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An experimental methodology for estimating Hispanic residents for states and counties

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Counts of the US Hispanic population are available every ten years from the decennial census, but for the years following or between censuses, estimates have to be created using data and techniques that are expected to track changes in that population over time. Such estimates are a recent development and there is currently no standard methodology that has been widely used, carefully documented, and rigorously tested. In this article, we describe an experimental methodology for estimating the Hispanic population of states and counties. Postcensal data on births, deaths, and school enrollment are used for estimates of the total Hispanic population and data from the two most recent decennial censuses are used for estimates of the age, sex, and race distribution of that population. We discuss the strengths and weaknesses of this methodology and illustrate its application by making estimates of the Hispanic population for counties in Florida.

1. Introduction

The US Bureau of the Census conducts a complete population count every ten years, collecting detailed information on the population of the United States and its states, counties, and subcounty areas. For the years following or between censuses, however, estimates have to be created using data and techniques expected to track population changes over time. A number of methods for estimating total population have been developed and thoroughly tested (see [3,11,17,20–22]), but methods for estimating particular segments of the population – such as seasonal residents, nursing home residents, or low-income persons – are not nearly as well established. For these estimates, there is much less methodological uniformity and experimentation with new definitions, techniques, and data sources is common (see [8,12–14]).

The Hispanic population is a case in point. Persons of Hispanic origin comprise a large and rapidly growing segment of the US population, but no widely used, carefully documented, and rigorously tested methodology for estimating that population has yet been developed. In fact, little research has focused on how to make or evaluate Hispanic population estimates, especially for small areas. Given the importance of such estimates for many planning and policy purposes, this lack of research poses a serious problem.

In this article, we describe an experimental methodology developed for making estimates of the Hispanic population by age, sex, and race for Florida and its counties on July 1, 1995. This methodology was based on an investigation of estimation techniques and data sources that were expected to reflect postcensal (and intercensal) changes in the Hispanic population over time. Although it was developed specifically for Florida, we believe this methodology can be modified and applied in other states as well.

2. Hispanic population data in the US

The availability of comprehensive and reliable data on the Hispanic population of the United States is a recent phenomenon. The 1970 census was the first to collect information directly on Hispanic ethnicity. The long-form questionnaire given to five percent of the population asked respondents to report their "Spanish descent" and national origin. Prior to 1970, data such as birthplace, parents' birthplace, mother tongue, language spoken at home, and Spanish surname were used as proxies for ethnicity in the production of Hispanic estimates [4]. Estimates based on these types of data were subject to a substantial margin of error.

In 1974, a federal Ad Hoc Committee on Racial and Ethnic Definitions was created to consider the limited availability of useful racial and ethnic data in the federal statistical information system. Recommendations from this committee were implemented on a trial basis in selected federal agencies in the spring of 1975. Following a time period for comment, review, and revision, the Office of Management and Budget (OMB) issued *Directive 15* on May 12, 1977, defining a standard set of racial and ethnic categories to be used in all federal data collection initiatives [28]. *Directive 15* required that ethnicity data be collected by "Hispanic origin" and "not of Hispanic origin". Following OMB guidelines, the 1980 census used both long- and short-form questionnaires to collect information on Hispanic ethnicity from all households; this was the first attempt to conduct a complete count of Hispanics in the United States. The 1990 census followed the same general guidelines as the 1980 census.

Postcensal (and intercensal) estimates of the Hispanic population are less readily available and less accurate than decennial census data. These estimates are produced by only a few organizations and generally cover only a few levels of geography and/or points in time. They are based on a variety of data sources and techniques, which can lead to dramatic differences in the estimates. For example, the Census Bureau estimated that there were 27 million Hispanics living in the United States on July 1, 1995 [7]. *Forbes* magazine reported a much higher number: 32 million residents of Mexican origin alone, not including Cubans, Puerto Ricans, and other Hispanic groups [16].

The Census Bureau uses a component method to produce estimates of national and state populations by age, sex, race, and Hispanic origin [5,18]. This method uses data series reflecting births, deaths, and migration to update population characteristics from the most recent decennial census. Birth and death data are supplied by the National Center for Health Statistics and state vital statistics agencies. State-to-state migration estimates are based on tax return data supplied by the Internal Revenue Service and records from the Social Security Administration. International migration estimates are based on a variety of administrative sources, including the Immigration and Naturalization Service, the Office of Refugee Resettlement, the Puerto Rico Planning Board, and the Defense Manpower Data Center.

