when the study looks at very narrowed subjects such as women's labor participation and interurban migration analysis, which are very sensitive to boundary shifts (Ellis, Reibel, and Wright 1999). Despite these concerns, the boundary shifts are not expected to present a problem in this analysis. Most immigrants lived in large metropolitan areas, such as Los Angeles, San Francisco, and New York where the geographic boundary shifts between 1980 and 1990 were not significant. The boundary mismatch problem has a crossing-out effect at the national level. Additionally, this paper conducts the analysis on major data categories such as population and number of households, which are less sensitive to the boundary shifts. Although it would be ideal to have the boundaries of all metropolitan areas perfectly matched between 1980 and 1990, there has not been such an adjustment procedure. Consequently, this analysis follows the available Metropolitan Area boundaries without any adjustment. This is in accordance with most previous comparative studies at the Metropolitan Area level (for example, see Barnard and Krautmann 1988; Mills and Lubuele

1995; Long and Nucci 1997a, 1997b; Gordon, Richardson, and Yu 1998; Fonseca and Wong 2000).

⁶ According to the Census Bureau, UA is an area consisting of a central place(s) and adjacent territory with a general population density of at least 1,000 people per square mile of land area that together have a minimum residential population of at least 50,000 people. The Census Bureau uses published criteria to determine the qualification and boundaries of UAs.

⁷ The central city construct in 1990 is available only at the PUMS 1 percent data. Therefore, we use the PUMS 1 percent dataset when the central city construct is involved. According to the Census Bureau, central city refers to the largest place in a metropolitan area and, in some areas, one or more additional places that meet official standards. A few primary metropolitan statistical areas do not have a central city.

The boundaries of the central cities present another concern regarding the geographic changes in the 1980s. Ottensmann (1996) notes that there has been a significant change in the concept of central city between 1980 and 1990. He found that the new definition added 107 new central cities while twenty-one municipalities lost their central city designations between 1980 and 1990. He observes that central cities as a whole experienced a 10.6 percent increase in population after adding all the new central cities. There have been attempts to adjust for this problem. Alba et al. (1999) adjust the geography based on a series of simulation procedures. Since their research has to use the PUMS 5 percent data to achieve more detailed information on race-ethnicity, the adjustment procedure suffers from loss of territory from 1980 to 1990. Therefore, it is not suitable for this analysis. Some other studies choose only a limited number of central cities in their sample for comparison to avoid the mismatch problem (for instance, see Kasarda et al. 1997; Galster, Metzger, and Waite 1999). These methods are not appropriate for this analysis either, since the selection process is subjective and the selected central cities may not be representative of the central cities in general. As with the argument in the previous section, the geographic shifts of central cities are not a major concern in this study, since this analysis focuses only on trends at the national level and includes all the population in the sample. In addition, enlarged central cities would only strengthen the results if there were significant out-migration from the central cities. In this case, the geography of central cities has been enlarged while the suburban areas shrank from 1980 to 1990. Many studies at the national level do not deliberately adjust for geography (for example, see Hill and Wolman 1997; Hill, Brennan, and Wolman 1998). However, it is necessary to interpret the demographic analysis with caution and keep in mind the potential implications of the geographic shifts problem.

⁸ For research using a similar method, see Myers (1999) and Myers and Park (1999).

⁹ In line with the two demographic methods, this analysis uses two ways to categorize population and households – one based on their immigration status and the other based on the recentness of arrival. The first way follows the cohort approach, categorizing all the people into three groups, which are U.S.-borns (born in the U.S.), immigrants who arrived before 1980, and immigrants who arrived after 1980. The membership is fixed in both 1980 and 1990. The second approach follows the immigrant group approach, separating people into three groups, which are U.S.-borns, settled immigrants who arrived here more than ten years, and new immigrants who just arrived in the United States within the last ten years. In the second approach, members of comparable groups have the same immigration status, or recentness of arrival, between 1980 and 1990.

