Chapter 16

Immigration and Densities: A Contribution to the Compact Cities and Sprawl Debates

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Introduction: The Public Policy Context

This paper focuses on the intersection between two very important public policy issues, international immigration and metropolitan sprawl, that superficially might seem, at best, loosely connected. It also, by inference rather than by being explicit, raises the question of how to bridge the gap between some public perceptions (including interest group positions) and demonstrable research findings. It makes no attempt to answer this latter question, but how to communicate the results of planning research to change the orientation of public policy debates remains vitally important.

Controlling population growth has intermittently erupted as a policy option in the efforts to fight sprawl, for example, in Sierra Club discussions. The Club leadership has sporadically attempted to ban the topic, recognizing that the liberal white middle class that is the core of its support is uncomfortable pursuing a path that leads to a call for limitations on immigration. An attempt to craft a compromise ballot initiative that would unite the membership around a policy that recognized the role of population growth (and, implicitly, immigration) in sprawl eventually failed, but a sizable proportion of the members continues to grumble.[1]

The interest group, FAIR (Federal Alliance for Immigration Reform), on the other hand, has more recently embraced the popularity of the combating sprawl argument as a powerful weapon in its fight for tougher immigration controls. Other fringe groups demonstrate a similar xenophobia. Consider, for example, a full-page advertisement in the New York Times, May 31, 2001, p. A21, by an organization

[1] A 1998 ballot garnered 40 percent support for population stabilization (and immigration reform). The April 2001 ballot obtained 46 percent support (although only 9.8 percent of the membership voted). A separate sub-group has been established among the Sierra Club membership, SUSPS (Sierrans for US Population Stabilization).

called DASA (Diversity Alliance for a Sustainable America)[2], whose most prominent members are Richard D. Lamm, the former Governor of Colorado, and Gaylord Nelson, the founder of Earth Day. Under the headline of "Why Do We Have an Energy Crisis?" there is the following quotation from the advertisement: "The energy crisis, like traffic congestion, *urban sprawl* and overcrowded schools, is exacerbated by population growth. Nearly 70 percent of current population growth in this country is immigration-related. It's therefore imperative that President Bush and Governor Davis advocate a sustainable immigration policy (my italics)."

Paul Krugman from Princeton University reported in a syndicated column (Krugman, May 24, 2001) that he had received a mound of correspondence that argued "vehemently, that the real culprit behind urban sprawl is population growth, and that therefore it's all because of immigration." It was a little reassuring in this climate that President Bush appeared to be a relatively strong immigration advocate (perhaps in part the result of his rapprochement with President Vicente Fox), at least before the World Trade Centre attack that may have a chilling effect on any attempts to liberalize immigration policy.

The Academic Context

In a more academic setting, with very different conclusions, Fulton *et al.* (2001, p.11) have suggested that "the single most important variable in explaining differences among metro areas' density change from 1982 to 1997 was the share of 1990 residents who were born abroad" and continue that "efforts by anti-immigration groups to link sprawl with immigration are misguided." This paper supports this position, and is a direct follow-up to their suggestion that "(w)e need to explore the dynamics of immigration and density in more detail." Their report is a broad overview touching on many aspects of demographic factors related to sprawl, so it would be unrealistic to expect a detailed analysis of the immigration-sprawl relationship. Nevertheless, their regression analyses showed that the foreign-born population share was a major variable explaining 1997 densities, density changes between 1982 and 1997 and urban land changes between 1982 and 1997. All these results indicate that immigration is negatively correlated with density, and hence probably with sprawl. However, the sole immigration variable used in their report is the foreign-born percentage of population in 1990.

One purpose of this paper is to suggest some more refined variables to explore this relationship and to provide a broader context for the discussion. It avoids the interesting but more complex issue of the measurement of sprawl by focusing on density and land consumption measures. It does not pretend or claim

[2] See www.diversityalliance.org for more details. There are many other similar groups (e.g. Limits to Growth, Numbers USA, Negative Population Growth, the Carrying Capacity Network, and the "independent, non-partisan" Center for Immigration Studies), most of them operating out of Washington, D.C. and occasionally giving testimony to Congress).

to provide a comprehensive explanation of sprawl. Instead, it confirms the positive association between immigration and density, but also highlights the negative correlation between density and incomes and the positive relationship between density and land (house) prices. The major implication for planners is the need to justify anti-sprawl strategies on rational not specious arguments.