Using the component method for local estimates is problematic due to the lack of relevant birth, death, and migration data. Consequently, estimates of the Hispanic population for small areas are frequently made by extrapolating historical trends or developing alternative methodologies. Several approaches have been used by the Census Bureau, state demographic agencies, and a few other organizations.

The Census Bureau began producing county estimates of the Hispanic population in 1992. They use a "top–down" methodology in which national estimates are created first, followed by state and finally by county estimates [19]. National and state estimates are based on the component method described above. County estimates are based on a three-step procedure. First, age/race/sex data from the 1990 census are used to calculate the proportion of each county's population falling into each age, sex, race, and ethnicity category (e.g., white Hispanic males age 25–29 as a proportion of the total county population). Since these categories are exclusive and exhaustive, the proportions add to one. Second, these 1990 proportions are controlled to the current total population for each county, as estimated by the Census Bureau using the Tax Return Method [1]. Finally, the resulting estimates by age, sex, race, and ethnicity for each county are controlled to state-level age, sex, race, and ethnicity estimates, with the additional constraint that the county totals must remain the same as estimated by the Tax Return Method. Unlike the method used for national and state estimates, the method used for county estimates does not incorporate any data specifically related to postcensal changes in the Hispanic population.

Only a few state demographic agencies produce estimates of the Hispanic population at the state or county level. California and Texas illustrate two of the approaches currently used. Demographers in California's Department of Finance have developed a "bottom-up" methodology that directly incorporates postcensal data on the Hispanic population at the county level [6]. Using regression techniques, they create a smoothed annual series of birth, death, and school enrollment data for each race/ethnic group in each county. Ratios are then calculated by dividing the smoothed 1990 values for births, deaths, and school enrollment by the 1990 populations of each race/ethnic group. These ratios are applied to the smoothed postcensal values for each data series to create three sets of updated population estimates by race and ethnicity. These three estimates are averaged together to create a single estimate for each race/ethnic group in each county. As a final step, the county race/ethnicity estimates are controlled to a separate estimate of total population and are summed to create a state total. California does not produce estimates of the age or sex distribution of the race/ethnic groups.

The Texas State Data Center uses a cohort-component projection technique to develop postcensal population estimates by age, sex, and race/ethnicity for the state and each county [23]. The starting point is the modified 1990 census count, adjusted to account for large institutional populations (e.g., prisons, universities). Postcensal birth and death data by age, sex, and race/ethnicity are used to "survive" the starting population forward to the estimate date. The survived population is subtracted from an independent estimate of total population to provide an estimate of total net migration since 1990. This estimate is distributed into age, sex, and race/ethnicity groups according to 1985–1990 county-to-county migration flow data, as reported by the Census Bureau. Population estimates by age, sex, and race/ethnicity are then obtained by adding the net migration estimates to the survived population, and adjusting for the institutional population. This method uses a combination of postcensal data (births and deaths) and extrapolated intercensal data (migration).

A number of private companies also make Hispanic estimates for small areas (e.g., Claritas, Equifax National Decision Systems). Written descriptions of the estimation methodologies are seldom available, but personal communication with demographers working for several of these companies has indicated that estimates are typically made using extrapolation techniques similar to those used by the Census Bureau; that is, they are not based on symptomatic indicators of postcensal changes in the Hispanic population.

3. An experimental methodology[1]

The Hispanic population in Florida has grown very rapidly in recent years [25–27]. It more than tripled between 1970 and 1990, growing from 451,382 to 1,574,143. Its share of total population almost doubled, from 6.6% to 12.2%. Growth rates at the local level were even more dramatic: the Hispanic population more than doubled between 1980 and 1990 in twenty-nine of the state's 67 counties (Fig. 1). In one county, the Hispanic population grew from 1,089 to 12,866, an increase of more than 1,100% in just ten years. At the other end of the spectrum, three counties lost Hispanic residents during the 1980s.

Given the tremendous volatility that characterizes Florida's total and Hispanic population growth, a methodology that simply extrapolates pre-1990 growth trends is not likely to provide accurate post-1990 estimates in many counties. We decided it was preferable to develop a methodology based at least in part on data reflecting postcensal changes in the Hispanic population.

3.1. Data sources

We investigated a number of data sources that we believed might reflect postcensal changes in the Hispanic population. Several (e.g., drivers license records,

[1] All analyses and data management routines used in the production of these estimates were conducted in SAS (version 6.11 in a Windows NT environment) using standard, built-in algorithms.

