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ESTIMATING THE POPULATION OF LOS ANGELES COUNTY CENSUS TRACTS BY ETHNICITY

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Introduction

From 1970 to 1980 Los Angeles County experienced a change of landslide scale in its ethnic composition. For the county as a whole, there was only a six-percent increase in population, from 7.04 million to 7.48 million persons. But the population of Spanish (or, interchangeably, Hispanic) origin increased by 97 percent, from 1.05 million to 2.07 million, while the number of non-Hispanic whites declined 21 percent, from 5.02 million to 3.99 million. Simultaneously the non-Hispanic black population grew by 24 percent reaching 0.93 million, and the non-Hispanic population of all other races (mainly Asians) skyrocketed from 0.23 million to 0.50 million, an increase of 123 percent (Southern California Association of Governments, 1984)

The above-mentioned results were derived by comparing results of the 1970 Census with that of the 1980 Census. Unfortunately, the United States Census of Population and Housing is taken only every ten years. Moreover, detailed results from the 1990 Census will probably not be available until sometime in 1993.

We therefore sensed the great need for postcensal estimates of the population of Los Angeles County by census tract and within each census tract by detailed ethnicity. We also believed that we could devise a methodology that would allow us to make such estimates with a reasonable degree of validity. Hence we decided to submit a research proposal to the John Randolph Haynes and Dora Haynes Foundation. That foundation granted our request for funding. Our complete results are contained in Heer and Herman (1990).

Our estimates presented by census tract are for 20 different ethnic groups. These are as follows: Non-Hispanic whites born in the United States, (2) Non-Hispanic whites born outside the United States, (3) persons of Mexican origin born in the United States, (4) persons of Mexican origin born outside the United States, (5) persons of Other Spanish origin born in the United States, (6) persons of Other Spanish origin born outside the United States, (7) blacks born in California, (8) blacks born in the United States outside of California, (9) blacks born outside the United States, (10) American Indians, Eskimo, and Aleuts, (11) Chinese born in the United States, (12) Chinese born outside the United States, (13) Japanese born in the United States, (14) Japanese born outside the United States, (15) Filipinos born in the United States, (16) Filipinos born outside the United States, (17) Koreans born in the United States, (18) Koreans born outside the United States, (19) Vietnamese, and (20) Other Asians and Pacific Islanders.

Our definition of persons born in the United States and outside the United States do not conform to standard definitions. However, we believe our definitions are more useful to governmental and social-service planners. We define persons born outside the United States to include not only persons actually born outside the United States but also all persons under age 15 whose mother (or, if no mother, father) was born outside the United States. (Likewise we employ this definition for blacks born in California versus the rest of the United States).

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Most demographers would have shied away from attempting to estimate the postcensal populations of census tracts by detailed ethnicity. They would have argued that the amount of error would be unacceptable since the populations in question would be far too small for valid postcensal estimates. We agree with other demographers that postcensal estimates for very small populations are bound to be less accurate than for larger populations. Nevertheless, we believe that our innovative methodology allows us to make reasonable estimates for much smaller populations than would have been possible given the existing methodologies. Basically, our method is a variant of what is called the censal ratio method. In the censal ratio method, symptomatic indicators, in our case births and deaths, are used as indicators of population growth. Conventionally, the actual values of the indicators are used. However, we agree with other demographers that using actual values is definitely not appropriate for very small populations. Hence our innovative methodology consists in using as symptomatic indicators the expected values from a linear regression equation relating the number of births (or deaths) in each year from 1980 through 1986 to time as the independent variable. This innovative procedure provides us symptomatic indicators with very much less sampling error than if we had relied on the actual increase in births (or deaths) from the base year to each postcensal year to estimate the population change from the base year to each postcensal year.

Male and female populations under age 15 and 15 to 44 years of age were estimated from change in the number of births. The male and female populations aged 45 to 64 and 65 and over were estimated from change in the number of deaths for these four age-sex groups.