Yu (2001) has provided some evidence on demographic and housing influences based on national-level metropolitan data for the 1980-1990 period. Immigrant arrivals after 1980 accounted for 45.8 percent of national population growth between 1980 and 1990 (and is somewhat offset by the negative contribution of settled migrants [-4.3 percent] via attrition). But the total immigrant contribution to the rate of household formation (the key determinant of housing demand) was much less, only 24.9 percent. At the same time as household size was increasing among immigrants, it was declining among the native-born. In addition, recent immigrants are more likely to choose to live in central cities, more likely to be renters (and rental housing is disproportionately found in the central cities), and are more like to use transit. Given the role of new housing construction in generating sprawl, the native-born occupied more than 90 percent of the new housing stock built between 1980 and 1990, while recent immigrants absorbed only three percent (Yu, 2001, p. 20).

In a study of more recent data, Borjas (2000) has also highlighted the homeownership gap between the native-born and foreign-born households. By the year 2000, it had widened to 20 percentage points (67 percent against 47 percent), five percentage points wider than ten years earlier. The gap is even wider in certain local housing markets, the most extreme being 30 percent in Orange County, California. In 2000, only 14.5 percent of immigrant households who had arrived in the previous five years owned their own homes, whereas in 1980, 19 percent of recent immigrants were homeowners. Thus, recent immigration primarily impacts the higher-density rental market[3], at least in the short and medium runs.

In addition, Myers (2001) has speculated about how the growth of the Latino population might affect compactness and density in California. The main focus of his paper is the future, and its most interesting question is about the rate and degree of cultural assimilation of the immigrant population. Will the settlement pattern and housing choices of the next generation of immigrants be indistinguishable from those of Americans without a recent foreign-born lineage? Similar results, based on past behaviour, have been suggested by Richard Alba, John Logan and others (e.g. Alba, et al., 1999; Alba, et al, 1994; Alba and Logan, 1992; and Alba, et al. 1991). This paper deals only with the present and the recent past, and does not address the future. But if the density benefits from immigration are temporary, it would be ironic if the anti-immigration lobbies adopted the argument that we

[3] It is not surprising that among large cities Los Angeles has the second lowest homeownership rate in the country (39 percent) behind New York City, while Los Angeles County has the lowest homeownership rate (49 percent) of any metropolitan county west of the Mississippi (Guerra, Marks and Brackman, 2001). High land prices and low immigrant incomes provide a killing combination for homeownership growth.

must stop immigration now, not because immigrants are "strangers" but because of the dangers that they will soon become just like "us" and replicate our residential location behaviour and consumption choices.

The Residential Behaviour of the Foreign-Born Population

There are substantial amounts of information about the foreign born, for both 1997 (Costanzo, 2000) and for 2000 (Lollock, 2000). They have much larger families (27 percent have households larger than five persons, more than double the native-born share), primarily because of the higher fertility of Latinos, who account for more than one-half of the foreign born. They are not equally distributed geographically, but are over-represented in the West (39.9 percent of the foreign born live there compared with 20.8 percent of natives) and underrepresented in the Midwest (10.7 percent compared with 24.6 percent).[4] In particular, they are heavily concentrated in selected metropolitan areas (e.g. Miami, Los Angeles, San Francisco, New York and Chicago, with foreign-stock shares of 60, 53, 43, 42 and 28 percent respectively) that are generally high-density locations, primarily the result of long-established land prices.[5] With higher poverty rates (17 percent of the foreign born compared to 11 percent of the native born), the foreign born are much more likely to live in higher-density apartments than in single-family homes. However, there is some evidence of upward mobility within a generation, as immigrants converge to the income and homeownership levels of natives (Myers and Lee, 1996). In terms of urban vs. rural locations, the foreign born are more concentrated in the central cities than the American born (45.1 percent as against 27.5 percent) and much less concentrated in non-metropolitan areas (5.1 percent relative to 20.7 percent); the proportions in the suburbs are more or less the same.

These descriptive statistics suggest that the foreign-born are very different in many respects from the native born, and this equally applies to their household size decisions, residential location and housing choices that are key in assessing their role in densities (and sprawl).

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[4] There are also significant regional differences in declining densities, 1982-97: Midwest, -19.03 percent; Northeast, -23.14 percent; South, -23.42 percent; West, -11.23 percent; compared with the United States average of -20.47 percent (Fulton *et al*., 2001).