¹⁰ It is possible that new immigrants may temporarily stay with their settled relatives upon

arrival. Therefore, measuring the immigration status of the householder might hide the status of a small number of recent arrivals. Since the way this research defines immigration status is consistent between 1980 and 1990 and this research is to measure the dynamic changes in the decade, this does not appear to be a major concern to the robustness of the research.

- ¹¹ Immigrants contributed 8.8 million more people and 2.8 million more households. At the same time, the population and household growth among native-borns are 12.4 million and 8.5 million respectively. If the growth rate among the native borns were the same as the foreign-borns, the number of native-born households would have increased by 4.0 million. Therefore, native-borns have added an extra of 4.5 million households or 114 percent more than if they would behave like foreign-borns. In his review of an early draft of this paper, Dowell Myers suggested that the differences in household formation between native-borns and foreign-borns were primarily due to their different age profiles, income, and many other factors. Therefore, it may not be appropriate to assume that native-borns could behave like foreign-borns. The constructive suggestion is well taken. The main purpose of this comparison is to reveal how much difference there is between foreign-borns and native-borns in household formation rather than to establish the causes of such differences.
- ¹² There are several reasons that could have caused the differences between native-borns and foreign-borns in the household growth. Native-borns tend to have higher income and mobility. Therefore, they have more liberty of residential choice. It is also more affordable for the native-born population to move to the suburbs and reside in larger lot sized areas. Next, the native-born population is more likely to be older and empty-nester than the foreign-born population. The native-born population has a lower fertility rate than the foreign-born population. Therefore, the family size of the native-born population is more likely to be small. Moreover, I speculate that cultural differences between native-born and foreign-born populations could also have an impact on the household growth. Further research is necessary to identify all the possible causes of such differences and see whether such causes are permanent or temporary to predict the future trends of the relationship between population and household growth.
- ¹³ Headship Rate denotes the percentage of total population in a group of people who are householders (owners plus renters).
- ¹⁴ This comparison is somewhat different from the previous one in the sense that it compares settled immigrants in 1980 with those in 1990, instead of comparing settled immigrants in 1990 with settled and new immigrants in 1980. This is to show the changes in household formation between the two decades.
- ¹⁵ Immigration has pumped new population into the central cities, enabling the cities to maintain their vitality despite increasing suburbanization. The cities have incubated newcomers and helped them achieve their upward social and outward spatial mobility. Without the replenishment of new immigrants, some cities experienced a downturn in population in the early 20th century.

References

- Alba, Richard D., John R. Logan, and Brian J. Stults. 2000. The Changing Neighborhood Contexts of the Immigrant Metropolis. *Social Forces* 79 (2):587-621.
- Alba, Richard D., John R. Logan, Brian J. Stults, Gilbert Marzan, and Wenquan Zhang. 1999. Immigrant Groups in the Suburbs: A Reexamination of Suburbanization and Spatial Assimilation. *American Sociological Review* 64 (3):15.