Results

Countywide Estimates. Table 2.1 presents the population estimates for each of the 20 ethnic groups for July 1, 1986, corresponding numbers for April 1, 1980 (the date of the last census), the absolute change in population between these two dates, and the percentage change in population. Numbers are also presented for specified combinations of the various ethnic groups.

Table 1. Population of Los Angeles County by Ethnic Group, April 1, 1980 and July 1, 1986

Ethnic Group	1980	1986	% Change
Total	7,477,566	8,331,200	11.4
Non-Hispanic white	3,999,481	4,037,916	1.0
Born in the U.S.	3,504,440	3,540,608	1.0
Born outside the U.S.	495,041	497,308	0.5
Hispanic	2,018,594	2,486,364	23.2
Mexican	1,610,982	1,780,754	10.5
Born in the U.S.	664,843	697,984	5.0
Born outside the U.S.	946,139	1,082,770	14.4

Other Spanish	407,612	705,610	73.1
Born in the U.S.	117,119	142,512	21.7
Born outside the U.S.	290,493	563,098	93.8
Black	947,345	1,029,544	8.7
Born in California	278,842	381,978	37.0
Born in Other U.S.	631,576	600,870	-4.9
Born outside the U.S.	36,927	46,696	26.5
American Indian, Eskimo and Aleut	54,489	64,876	19.1
Asian/Pacific dander	457,656	712,499	55.7
Chinese	94,450	154,686	63.8
Born in the U.S.	16,868	20,836	23.5
Born outside the U.S.	77,582	133,850	72.5
Japanese	117,551	111,079	-5.5
Born in the U.S.	77,184	71,654	-7.2
Born outside the U.S.	40,367	39,425	-2.3
Filipino	100,121	180,811	80.6
Born in the U.S.	12,385	17,833	44.0
Korean	64,455	128,064	98.7
Born in the U.S.	2,456	2,848	16.0
Born outside the U.S.	61,999	125,216	102.0
Vietnamese	25,930	43,523	67.8
Other Asian/Pacific Islander	55,149	94,336	71.1

Comparison with Other Results

The estimates contained in our work may be compared with two other published sources of data concerning the population of Los Angeles County by ethnicity following the 1980 Census. The first of these is a U.S. Bureau of the Census report providing population estimates by race and Hispanic origin for States, metropolitan areas, and selected counties for the period from 1980 through 1985 (U.S. Bureau of the Census, 1989). The second, and ^{more} most important, is the 1986 Test Census of Central Los Angeles County. We shall discuss each of these comparisons in turn.

Comparison with the Census Bureau Estimates for Los Angeles County

In a "research developmental" report (U.S. Bureau of the Census, 1989) the U.S. Bureau of the Census estimated that the Hispanic population of Los Angeles County had increased by 32.1 percent from April 1980 to July 1985 to reach a figure of 2,743,000 in the latter year. This contrasts strongly with our figure of an increase of 18.9 percent for the corresponding period and a population in the latter year of only 2,401,051. Percentage changes for other major ethnic groups did not differ substantially between our estimates and the Census Bureau "Research Developmental" Report.

The differences between the two sets of findings may be analyzed as due to the different definitions, methodologies and assumptions used. The Census Bureau research/developmental report estimated the total population of Los Angeles County to be 133,000 greater than its official estimate employed in the Bureau's regular reports. We, on the other hand, relied on the official Census Bureau estimate

of the county's population. A very small part of the difference for Hispanics is because of the difference in definition. We excluded all Hispanics who were black, American Indian, or Asian/Pacific Islander. Based on the 1980 data, one can infer that if we had used the Bureau's definition for the Hispanic population, we would have estimated it to be 2,442,326 instead of 2,401,051.