[5] Newbold and Achjar (2002) use a different source (a pooled-cross-section of INS microdata over the period 1980-90) to obtain similar results. The intended destinations of the 2.35 million new legal adult immigrants who entered the United States between 1980 and 1990 were overwhelmingly the large metropolitan areas, with 45 percent headed for three metropolitan areas (New York, Los Angeles and San Francisco). Only 30 percent intended to move to destinations outside the 25 largest metropolitan areas.

Data

The 1997 data on immigration used in this research are from the Current Population Survey (CPS); this makes a convenient match with the National Resources Inventory (NRI) land use data that have been recently made available to measure trends in urban developed land between 1982 and 1997.[6] However, the sample size problem in the CPS (Schmidley and Robinson, 1998) requires limiting the analysis to forty one-million plus metropolitan areas (in some of the tests, Greensboro, North Carolina, and Providence, Rhode Island, are excluded because of gaps in the data sets, as is Boston because of its unusual definition of what constitutes a CMSA). Whether interpolated estimates based on the 1990 and 2000 Censuses would be preferable to the 1997 CPS estimate is a question that currently cannot be answered because the foreign-born component of the 2000 Census is only gradually being released. Comparison of the foreign-born estimates from the 1997-2001 CPS lends some credence to the reliability of the 1997 estimates: the year-to-year changes look plausible, and the percentage of foreign-born population remained stable from year to year.[7]

Fulton *et al*. (2001) use the 1990 foreign born population estimate as a proxy for immigration. In this paper, I consider three alternative immigration measures and three alternative sprawl measures. Table 16.1 shows the basic data for the alternative immigration and sprawl measures.

The first immigration measure is the 1997 CPS estimate of the foreign-born population share in each metropolitan area. The range of variation is wide, from 1.6 percent in Pittsburgh (with very low shares also found in Greensboro, Cincinnati, Norfolk, Indianapolis, and New Orleans, and St. Louis, among others) to 38.6 percent in Miami (Los Angeles had a 30.6 percent foreign born share, while the shares in San Diego, New York and San Francisco were above 20 percent; the next in rank were Houston, Phoenix and Orlando). The numbers confirm the generalization that the foreign born gravitate to larger cities, to California, Florida and to States on the border with Mexico.

The second measure is the increase in foreign born between 1982 and 1997 as a proportion of the foreign born stock of 1982. This is a proxy for immigration during the 1982-97 NRI data period. It is not wholly accurate because a person recorded as foreign born during this period in a particular metropolitan area may have migrated to or from another metropolitan area, even prior to 1982; hence, foreign-born internal migrants will be reflected in these numbers. Also, the foreign born stock of 1982 is depleted over the analysis period from deaths which offset, to

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[6] I gratefully acknowledge the provision of the 1997 data prior to publication by Henry Bogusch of the United States Department of Agriculture Office in Austin, Texas. Publication had been delayed by concerns about margins of error related to sample size. These should not affect the large metropolitan areas discussed in this paper. These data are the new revised numbers. The data published in 1999 had to be withdrawn because of major errors related to a computer glitch.

[7] These data were kindly supplied by Dianne Schmidley of the Census Bureau, although they can be extracted from the individual CPS reports.