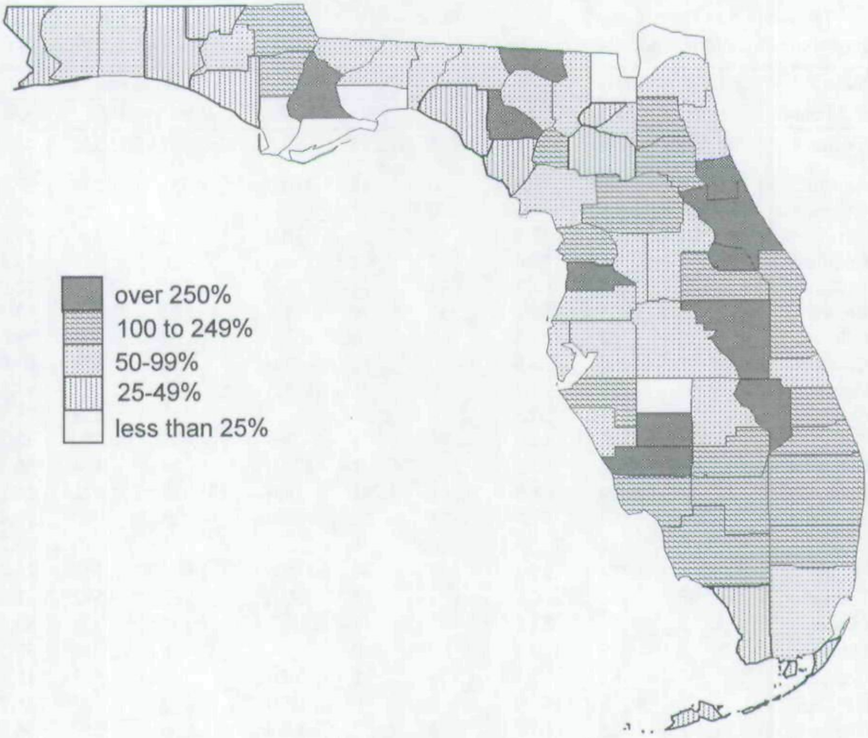

Fig. 1. Percent Change in the Hispanic Population of Florida Counties, 1980–1990.

Hispanic surname indexes) were found to be incomplete or unreliable in Florida, but others were available annually for all counties and appear to be useful for estimation purposes:

1) Hispanic and total births [10].
2) Hispanic and total deaths [10].
3) Hispanic and total school enrollment in grades K-12 [9].

These data series reflect changes in three different segments of the population. Births occur mostly to females age 15–44. Deaths are distributed throughout the population, but are concentrated most heavily among older persons. School enrollment is composed almost entirely of persons age 5–19. All three data series are expected to be correlated with changes in total population size. Table 1 shows Hispanic birth, death, and school enrollment data for Florida and its counties in 1990 and 1995 (or 1994).[2]

[2]We obtained these data in electronic form directly from the source agencies. Birth and death data were provided by the Florida Office of Vital Statistics (tel.: +1 904-359-6963). School enrollment

Table 1
Hispanic births, deaths and school enrollment (K-12), Florida and its counties, 1990 and 1994 (1995)