- Audirac, Ivonne, Anne H. Shermeyen, and Marc T. Smith. 1990. Ideal Urban Form and Visions of the Good Life Florida's Growth Management Dilemma. *Journal of the American Planning Association* 56: 470-482.
- Bank of America. 1995. *Beyond Sprawl: New Patterns of Growth to Fit the New California*. Journal of Planning Education and Research. San Francisco: Bank of America.
- Barnard, Jerald R., and Anthony C. Krautmann. 1988. Population Growth Among U.S. Regions and Metropolitan Areas: A Test for Causality. *Journal of Regional Science* 28 (1):103-119.
- Brueckner, Jan K. 2000. Urban Sprawl: Diagnosis and Remedies. *International Regional Science Review* 23 (2):12.
- . 2001. Urban Sprawl: Lessons from Urban Economics. *Brookings-Wharton Papers on Urban Affairs* 2001 (1):65-98.
- Burchell, Robert W. 1997. Economic and Fiscal Costs (and Benefits) of Sprawl. *The Urban Lawyer* 29 (2):159-181.
- Burgess, Ernest Watson. 1926. *The Urban Community: Selected Papers from the Proceedings of the American Sociological Society, 1925*. Chicago: University of Chicago Press.
- Burton, E. 2000. The Compact City: Just or Just Compact? A Preliminary Analysis. *Urban Studies* 37 (11):1969-2006.
- Cervero, Robert. 2001. Efficient Urbanisation: Economic Performance and the Shape of the Metropolis. *Urban Studies* 38 (10):1651-1671.
- Ciscel, David H. 2001. The Economics of Urban Sprawl: Inefficiency as a Core Feature of Metropolitan Growth. *Journal of Economic Issues* 35 (2):405-415.
- Clark, William A.V., and F.M. Dieleman. 1996. *Households and Housing: Choices and Outcomes in the Housing Market*. New Brunswick, NJ: Center for Urban Policy Research.
- Downs, Anthony. 1997. The Challenge of Our Declining Big Cities. *Housing Policy Debate* 8 (2):359-409.
- . 1998. How America's Cities Are Growing: The Big Picture. *The Brookings Review* 16 (4):8-12.
- . 1999. Some Realities About Sprawl and Urban Decline. *Housing Policy Debate* 10 (4):955-975.
- Ellis, Mark, Michael Reibel, and Richard Wright. 1999. A Procedure for Comparative Metropolitan Area Analysis Using the 1980 and 1990 Census Public Use Microdata Samples. *Urban Geography* 20 (1):75-93.
- Ewing, Reid. 1997. Counterpoint: Is Los Angeles-Style Sprawl Desirable? *Journal of the American Planning Association* 63 (1):107-126.
- F.A.I.R. 2000. Urban Sprawl is One Consequence of Rapid Population Growth. In *News Release*. Washington, DC: The Federation for American Immigration Reform.
- . 2001. Immigration and Sprawl. In *Issue Brief*. Washington, DC: The Federation for American Immigration Reform.
- Farley, Reynolds. 1996. *The New American Reality: Who We Are, How We Got Here, Where We Are Going*. New York: Russell Sage Foundation.
- Fields, Robin. 2001. '90s Saw a Tide of New People. *Los Angeles Times*, 6 August.
- Fonseca, James W. and David W. Wong. 2000. Changing Patterns of Population Density in the United States. *Professional Geographer* 52 (Aug. 2000):504-517.
- Freeman, Lance. 2001. The Effects of Sprawl on Neighborhood Social Ties: An Explanatory Analysis. *Journal of the American Planning Association* 67 (1):69-78.