Table 16.1 Basic data on immigration and sprawl in US metropolitan areas

Metropolitan Area	(a) Foreign Born 1997 (%)	(b) Changes in Foreign Born,1982-97 / Foreign Stock,1982	(c) Foreign Born Increase / Pop Increase 1982-97	(d) Pop Density 1997	(e) Changes in Density (%)	(f) Changes in land consumption minus pop growth impact 1982-97 (%)
Atlanta, GA MSA	4.7074	2.0765	0.0843	2.74	-11.47	25.58
Boston-Worcester-Lawrence, MA-NH-ME-CT CMSA	7.8805	0.2602	-0.2022	n.a.	n.a.	n.a.
Buffalo-Niagara Falls, NY MSA	4.5924	-0.1889	0.2636	5.74	-14.97	129.94
Charlotte-Gastonia-Rock Hill, NC-SC MSA	4.3638	3.3239	0.1251	2.41	-21.42	50.41
Chicago-Gary-Kenosha, IL-IN-WI CMSA	11.9543	0.3223	0.3341	5.96	-12.89	62.92
Cincinnati-Hamilton, OH-KY-IN CMSA	1.8002	0.1296	0.0214	3.70	-22.39	74.90
Cleveland-Akron, OH CMSA	3.6975	-0.2479	0.0852	3.96	-33.93	138.58
Columbus, OH MSA	4.4963	1.4016	0.1766	3.44	-13.63	51.51
Dallas-Fort Worth, TX CMSA	9.5299	1.9704	0.1925	3.54	-2.95	8.47
Denver-Boulder-Greeley, CO CMSA	8.2272	1.5516	0.2156	4.52	-7.53	25.99
Detroit-Ann Arbor-Flint, MI CMSA	6.8567	0.2579	0.3233	4.10	-18.42	83.86
Greensboro--Winston-Salem--High Point, NC MSA	1.4963	0.7775	0.0354	2.71	-18.67	55.40
Hartford, CT MSA	10.5891	0.6135	1.5081	3.97	-14.67	86.56
Houston-Galveston-Brazoria, TX CMSA	15.2921	1.5186	0.4483	3.40	-8.60	31.39
Indianapolis, IN MSA	2.4761	0.8630	0.0769	3.55	-15.11	54.39
Kansas City, MO-KS MSA	4.0315	1.2687	0.1516	3.73	-14.38	53.04
Los Angeles-Riverside-Orange County, CA CMSA	30.2016	0.9749	0.6275	8.31	2.76	-12.75
Memphis, TN-AR-MS MSA	3.0645	1.7910	0.1353	3.45	-30.55	75.16

Miami-Fort Lauderdale, FL CMSA	39.2362	0.9122	0.7922	7.93	-3.86	14.54
Milwaukee-Racine, WI CMSA	4.8333	0.2506	0.1579	3.93	-14.69	73.73
Minneapolis-St. Paul, MN-WI MSA	6.8312	1.6449	0.2081	3.79	-22.37	58.52
New Orleans, LA MSA	3.0422	-0.1303	0.3180	5.28	-20.86	105.75
NY- No. NJ- Long Island CT-PA CMSA	22.1280	0.5896	1.0514	7.32	-14.59	68.63
Norfolk-Virginia Beach-Newport News, VA-NC MSA	2.4400	0.2624	0.0267	4.00	-21.03	58.35
Orlando, FL MSA	10.9300	3.0175	0.1944	3.49	-15.40	30.12
Philadelphia-Wilmington-Atl City, PA-NJ-DE-M CMSA	6.1892	0.3262	0.7754	4.65	-25.83	94.66
Phoenix-Mesa, AZ MSA	13.1901	3.0756	0.2368	6.58	16.45	-50.63
Pittsburgh, PA MSA	1.6303	-0.4892	0.2133	3.51	-34.66	116.01
Portland-Salem, OR-WA CMSA	10.8319	2.2780	0.3178	4.84	-11.61	35.68
Providence-Fall River-Warwick, RI-MA MSA	11.0250	0.0349	0.0477	5.65	-11.26	61.93
Rochester, NY MSA	6.4656	0.2302	0.2913	4.43	-14.35	80.14
Sacramento-Yolo, CA CMSA	10.2009	1.0148	0.1639	5.55	-2.84	8.54
St. Louis, MO-IL MSA	2.9192	0.4465	0.1447	3.82	-14.46	73.08
Salt Lake City-Ogden, UT-MSA	7.5077	1.4753	0.1943	5.00	-13.65	40.70
San Antonio, TX MSA	7.8416	0.4551	0.1033	4.47	-7.45	25.32
San Diego, CA MSA	22.5379	1.2957	0.4632	7.50	-4.33	14.14
San Francisco-Oakland-San Jose, CA CMSA	19.9326	0.6523	0.4259	7.96	-3.86	17.84
Seattle-Tacoma-Bremerton, WA CMSA	5.4187	0.1329	0.0247	4.67	-13.83	38.43
Tampa-St. Petersburg-Clearwater, FL MSA	10.7525	1.1950	0.2340	3.86	-11.36	33.88
Washington-Baltimore, DC-MD-VA-WV CMSA	10.9764	1.6573	0.3555	4.96	-16.45	50.55

Source: U.S. Department of Agriculture, *National Resources Inventory, 1982, 1997*

varying degrees, the foreign-born increase from new immigration. Nevertheless, the estimates are reasonable. The 1982 estimate is based on an interpolation between the 1980 and 1990 Censuses, not straight-line but based on the fluctuations in official INS immigration data in the 1980s. Of course, the foreign-born estimates used in this paper are undoubtedly underbounded because the undocumented immigrants are underrepresented in all the data sets. Also, the underestimation is probably skewed, being greater in the larger cities with high proportions of foreign-born that provide sustenance to the undocumented via the "friends and relatives effect."