State	Births			Deaths			School enrollment		
and county	1990	1994	% Ch.	1990	1994	% Ch.	1990	1995	% Ch.
Florida	31,465	37,472	19.1	8,738	11,113	27.2	230,861	332,570	44.1
Alachua	98	89	−9.2	10	21	110.0	537	898	67.2
Baker	0	1	–	0	1	–	5	6	20.0
Bay	31	41	32.3	4	10	150.0	203	320	57.6
Bradford	2	3	50.0	1	2	100.0	30	26	−13.3
Brevard	152	245	61.2	45	61	35.6	1,321	2,284	72.9
Broward	2,720	3,755	38.1	353	596	68.8	14,853	27,825	87.3
Calhoun	3	2	−33.3	0	0	–	8	26	225.0
Charlotte	41	56	36.6	20	15	−25.0	270	458	69.6
Citrus	13	12	−7.7	9	21	133.3	170	337	98.2
Clay	39	51	30.8	3	5	66.7	320	563	75.9
Collier	773	886	14.6	76	73	−3.9	4,495	6,280	39.7
Columbia	9	12	33.3	1	2	100.0	64	164	156.3
Dade	17,472	19,019	8.9	6,561	7,782	18.6	135,982	168,921	24.2
De Soto	61	93	52.5	3	12	300.0	313	690	120.4
Dixie	0	1	–	0	1	–	6	10	66.7
Duval	261	338	29.5	38	44	15.8	1,804	3,152	74.7
Escambia	86	86	0.0	4	14	250.0	282	512	81.6
Flagler	7	11	57.1	3	11	266.7	137	259	89.1
Franklin	3	0	−100.0	0	0	–	8	11	37.5
Gadsden	37	63	70.3	4	2	−50.0	243	513	111.1
Gilchrist	1	2	100.0	1	0	−100.0	7	20	185.7
Glades	9	15	66.7	13	2	−84.6	86	219	154.7
Gulf	2	2	0.0	1	1	0.0	5	9	80.0
Hamilton	10	12	20.0	0	2	–	48	84	75.0
Hardee	184	179	−2.7	11	17	54.5	1,406	2,316	64.7
Hendry	176	218	23.9	21	26	23.8	1,220	2,386	95.6
Hernando	38	39	2.6	16	27	68.8	430	702	63.3
Highlands	103	144	39.8	14	19	35.7	733	1,293	76.4
Hillsborough	2,021	2,428	20.1	518	676	30.5	14,931	23,998	60.7
Holmes	3	3	0.0	1	0	−100.0	19	19	0.0
Indian River	72	94	30.6	5	20	300.0	439	827	88.4
Jackson	6	8	33.3	0	0	–	26	90	246.2
Jefferson	0	2	–	0	0	–	9	5	−44.4
Lafayette	3	4	33.3	0	1	–	16	37	131.3
Lake	74	155	109.5	9	21	133.3	740	1,290	74.3
Lee	392	465	18.6	45	82	82.2	3,264	5,567	70.6
Leon	39	55	41.0	8	8	0.0	254	499	96.5
Levy	7	11	57.1	3	2	−33.3	93	117	25.8
Liberty	0	4	–	2	0	−100.0	24	40	66.7
Madison	0	4	–	0	1	–	3	27	800.0
Manatee	335	479	43.0	23	37	60.9	2,048	3,322	62.2
Marion	81	157	93.8	15	49	226.7	1,017	1,841	81.0
Martin	133	156	17.3	12	18	50.0	718	1,278	78.0
Monroe	145	151	4.1	53	68	28.3	1,074	1,505	40.1
Nassau	4	9	125.0	0	1	–	18	67	272.2
Okaloosa	66	93	40.9	7	11	57.1	599	884	47.6
Okeechobee	132	114	−13.6	15	11	−26.7	814	1,186	45.7

Table 1
(Continued)

State and county	Births 1990	Births 1994	Births % Ch.	Deaths 1990	Deaths 1994	Deaths % Ch.	School enrollment 1990	School enrollment 1995	School enrollment % Ch.
Orange	1,429	2,073	45.1	171	353	106.4	11,420	19,833	73.7
Osceola	255	443	73.7	41	81	97.6	3,451	6,843	98.3
Palm Beach	2,041	2,541	24.5	272	436	60.3	11,210	17,986	60.4
Pasco	163	252	54.6	22	47	113.6	1,299	2,374	82.8
Pinellas	222	393	77.0	72	92	27.8	1,275	2,839	122.7
Polk	494	638	29.1	59	72	22.0	3,019	5,519	82.8
Putnam	68	76	11.8	10	4	−60.0	429	849	97.9
St. Johns	19	22	15.8	2	8	300.0	123	360	192.7
St. Lucie	183	299	63.4	33	44	33.3	798	1,881	135.7
Santa Rosa	11	26	136.4	2	4	100.0	111	227	104.5
Sarasota	101	115	13.9	17	23	35.3	706	1,242	75.9
Seminole	300	425	41.7	46	84	82.6	3,369	5,466	62.2
Sumter	18	21	16.7	2	4	100.0	115	206	79.1
Suwannee	4	15	275.0	1	3	200.0	23	119	417.4
Taylor	3	0	−100.0	2	0	−100.0	7	25	257.1
Union	1	5	400.0	4	5	25.0	14	21	50.0
Volusia	302	356	17.9	53	77	45.3	2,330	3,794	62.8
Wakulla	1	0	−100.0	0	0	–	7	9	28.6
Walton	3	5	66.7	1	2	100.0	21	71	238.1
Washington	3	0	−100.0	0	1	–	42	23	−45.2

Several things stand out from this table. First, many of the birth, death, and school enrollment numbers are very small, reflecting the small number of Hispanic residents in many counties; twenty-six of Florida's 67 counties had fewer than 1,000 Hispanic residents in 1990. Second, in some counties births, deaths, and school enrollment have followed sharply contrasting trends since 1990. For example, Hispanic school enrollment in Alachua County grew by 67% between 1990 and 1995, whereas deaths increased by 110% and births *declined* by 9% between 1990 and 1994. Differences were even greater in some other counties. Small numbers and diverging trends add a substantial degree of uncertainty to the interpretation of the data.