- Freilich, Robert H., and Bruce G. Peshoff. 1997. The Social Costs of Sprawl. *The Urban Lawyer* 29 (2):183-198.
- Frey, William H. 1995a. Immigration and Internal Migration 'Flight' from U.S. Metropolitan Areas: Toward a New Demographic Balkanisation. *Urban Studies* 32 (4/5):733-758.
- . 1995b. Immigration Impacts on Internal Migration of the Poor: 1990 Census Evidence for U.S. States. *International Journal of Population Geography* 1 (1):51-76.
- Fulton, William, Rolf Joseph Pendall, Mai Nguyen, and Alicia Harrison. 2001. *Who Sprawls Most? How Growth Patterns Differ Across the U.S.* Washington D.C.: Center on Urban and Metropolitan Policy, Brookings Institution.
- Galster, George C., Royce Hanson, Michael R. Ratcliffe, Hal Wolman, Stephen Coleman, and Jason Freihage. 2001. Wrestling Sprawl to the Ground: Defining and Measuring an Elusive Concept. *Housing Policy Debate* 12 (4):681-718.
- Galster, George C., Kurt Metzger, and Ruth Waite. 1999. Neighborhood Opportunity Structures of Immigrant Populations, 1980 and 1990. *Housing Policy Debate* 10 (1):395-443.
- Glasser, Jeff. 2001. Boomtown, U.S.A. *U.S. News & World Report*, 25 June, 16.
- Gordon, Peter, and Harry W. Richardson. 1989. Gasoline Consumption and Cities: A Reply. *Journal of the American Planning Association* 55 (3):342-346.
- . 1997a. Are Compact Cities a Desirable Planning Goal? *Journal of the American Planning Association* 63 (1):95-107.
- . 1997b. Where's the Sprawl? Letters to the editors. *Journal of the American Planning Association* 63 (2):275-278.
- . 2000. Defending Suburban Sprawl. *The Public Interest* 139:65-71.
- Gordon, Peter, Harry W. Richardson, and Gang Yu. 1998. Metropolitan and Non-Metropolitan Employment Trends in the U.S.: Recent Evidence and Implications. *Urban Studies* 35 (7):1037-1057.
- Hansen, Julia, John Formby, and W. Smith. 1996. The Income Elasticity of Demand for Housing: Evidence from Concentration Curves. *Journal of Urban Economics* 39 (2):20.
- Hill, E. W., J. F. Brennan, and H. L. Wolman. 1998. What is a Central City in the United States? Applying a Statistical Technique for Developing Taxonomies. *Urban Studies* 35 (11):1935-1969.
- Hill, Edward W., and Harold L. Wolman. 1997. Accounting for the Change in Income Disparities between U.S. Central Cities and their Suburbs from 1980 to 1990. *Urban Studies* 34 (1):43-60.
- Ihlanfeldt, Keith Ray. 1981. An Empirical Investigation of Alternative Approaches to Estimation of the Equilibrium Demand for Housing. *Journal of Urban Economics* 9:97-105.
- Kahn, Matthew E. 2001. Does Sprawl Reduce the Black/White Housing Consumption Gap? *Housing Policy Debate* 12 (Part 1):77-86.
- Kasarda, John D., J. Appold, Stuart H. Sweeney, and Elaine Sieff. 1997. Central-City and Suburban Migration Patterns: Is a Turnaround on the Horizon? *Housing Policy Debate* 8(2):307-359.
- Knaap, Gerrit J. 2000. Sprawl, Sprawl, and More Sprawl - Once There Were Greenfields: How Urban Sprawl is Undermining America's Environment, Economy and Social Fabric. *Journal of the American Planning Association* 66 (3):332-333.
- Knaap, Gerrit J., and Lewis D. Hopkins. 2001. The Inventory Approach to Urban Growth Boundaries. *Journal of the American Planning Association* 67 (3):314-327.
- Kritz, Mary M. and Douglas T. Gurak. 2001. The Impact of Immigration on the Internal Migration of Natives and Immigrants. *Demography* 38 (1):133-145.
- Krugman, Paul. 2001. My Beautiful Mansionette. *New York Times*, 23 May, A.27.