Metropolitan areas with high scores on this measure have experienced high rates of international immigration in the past decades; most of those with indices around 2.0 or more are located in the West or the South. Conversely, those metropolitan areas with low scores (less than 0.5) are located in the Northeast and the Midwest. The regional differentiation is very strong, although there are a few exceptions (e.g. Columbus and Minneapolis). A few metropolitan areas (Buffalo, Cleveland, New Orleans and Pittsburgh) have a negative score on this index, primarily reflecting low immigration being outweighed by mortality among the older foreign born. The other interesting point is that some of the higher scores on this index are found in metropolitan areas with modest foreign-born shares, such as Atlanta, Charlotte and Memphis (although they are experiencing quite rapid growth). This is firm evidence of recent international immigrants dispersing into new areas.

The third measure is the increase in foreign born, 1982-97, as a proportion of the increase in total population at the metropolitan level; this measures the immigration component of population change. This is more difficult to interpret because a slow-growing metropolitan area (such as Philadelphia) might show a high foreign-born contribution simply because its population growth was slow (although Philadelphia has a modest foreign-born share, the foreign born accounted for 78 percent of its population growth). New York also falls into this category; without the increase in the foreign born, its population would have declined (hence, its index of 1.06). The other high foreign-born population increase shares are found in the fast-growing and high-immigrant metropolitan areas of Miami (79 percent) and Los Angeles (63 percent). On the other hand, in some metropolitan areas, such as Cincinnati, Greensboro, Norfolk and Seattle, the foreign-born contribution to population growth was minimal.

The purpose of this paper is not to suggest sophisticated measures of sprawl, but to focus on densities as a common proxy for sprawl. Recently, there have been some very interesting and important attempts to adopt multidimensional measurements (e.g. Galster *et al*., 2001, Pendall *et al*., 2000, and Torrens and Alberti , 2000). Such research includes measures in addition to density, such as continuity, concentration, compactness, centrality, nuclearity, connectivity, scatteration, diversity and proximity. These extensions of the sprawl concept are very welcome, but beyond the scope of this paper. The analysis here confines measurement to the core measure of densities and density changes (to take

advantage of the NRI database that yields more sophisticated data than the Census urbanized area measures). It is somewhat of a subjective decision as to how well these density measures represent sprawl. However, the fact is that many of the alternative measures are highly correlated with density variables.

As for the sprawl proxies, two are straightforward: density in 1997 (population per acre of *developed* urban land using the NRI database as the denominator) and change in these densities, 1982-97.[8] These density measures are quite different from those that would be obtained by dividing population by a metropolitan region's urbanized area, because the NRI data pinpoint the parts of the urbanized area that have, in fact, been developed. The density measures show a wide range, varying by a factor of 3.5. Also, three of the top five densest metropolitan areas (Los Angeles, San Francisco and San Diego) are located in California, all of them not only with high foreign-born shares but also high land prices.

It is not surprising that low-density metropolitan areas tended to experience the highest percentage declines in densities between 1982 and 1997. Only Phoenix (by 16.5 percent) and Los Angeles (by 2.8 percent) showed density increases. Other California metropolitan areas (Sacramento, San Francisco and San Diego) had modest density declines, as did Dallas, Miami, San Antonio, Houston and Denver. On the other hand, about a quarter of the metropolitan areas experienced huge density declines, in excess of 20 percent, occasionally greater than 30 percent. Most of these had very modest population growth over the 1982-97 period as well as low foreign born shares. These are the truly sprawling metropolitan areas.

A third measure is an attempt to separate out the population growth contribution from the increased land consumption component of sprawl. It subtracts the contribution of population growth (by assuming that the increase in population between 1982 and 1997 takes place at the metropolitan density of 1982) from the increase in urbanized land during the same period (using the NRI land use data), and expresses this as a proportion of the increase in the urbanized land area between 1982 and 1997. The resulting measure is a proxy for the contribution to sprawl of increased land consumption per capita by both the pre-1982 population and the increment in population between 1982 and 1997. The increase in population at 1982 densities measures the "pure" population effect.