The Bureau prepared its estimates by a cohort-component method in which each existing age cohort was decreased by deaths and either increased or decreased by net international migration and net international migration, and each entering cohort of persons born after the 1980 Census was similarly modified. Net internal migration was estimated by means of the matching of addresses on two consecutive years of income tax returns which had previously been matched to information on age, sex, race, and Spanish origin found in the application for a social security number. Net international migration was estimated with less certainty as to its accuracy. The total amount of net international immigration to the United States was assumed to be equal to the recorded number of legal immigrants plus an estimate of 200,000 net undocumented immigration per year minus an estimate of 160,000 emigrants per year. Then it was assumed that the distribution of the estimated net international migration per year by geographical area was identical to that recorded in the 1980 Census for the period from 1975 to 1980 based on a question in the 1980 Census asking where one lived five years ago. Whether the 1975-80 immigration distribution by geographical area stayed the same in the 1985 period remains to be seen. We believe that it did not, and that Hispanic immigration into Los Angeles County was

substantially less in the 1980-85 period than it was during the period from 1975 to 1980.

Comparison with the 1986 Test Census for Central Los Angeles County.

On March 16, 1986 the Bureau of the Census conducted a test census of an area within the central portion of Los Angeles county comprising East Los Angeles, Montebello, Monterey Park, Pico Rivera, and other smaller adjacent places (U.S. Bureau of the Census, 1987). The total population as enumerated in this test census was 373,000. The test census area consisted of 56 whole census tracts and portions of 13 other census tracts. The only comparison possible with our estimate is for the 56 whole census tracts. The summary tape file for the test census included a table of race (white; black; Asian and Pacific Islander, American Indian, Eskimo, and Aleut; and other) by whether of Spanish origin. Thus an exact comparison of our estimates with the test census numbers was available for the following ethnic groups: (1) non-Hispanic whites (including non-Hispanics of other race), (2) Hispanics (excluding blacks, Asians and Pacific Islanders, American Indians, Eskimo, and Aleut), (3) blacks, (4) American Indians, Eskimo, and Aleut, and (5) Asians and Pacific Islanders. In order to obtain our own estimates for March 16, 1986, a linear interpolation was performed, based on our estimates for July 1, 1985 and July 1, 1986.

Table 2 presents data by ethnic group for the aggregate of the 56 census tracts from the 1986 test census, our interpolated estimates for March 16, 1986, and the 1980 Census (obtained from Summary Tape File 3).

Table 2. Comparison of Population by Ethnicity According to Our Estimates for March 16, 1986, the Test Census, and the 1980 Census for 56 Census Tracts in Central Los Angeles County.

Population according to:	Total	Non-Hispanic White	Hispanic	Black	American Indian, Eskimo, Aleut	Asian and Pacific Islander
Our Estimate	339,764	56,150	241,712	1,779	2,019	38,104
Test Census	327,671	47,107	231,048	2,678	1,625	45,213
1980 Census	316,031	58,371	225,409	1,535	2,202	28,514
Difference and percentage difference between:						
Our Estimate and Test Census	12,093 3.7	9,043 19.2	10,664 4.6	-899 -33.6	394 24.2	-7,109 -15.7
Test Census and 1980 Census	11,640 3.7	-11,264 -19.3	5,639 2.5	1,143 74.5	-577 -26.2	16,699 58.6
Estimate and 1980 Census	23,733 7.5	-2,221 -3.8	16,303 7.2	244 15.9	-183 -8.3	9,590 33.6
Percentage distribution by ethnicity:						
Our Estimate	100.0	16.5	71.1	0.5	0.6	11.2
Test Census	100.0	14.4	70.5	0.8	0.5	13.8
1980 Census	100.0	18.5	71.3	0.5	0.7	9.0

Use of the 1986 Test Census as a gauge of the accuracy of our estimates implies that there is no error in the Test Census. However, no census is free from error. With respect to the 1986 Test Census, we do have some idea of the error it contains. This is because the 1986 Test Census was followed by a Post- Enumeration Survey designed to measure the coverage error in the Test Census. According to a Census Bureau staff paper (Diffendal, 1988), the total net undercount of the 1986 Test Census was estimated at 9.0 percent. The highest undercount (13.7 percent) was for Hispanic renters in Hispanic blocks. Moreover, this group constituted 42 percent of the total households in the post-enumeration survey. In general, Hispanics were shown to have a higher undercount rate (10.2 percent) than Asians and Pacific Islanders (7.0) or all other ethnic groups (6.1 percent). The Bureau of the Census also conducted concurrent anthropological surveys of two Hispanic neighborhoods within the Test Census area (Vigil, 1987, and Long, 1987) which revealed the problems in enumeration caused by many persons living in housing units in back lots that were not included in the Bureau's list of housing units. The methodology of our estimates is such that they assume the same degree of undercount as occurred for each ethnic group in the 1980 Census. However, there is no way of