3.2. Estimates of the total Hispanic population

We divided the estimation process into two distinct parts, one dealing with the total Hispanic population and the other dealing with the distribution of that population by age, sex, and race. For estimates of the total Hispanic population of each county, we used four extrapolation techniques based on 1980–1990 population

data were provided by the Florida Department of Education (tel.: +1 850-487-2280). At the time we made the estimates, school enrollment data were available through 1995 but birth and death data were available only through 1994; estimates of births and deaths for 1995 were created by extrapolating 1990–1994 trends. All data used in this article are available from the authors upon request.

trends and nine estimation techniques based on changes in birth, death, and school enrollment data since 1990:

1) LINE: the average annual absolute change in the Hispanic population between 1980 and 1990 is extrapolated to 1995.
2) EXPO: the average annual growth rate of the Hispanic population between 1980 and 1990 is extrapolated to 1995.
3) SHARE: Hispanic population growth 1980–1990 as a share of total population growth 1980–1990 is applied to total population growth 1990–1995 and added to the 1990 Hispanic population.
4) SHIFT: the average annual change in the Hispanic share of total population between 1980 and 1990 is extrapolated to 1995 and applied to the estimate of total population for 1995.
5) SCHOOL-PC: the percent change in Hispanic school enrollment from 1990 to 1995 is applied to the 1990 Hispanic population.
6) BIRTH-PC: the percent change in Hispanic births from 1990 to 1994 is extrapolated to 1995 and applied to the 1990 Hispanic population.
7) DEATH-PC: the percent change in Hispanic deaths from 1990 to 1994 is extrapolated to 1995 and applied to the 1990 Hispanic population.
8) AVE-1: the average of estimates from techniques 5–7.
9) SCHOOL-RT: the ratio of the Hispanic population growth rate 1980–1990/ Hispanic school enrollment growth rate 1980–1990 is applied to the school enrollment growth rate from 1990 to 1995 and multiplied by the 1990 Hispanic population. This ratio was truncated at 0.1 and 2.0 to reduce the impact of statistical outliers.
10) SCHOOL-SH: the percent change in the Hispanic share of total school enrollment between 1990 and 1995 is applied to the Hispanic share of total population in 1990 and multiplied by the 1995 estimate of total population.
11) BIRTH-SH: the percent change in the Hispanic share of total births between 1990 and 1994 is extrapolated to 1995, applied to the Hispanic share of total population in 1990, and multiplied by the 1995 estimate of total population.
12) DEATH-SH: the percent change in the Hispanic share of total deaths between 1990 and 1994 is extrapolated to 1995, applied to the Hispanic share of total population in 1990, and multiplied by the 1995 estimate of total population.
13) AVE-2: the average of estimates from techniques 10–12.

Techniques 1–4 extrapolate 1980–1990 Hispanic growth trends forward to 1995. Techniques 5–8 apply 1990–1995 growth rates in Hispanic births, deaths, and school enrollment to the 1990 Hispanic population; these techniques are similar to those used by the State of California. Technique 9 is based on the assumption that the relationship between the Hispanic population growth rate and the Hispanic school enrollment growth rate is the same for 1990–1995 as it was for 1980–1990. Techniques 10–13 assume that the Hispanic share of total population changes at the

Table 2
Hispanic estimates by technique for selected counties

	County			
Technique	Manatee	Osceola	Putnam	St. Johns
LINE	12,544	18,755	2,235	2,293
EXPO	16,211	44,223	2,843	2,479
SHARE	11,540	18,690	2,023	2,247
SHIFT	13,067	22,967	2,296	2,270
SCHOOL-PC	15,286	25,512	3,341	5,567
BIRTH-PC	14,488	24,723	1,936	2,277
DEATH-PC	16,594	28,556	422	9,035
AVE-1	15,456	26,264	1,900	5,626
SCHOOL-RT	13,557	23,778	1,853	2,920
SCHOOL-SH	13,936	24,667	3,303	4,921
BIRTH-SH	17,026	29,472	2,460	3,007
DEATH-SH	16,130	28,359	462	9,374
AVE-2	15,697	27,499	2,075	5,767

same rate as the Hispanic share of births, deaths, and school enrollment between 1990 and 1995.[3]

For some counties, these techniques produced estimates that were quite similar to each other; for other counties, they produced estimates that were vastly different. Table 2 provides several examples.