This is, by far, the most interesting of the sprawl proxies, in part because it suggests the need for care in generalizing about universal results. First, how should this measure be interpreted? The answer is the higher the percentage, the greater the contribution of land profligacy. In those metropolitan areas where the index is above 100 percent (occasionally above 200 percent), population declined, so the area of urbanized land expanded despite the absence of population pressure. At the

[8] My numbers show minor differences with those reported by Fulton *et al*. (2001). These primarily reflect differences in the derivation of the intercensal population estimates. Also, I used 2000 MSA definitions; they used 1990 definitions. This makes a difference in a few cases.

other extreme, two metropolitan areas (Los Angeles and Phoenix) have negative pure land consumption increases. This means that population density increased, and the amount of land urbanized was less than that resulting from the population increment (assuming 1982 densities). Several other metropolitan areas (in the West or South), such as Dallas-Fort Worth, Sacramento, Miami, San Diego, and San Francisco have land consumption indices less than 20 percent. Even Atlanta, so often excoriated as the epitome of urban sprawl, has an index of less than 26 percent; this means that urban land absorption was much more because of population growth than increased land consumption per household (population densities declined less in Atlanta between 1982 and 1997 than in 23 of the metropolitan areas in the sample). This implies that those who have suggested that population growth contributes to sprawl can find metropolitan examples to support their position. Rarely, however, as shown by the Atlanta case (with its small foreign-born population), has this anything to do with immigration.

In a supplementary analysis of comparing housing opportunities (and their components: house prices and incomes) and immigration, and their changes, as influences on densities, the year 1997 and a shorter time period (1992-97) were used, because of data limitations (1991 was the first year for the housing opportunity index).

Tests

Three kinds of tests were undertaken to explore the relationship between immigration and sprawl. The first was a set of simple regressions of the immigration indices on the sprawl measures to indicate the degree of correlation between these. The second was cross-sectional tests of 1997 data to examine the relationship between density (a proxy measure for sprawl) and not only immigration, but also income and house prices (that closely reflect land prices), with a transportation congestion variable as a control measure. The third test was to undertake a very similar test to the second, but this time dealing with changes between 1992 and 1997. There is no attempt in this paper to provide a comprehensive explanation of the determinants of sprawl, but rather to explore the relationship between immigration and density (and possibly sprawl).

This paper does not report in detail on all these tests; some of them were revealing, others less so.[9] I focus on the second test, an alternative hypothesis that suggests that land (and housing) prices and incomes may be key variables

[9] In terms of simple regressions, the 1997 foreign born share explains 63 percent of the variation in metropolitan population densities; using the other measures in Table 1 results in lower R^2s, in the 0.17-0.39 range, but still rather impressive (and all statistically significant). The results confirm the basic hypothesis of this paper. Immigration is not a source of sprawl; on the contrary, those metropolitan areas with high scores on the immigration measures are among the densest. Conversely, those metropolitan areas that were profligate in consuming land had small proportions of foreign-born and modest increases in their immigrant populations.

explaining densities rather than immigration. This was tested with 1997 data. As shown in Table 16.2, the key result is conclusive. Metropolitan areas with a high proportion of immigrants are more rather than less dense. In addition, metropolitan areas with low land and house prices and with high incomes tend to sprawl much more. Three variables (percentage foreign-born, median income [this variable is on the margin of significance], and median house price) explain more than 70 percent of the variation in metropolitan area densities. There is no way to interpret these results in terms of an argument that immigration contributes to low-density development.

Table 16.2 Determinants of population density in 1-mllion plus US metropolitan areas

	Coefficient	t-statistic
Intercept	4.105	3.82
Foreign Born (1997)	0.116	5.8
Median Household Income (1997)	-0.052	1.92
Median Housing Price (1997)	0.017	3.28
Adjusted R^2	0.701	

Source: Calculated by author

Other variations of this test added the Texas Transportation Institute indices of travel time or road congestion for the year 1997 as alternative control variables for the idea that there may be an association between density and traffic congestion. In fact, these variables did not add explanatory power. This finding may be consistent with criticisms of the TTI indices that they are inadequate measures of system-wide congestion (Gordon and Richardson, 1994), or it may reflect the lack of association between density and traffic congestion, except perhaps at the very local level.

The third set of tests looked at changes in all these variables between 1992 and 1997 (the range of dates was set by the dates of the NRI data [1992-1997] and the NAHB initial date for metropolitan house prices, 1991). These results are not reported in detail. The signs on the coefficients were as expected, but the coefficients themselves were statistically insignificant, and the degree of explanatory power of the equations was quite low. The most likely explanation is that a five-year period (1992-1997) is too short for trying to explain changes in densities and land consumption because the key characteristics of the built environment change very slowly.[10]

[10] The Portland experience illustrates this point very well. Portland Metro has pursued an aggressive strategy of densification for many years, but its average densities still remain low in comparison to many metropolitan areas.