knowing what was the percentage undercount for the 1980 Census in the Test Census area. Thus it is possible, but not certain, that our numbers for the total population and the Hispanic population exceed those of the Test Census because of greater undercount in the Test Census than in the 1980 Census. However, such an hypothesis does not explain why there are fewer Asians and Pacific Islanders according to our estimates than according to the Test Census.

In evaluating its postcensal population estimates in comparison with actual figures from a Decennial Census, the U.S. Bureau of the Census customarily presents the mean absolute difference between the estimate and the Census for all of the units being estimated. It also customarily presents the mean percent difference for the same set of units. If the Decennial Census is considered as offering a true count, then the mean absolute difference translates into the mean absolute error and the mean percent difference translates into the mean percent error. Accordingly, Table 3 presents the parameters of the distributions by ethnic group for the absolute difference and for the absolute percent difference between our own estimates and the 1986 Test Census for the total population and for each of the five ethnic groups.

Table 3. Parameters of the Distributions by Ethnic Group across the 56 Census Tracts for the Absolute Difference and the Absolute Percent Difference between our 1986 Estimates and the 1986 Test Census

	Total	Non-Hispanic White	Hispanic	Black	American Indian, Eskimo, Aleut	Asian and Pacific Islander
Absolute Difference:						
Mean	755	221	553	331	27	245
Standard Deviation	736	205	621	79	48	398
Maximum	3,755	909	3,286	565	327	2,093
Minimum	5	5	5	0	0	9
Range	3,750	904	3,281	565	327	2,084
Absolute Percent Difference:						
Mean	13.4	66.3	14.6	142.4	103.3	49.3
Standard deviation	12	117	15	197	165	29
Maximum	65	569	78	922	1,090	100
Minimum	0.1	0.9	0.1	0.0	0.0	6.1
Range	64	568	78	922	1,090	94

Six census tracts had an absolute difference of more than 2,000 between the total population as estimated by the Test Census and as estimated by us. Some relevant data from each of these six census tracts are presented in Table 4.

Table 4. Characteristics of 6 Census Tracts with a Difference of 2,000 or More between Total Population According to the Test Census and Total Population According to Our Estimates.

Census Tract	Total population in Test Census	Difference between our estimates and the 1986 Test Census:			Difference in total population between our estimate & 1980 Census:	Difference in total population between Test Census & 1980 Population:
		Total population	between Hispanic population	between Asian/Pac. population		
4820.02	7,043	2,241	109	2,093	2,411	170
4822.00	8,134	-2,348	-582	-1,704	-195	2,153
5309.00	5,821	3,755	3,286	-15	3,493	-262
5311.00	6,052	2,218	2,289	-81	1,571	647
5312.00	7,979	2,465	1,988	-69	2,218	-247
5316.01	5,971	2,174	2,068	-94	2,282	108

The first two of the six census tracts listed in Table 4 are located in Monterey Park, and in each of them the population was substantially more than 50 percent of Asian/Pacific Islander race according to the Test Census. In the first census tract (4820) our estimate was substantially higher than that from the Test Census. In the second tract (4822) our estimate was substantially lower. A possible, but unproven hypothesis, is that the error is in our estimates and that it resulted because of the similarity in the two census tract numbers. Specifically, it is possible that erroneous coding of birth and death certificates by census tract in 1985 and 1986 shifted cases from census tract 4822 to 4820.