- Ladd, Helen F. 1992. Population Growth, Density and the Costs of Providing Public Services. *Urban Studies* 29 (2):273-296.
- Levine, Ned. 1997. Credit Distributed, New Points Raised. Letter to the editors. *Journal of the American Planning Association* 63(2):275.
- Long, Larry, and Alfred Nucci. 1997a. The 'Clean Break' Revisited: Is U.S. Population Again Deconcentrating? *Environment and Planning A* 29:1355 - 1366.
- . 1997b. The Hoover Index of Population Concentration: A Correction and Update. *Professional Geographer* 49 (4):431-441.
- Maher, T. Michael. 1997. How and Why Journalists Avoid the Population-Environment Connection. *Population and Environment* 18 (4):339-373.
- Malpezzi, Stephen. 1999. *Estimates of the Measurement and Determinants of Urban Sprawl in U.S. Metropolitan Areas, Working Paper (99-06)*. The Center for Urban Land Economics Research, University of Wisconsin.
- Marcelli, Enrico A. 2001. *From the Barrio to the 'Burbs: Immigration and Urban Sprawl in Southern California, Working Paper*. San Diego: The Center for Comparative Immigration Studies, U.C. San Diego.
- Mieszkowski, Peter, and Edwin S. Mills. 1993. The Causes of Metropolitan Suburbanization. *The Journal of Economic Perspectives* 7 (3):135-147.
- Mills, Edwin S. 1999. Should Governments Try to Control Suburban Growth? *Chicago Fed Letter*, March, 1-4.
- Mills, Edwin S. and Luan' Sende Lubuele. 1995. Projecting Growth of Metropolitan Areas. *Journal of Urban Economics* 37 (3):344-360.
- Myers, Dowell. 1992. *Analysis with Local Census Data: Portraits of Change*. Boston: Academic Press.
- . 1999. Demographic Dynamism and Metropolitan Change: Comparison of Los Angeles, New York, Chicago, and Washington, D.C. *Housing Policy Debate* 10 (4):919-955.
- Myers, Dowell, and Alicia Kitsuse. 1999. *The Debate Over Future Density of Development: An Interpretive Review, Working Paper*. Lincoln Institute of Land Policy.
- Myers, Dowell, and Julie Park. 1999. The Role of Occupational Achievement in Homeownership Attainment by Immigrants and Native Borns in Five Metropolitan Areas. *Journal of Housing Research* 10 (1):61-93.
- Nelson, Arthur C. and R. Peterman David. 2000. Does Growth Management Matter? The Effect of Growth Management on Economic Performance. *Journal of Planning Education and Research* 19 (3):277-285.
- Ottensmann, John R. 1996. The New Central Cities: Implications of the New Definition of the Metropolitan Area. *Urban Affairs Review* 31 (5):681-687.
- Park, Robert Ezra, Ernest Watson Burgess, Roderick Duncan McKenzie, and Louis Wirth. 1925. *The City, University of Chicago Studies in Urban Sociology*. Chicago: University of Chicago Press.
- Peiser, Richard. 1989. Density and Urban Sprawl. *Land Economics* 65 (3):193-204.
- Sierra Club. 2000. *Sprawl Costs Us All: How Your Taxes Fuel Suburban Sprawl*. Report, spring 2000, cited July 2001. Available from <http://www.sierraclub.org/sprawl>.
- Stein, Dan. 2001. Immigration vs. Sprawl. *New York Times*, May 30.
- Stoel, Thomas B., Jr. 1999. Reining in Urban Sprawl - Can U.S. Cities Diverge from the Path of Sprawl and Escape its Damaging Environmental Consequences? *Environment* 41 (4):6.
- Thurston, Lawrence and Anthony M. J. Yezer. 1994. Causality in the Suburbanization of Population and Employment. *Journal of Urban Economics* 35 (1):28-45.

- Torrens, Paul M., and Marina Alberti. 2000. *Measuring Sprawl, Working Paper No.27*: Centre for Advanced Spatial Analysis, University College London.
- U.S. Bureau of Census. 2001. *Census 2000 Supplementary Survey* [Internet]. U.S. Census Bureau, Demographic Surveys Division, 06-Aug-01 2001 [cited July 2001]. Available from <http://www.census.gov/c2ss/www/>.
- USA Today. 2000a. Ads Linking 'Urban Sprawl' with Immigration Stir Controversy in Virginia. 3 October.
- . 2000b. Time to Control, Limit Immigration. *USA Today*, 31 May, 12A.
- von Hoffman, Alexander. 1999. Housing Heats Up: Home Building Patterns in Metropolitan Areas. Washington D.C.: Center on Urban and Metropolitan Policy, Brookings Institution.
- Wasserman, Miriam. 2000. Urban sprawl. *Regional Review - Federal Reserve Bank of Boston*, first quarter, 9-17.
- White, Michael J., and Zai Liang. 1998. The Effect of Immigration on the Internal Migration of the Native-Born Population, 1981-1990. *Population Research and Policy Review* 17 (2):141-166.
- Wim, Wiewel, Joseph Persky, and Mark Sendzik. 1999. Private Benefits and Public Costs: Policies to Address Suburban Sprawl. *Policy Studies Journal*, (spring): 96-114.
- Wright, Richard A., Mark Ellis, and Michael Reibel. 1997. The Linkage Between Immigration and Internal Migration in Large Metropolitan Areas in the United States. *Economic Geography* 73 (2):234-255.