Intra-Metropolitan Distribution

The reason why suburban densities are higher in high-immigrant MAs is interesting. Both immigration and high land prices (implying high densities, reflecting the laws of demand) are the result of strong economic growth. The data in Table 16.3 illustrate another important point: how the central city vs. suburban

Table 16.3 Foreign-born population in US metropolitan and non-metropolitan areas by date of entry, 1997 ('000s)

Date of Entry	Central Cities	Suburbs	Non-Metro Areas	Total
Post-1990	3,892	3,171	475	7,539
%	51.6	42.1	6.3	100
1980-89	4,117	4,039	398	8,555
%	48.1	47.2	4.7	100
1970-79	2,242	2,467	226	4,935
%	45.4	50	4.6	100
Pre-1970	1,797	2,620	332	4,749
%	37.8	55.2	7	100
Total	12,048	12,297	1,431	25,778
%	46.7	47.7	5.6	100

Source: U.S. Bureau of the Census, Population Division, Ethnic and Hispanics Statistics Branch (2000), *Current Population Survey, 1997*.

immigration shares have changed over time. Prior to 1970, 55.2 percent of the foreign born lived in the suburbs. This share has slid in recent decades. By 1997, the central city and suburban foreign-born shares were almost identical, at 46.7 percent; the balance (5.6 percent) lived in nonmetropolitan areas. One reason for this shift is that prior to the 1970s, most of the foreign born came from Europe (e.g. 50.2 percent in the period 1955-64). Since then, Asian and Latin American immigrants have dominated (in the period, 1995-97, Asians accounted for 34.6 percent of immigrants, while the American Continent (including Canada, the Caribbean and South America as well as Mexico and the Central American countries) accounted for 53.7 percent of immigrants at its peak (1985-94; U.S. Department of Justice, 1998). These groups (especially the Latinos) were more likely to immigrate into the central cities rather than the suburbs, at least initially, primarily because of income constraints. Of course, increased suburbanization reflects assimilation as well as region of origin. In total, the foreign born are equally divided between the central cities and the suburbs, whereas about 70 percent of the metropolitan total population now live in the suburbs.

The Anti-Immigration Case and Its Defects

The thesis of those who link immigration as a major contributor to sprawl is simple. Population growth is a more important source of sprawl than increasing land consumption per household. International immigration is a major contributor to population growth. Hence, limitations on immigration can dramatically reduce the negative impacts of the sprawl impact. The argument appears compelling and plausible at first sight, but it is naïve and inconsistent with the facts. The evidence in this paper points to several contrary findings. The increase in metropolitan populations is not strongly correlated with high rates of conversion of land for urban development. Many slow-growing metropolitan areas have absorbed proportionately huge amounts of land, such as Buffalo, Cincinnati, Cleveland, Memphis, New Orleans and Pittsburgh. The correlation of immigrant population shares with population densities is strongly positive, *both* at the central city and the metropolitan level. Aggregate data belie the wide variety of experiences from city to city, and within metropolitan areas. Spatially disaggregated data would permit assessment at the individual MSA level. This is important because international immigration is non-uniform over geographical space. The arrival of the 2000 Census PUMS (Public Use Micro Sample) data in 2003 will facilitate this analysis. Some of the MSAs in some regions have very low densities and low immigration shares. House prices (reflecting land prices) rise slowly because their economies perform modestly. Low land (and house) prices imply more land consumption, and this means low densities. Densities (and total population) have increased in the central cities of MSAs experiencing high immigration. However, these locations have not benefited from new construction. Instead, the immigrants crowd into the existing housing stock. Higher densities reflect more persons per dwelling rather than more dwelling units per acre. Also, demographic factors (larger household size and higher fertility rates) affect these densities.

When recent immigrants experience upward mobility, they often replicate the behaviour of the native born, at least in California (Myers, 1999 and 2001). Upward mobility in terms of income is matched by geographical mobility into the suburbs. Because this affects only a proportion of the immigrants, clusters remain behind in the central city (and these remain high density because of the flow of new immigrants) while new low-density clusters are created in the suburbs. As an example, Koreatown near downtown Los Angeles has now, despite its name, an overwhelmingly Latino residential population. The businesses are still primarily Korean, but their owners live in suburbs such as Garden Grove, Cerritos, Fullerton, Walnut and Diamond Bar. Also, in Los Angeles Fulton *et al*. (2001,p. 12) argue that: "immigrant and non-Anglo populations, many of which have modest incomes, are increasing household sizes and doubling up in existing areas, thereby increasing the population density even though the physical fabric does not change very much."