The last four census tracts shown in Table 4 are all in East Los Angeles. Three of these are contiguous tracts and each of these three tracts is adjacent to the City of Los Angeles. According to the Test Census (U.S. Bureau of the Census, 1987), the proportion of the total population in each of the four tracts that was of Spanish origin ranged from 94 to 98 percent. In all four of these tracts our estimates show a much higher population than the Test Census and in three of these tracts the Test Census recorded a decline in total population since the 1980 Census. To investigate these tracts more thoroughly, we decided to visit the three contiguous tracts adjacent to the city of Los Angeles. We drove through all three census tracts and spent considerable time walking around the area in census tract 5309, the tract with the largest discrepancy between our estimate and the Test Census. We also spoke to several individuals in tract 5309. We came back from our trip convinced that the Test Census had severely undercounted these three tracts. Where we drove and walked, practically every house close to the street had a second house in the back of the lot. Moreover, we saw many garages that had been converted into housing units and many buses and trailers sitting on these lots that had been converted into housing units. We talked to a postal carrier who told us that there had been a major increase in population in the area, that many families lived in the houses

at the back of each lot, and that many of the housing units contained more than one family. Two other residents of the area with whom we talked told us the same story. Following the trip we became convinced that a substantial part of the discrepancy between our estimates for the four census tracts in East Los Angeles and the results of the Test Census was due to undercount in the Test Census and that only part of the discrepancy could be explained by error in our own estimates.

East Los Angeles has long been considered to be at the heart of the Mexican immigrant barrio. For the 19 census tracts entirely or partly in East Los Angeles we estimated a total population of 128,118 whereas the count according to the Test Census was only 109,438. Thus our count exceeded that of the Test Census by 17.1 percent. Perhaps more significantly, according to the Test Census the population of these 19 census tracts declined by 1.9 percent following the 1980 Census. On the other hand, in its "research-developmental" report, the Bureau of the Census (1989) reported that the Hispanic population of Los Angeles County increased by 32 percent whereas we estimated its increase as only 19 percent. We believe that it is not plausible to claim, on the one hand, that the Hispanic population has increased as rapidly as 32 percent in the county as a whole, while there has been a population decline in the area where this population is most concentrated. To the contrary, we believe that the sharp increase in housing costs in Los Angeles County is likely to have forced more and more crowding in those areas of poor but inexpensive housing, such as in East Los Angeles, that have traditionally been the entry points for Hispanic immigrants, particularly for those who are undocumented (Heer, 1990). Accordingly, we believe that credence should be given to our figures that show a more moderate increase in the county's Hispanic population than those of the Bureau's research-developmental report but a much greater increase for East Los Angeles than that shown by the Test Census.

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REFLECTIONS ON BOWLING GREEN

On October 18-20, 1990 the third biennial "North American Conference on Applied Demography" was held at Bowling Green, Ohio. The conference was sponsored by the PAA, the Canadian government, and Bowling Green State University, and featured a broad range of speakers and workshops. Below is a first hand account of the conference by Paul R. Voss, Chair, State and Local Demography Interest Group.

In many respects, the third biennial conference on applied demography held this past October at Bowling Green State University had a very familiar feel. As with the previous two conferences in 1986 and 1988, the sessions were held in the comfortable surroundings of the BGSU University Union building; the campus continuing education staff had things running smoothly, as usual; and there again were the familiar faces from past applied demography conferences — those of colleagues from around the country who toil on the applied side of the discipline.

But there also were some distinct differences from past Bowling Green conferences. For one thing, while most participants indeed were again drawn from institutions in the United States, there also was strong participation from Canada — a reflection of the fact that the Department of External Affairs of the Canadian Embassy was among the sponsors of the event, and also that the formal title of the conference this year was the "North American Conference on Applied Demography." For another change, this year's conference was sufficiently well attended that for the first time the program required concurrent sessions. This latter fact is a remarkable tribute to just how important this conference has become for applied demographers. It might well have been otherwise. Because of an unfortunate scheduling coincidence, the BGSU conference fell on exactly the same dates as the meetings of the Southern Demographic Association (an annual occasion for a trip to the watering hole for many applied demographers), and — as if one coincidence isn't enough! — these also were the dates of an important regional meeting of the Census Bureau's State Data Center program. Prior to the conference I expressed doubts to organizer Jerry Wicks about whether a decent turnout could be anticipated. But in the end, more than 100 registrants were counted.