They also suggest that "some declining cities have begun to study the possibility of attracting foreign-born immigrants to their thinning neighbourhoods" (Fulton *et al*., 2001, p. 18). This argument for a possible strategy of how to revive

the central city may be inconsistent with the fact that most new immigrants are poor and add more to the demand for central city services (except in rare circumstances such as the entry of Iranians into Beverly Hills after the late 1970s or wealthy Hong Kong residents into Vancouver in the 1980s and early 1990s). Attracting foreign-born immigrants as a strategy to save large central cities, especially in fiscal terms, may be problematic. However, it might be a more viable strategy in the smaller cities that fall outside the scope of this paper (where the native-born tend to have more modest incomes, where the immigrants may not be significantly poorer, and where public safety, education and other public service costs may be lower).

Planning Implications

Why is this analysis of potential interest to urban planners? First, if we accept that density is an approximate proxy for other measures of sprawl, few could challenge the view that the sprawl debate has, for better or worse, become a core issue in planning. Second, to understand sprawl, we need a better understanding of its sources. The idea that population growth contributes to sprawl, and if so then immigration contributes to sprawl, seems rather obvious; thus, it seems important to subject this hypothesized relationship to closer scrutiny. Third, the implication that many immigrants live at high densities in tight housing markets reinforces the case for more attention to the affordable housing crisis in high-cost locations. Of course, this is not merely an immigrant problem but a low-income household problem. Fourth, because immigrants continue to concentrate in "gateway" metropolitan areas (despite a moderate degree of subsequent dispersal), their pressure on infrastructure and public services is becoming a critical planning issue. Fifth, from an anti-sprawl perspective, most immigrants were (prior to their entry into the United States) accustomed to living in high-density living environments. If developers were more proactive with "smart growth" projects, immigrant households may make an easier demand match to the new sources of supply. Sixth, and more generally, the United States continues to have a reasonably liberal immigration policy (by world standards), so immigration is apparently destined to be a major stimulus to future population growth. Regardless of its implications for densities (or sprawl), future immigration will continue to place extreme pressure on planning resources (e.g. housing, education, health) at key locations, such as in California and New York.

Conclusions

The aim of this paper has been modest. It is not intended to examine the determinants of sprawl, but has a much narrower focus: the relationship between immigration and densities (as a correlate of sprawl). As pointed out at the beginning, a common argument is that population is a major contributor to sprawl,

immigration accounts for a sizable fraction of the increase in population, hence immigration leads to sprawl. This research has suggested that there is little truth in this argument. First, although population growth does increase the demand for land, it is more often associated with other forces, such as strong employment (and income) growth and higher land (and house) prices, that induce developers to supply housing at higher densities than in the absence of robust population growth. Second, trends in rising land consumption per capita (and hence declining densities) are more evident in metropolitan areas exhibiting slow population growth (and little immigration) that are characterized by low land (and house) prices. Third, recent immigration (although it is now dispersing more than in the past) is skewed towards a limited number of metropolitan areas, most of which are relatively high-density and are either becoming more dense or are sprawling much less than the national metropolitan average. Fourth, the household size of immigrants is significantly larger than that of the native-born (Latino-origin households are typically about twice as large as the white and African-American native born) so that immigrants contribute to higher dwelling densities independently of land consumption effects. Fifth, at the large metropolitan level, immigration and density levels and changes are positively, not negatively, correlated. Sixth, immigrants are initially more likely to live in the central cities than in the suburbs when compared with the native-born, and hence contribute more to compactness; they provide an important offset to suburbanization and exurbanization trends. However, in the longer run (e.g. because of inter-generational effects) many of them may begin to adopt the lifestyles and the residential preferences of the native-born (because they are then either native-born or came to America so young that they behave like the native-born). Finally, and above all, it is wrong to use the need to control sprawl as a rationalization for anti-immigration policy, or to adopt an anti-immigration stance to justify sprawl control policies. There are much better arguments for anti-sprawl strategies, while discussions of immigration policy need to be based on a sounder footing.

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