Sessions dealt with most of the general issues confronting applied demographers in a variety of work settings. And that list of issues continues to grow! Because of the concurrent session format, each of us heard only half the presentations. But there were some splendid contributions. I especially enjoyed Lynn Wombold's and Edmond Ting's critique of "ZIP+4 Market Segmentation; Bill Frey's overview of his "Computer-based Undergraduate Demography Course;" the discussion by Yi Zhao of the process by which she and John Green process hierarchical census files using INGRES; Dave Swanson's 35mm slide presentation (with John Carlson) of the difficulties in estimating migration in (very!) sparsely populated portions of Nevada; Tom Cripp's thorough

discussion and critique of the Census Bureau's CD-ROM products; Pini Herman's tract-level study (and accompanying colored maps) of housing patterns in Los Angeles county; and the panel discussion of applied demography curriculum issues by recent graduates now working in applied settings.

As with the previous two conferences, the third Bowling Green conference on applied demography represented a chance to get away from the office for a couple days to share and learn about the things we do and how we might do them better. The setting there is comfortable and the pace of the conference less exhausting than most larger professional gatherings. We owe a word of appreciation and thanks to Jerry Wicks and his Bowling Green colleagues (and others who assist in pulling together this biennial event) for their unflagging efforts in keeping this conference series alive and for building on past successes.

1991 PPA ANNUAL MEETINGS

The annual meetings will be held in Washington, DC during March 21 - 23, and will feature numerous sessions of great interest to applied demographers. One of these sessions will discuss plans and proposals for redesigning the year 2000 census of population and housing. Among the changes being proposed is elimination of the sample census for small areas of geography, a proposed change which would obviously have great impacts on our capacity for small area analysis.

The session on the year 2000 census is a panel discussion entitled "What will a redesigned census mean for applied demographers," and the presenters are Ken Hodges, Linda Gage, and Omer Galle. It is planned for Thursday night (March 21) from 8 to 10 pm.

For a copy of the full program write to:

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CASE STUDY EVALUATIONS NEEDED

Do you teach a class in applied demography? Looking for real-world examples of how demography can be applied to business and government issues? The co-editors of this book of case studies (Hallie Kintner, Peter Morrison, Paul Voss and Tom Merrick) are pleased to announce that 7 case studies are now available for preliminary classroom evaluation. The case studies include (as of 1-28-91): "Demographic Analysis of the Market for a Long-Term Care Facility" by Steve Murdock and R. Hamm; "Strategic Financial Planning for

Hospitals" by N. W. Rives; "Targeting Wealthy Ex-Wisconsinites in Florida" by P. Voss; "Using Demographic Analysis in Health Services Planning: A Case Study in Obstetrical Services" by R. Thomas; "Study in Obstetrical Services" by R. Thomas; "Selecting Markets for Corporate Expansion" by K. Johnson; "The Use of Intercensal Population Estimates in Political Redistricting" by W. Serow, E. W. Terris, R. Weller, and R. Wichmann; and "Improving Cellular Market Area Valuation with Demographic Data" by G. Billings and L. Pol. If you are interested in obtaining an advance copy of this publication, or wish to contribute a chapter, please contact Hallie Kintner at (313) 986-1350.

DEMOGRAPHIC EVENTS

Larry Rosen has moved his work place venue from the Michigan State Data Center to the Michigan Hospital Association.

Sea Changes at American Demographics! Cheryl Russell has left the editorship in favor of a freelance writing career, and Marty Riche is moving to the Population Reference Bureau.

Bill O'Hare will soon leave the Population Reference Bureau for a new appointment at the University of Louisville.

Tom Hirschl celebrates the arrival of his second child Noah Thomas, and Carol Schuckman celebrates the arrival of her second child Rachel Gaia.

EDITOR'S CORNER

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