Manatee and Osceola Counties are located in central Florida and had about 10,000 Hispanic residents each in 1990. In both counties, the birth, death, and school enrollment techniques provided fairly similar estimates. For Manatee County, the three data series produced estimates between 13,500 and 17,000, similar to the estimates produced by the four extrapolation techniques (11,500–16,200). For Osceola County, the three data series produced estimates between 23,800 and 29,500; these estimates are higher than those coming from the LINE, SHARE, and SHIFT techniques, but much lower than the EXPO estimate. In both counties, the three postcensal data series tell a fairly consistent story regarding changes in the Hispanic population since 1990.

Putnam and St. Johns Counties are located in northeast Florida and had about 1,800 Hispanic residents each in 1990. In these counties the birth, death, and school enrollment estimates were not at all consistent with each other. In Putnam County, estimates based on death data were far lower than all the other estimates; in St. Johns County, estimates based on death data were far higher than all the other estimates. In these counties, the three postcensal data series tell very different stories regarding Hispanic population growth since 1990.

How can reasonable population estimates be made in the face of such diversity? One approach is to take an average of all the estimates or some subgroup of

[3]For techniques which required the use of 1995 estimates of total population by county, we used the official estimates produced by the University of Florida [2].

Table 3
Distribution of final estimates by technique

Technique	Number
LINE	2
EXPO	7
SHARE	1
SHIFT	6
SCHOOL-PC	0
BIRTH-PC	2
DEATH-PC	0
AVE-1	6
SCHOOL-RT	31
SCHOOL-SH	4
BIRTH-SH	3
DEATH-SH	1
AVE-2	4
Total	67

the estimates, perhaps after deleting several outliers [21]. Another is to base the selection of the final estimate on an examination of the relevant data and the application of professional judgment [20]. That is the approach we selected.

For each county, the nine estimates based on birth, death, and school enrollment data were evaluated according to how well they fit with each other, with the four extrapolation techniques, and with an independently produced estimate of total population [2]. The final estimate was the one judged to be the best according to these criteria. We also made special adjustments in a number of counties to account for changes in institutional populations (e.g., prisons, universities). As a final step, the state Hispanic estimate was calculated as the sum of the county Hispanic estimates.

Table 3 shows the number of counties for which each technique was selected as the final estimate. One of the four extrapolation techniques was selected in sixteen counties and one of the nine birth/death/school enrollment techniques was selected in 51 counties. Technique 9 – based on the relationship between population growth and school enrollment growth – appeared to be the best of the thirteen techniques. It was selected in 31 counties, far more frequently than any other technique. Even in counties where this technique was not chosen, it often produced an estimate similar to the one that was selected. We conclude that in this sample school enrollment data generally provided more realistic indicators of Hispanic population change than either birth or death data or the extrapolation of past trends; and that school enrollment data provided more realistic estimates when adjustments were made to account for the historical relationship between school enrollment growth rates and population growth rates.

A full evaluation of the accuracy of these techniques cannot be performed until data from the next decennial census become available. However, we can compare the sum of the county estimates (2,037,000) with a couple of independent state estimates. The 1995 Florida estimate produced by the Census Bureau using the component method was 1,955,000, about 4% lower than the experimental estimate [7]. The 1995 Florida estimate based on the Current Population Survey was 2,255,700, about 11% higher than the experimental estimate [24].[4] The methodology described here thus produced a state estimate similar to the estimates produced by two independent and relatively well-established methodologies. This does not prove the validity of the experimental methodology, of course, but at least it provides a bit of empirical support.

3.3. Estimates by age, sex, and race

Estimates of the Hispanic population by age, sex, and race were constructed using the cohort-survival method, which is a simplified version of the cohort-component projection method [15]. These estimates were based on the Census Bureau's 1980 and 1990 modified counts of the Hispanic population by age, sex, and race.[5] Ratios of the population age t in 1990 to the population age t-10 in 1980 were constructed for each age/sex/race category in the population. We call these ratios "progression rates". These rates were applied to the population by age, sex, and race in 1990 to produce projections of the population age 10 and older in the year 2000.

The numbers for each age/sex/race cohort in 2000 and the corresponding cohort in 1990 were interpolated to 1995, providing a projection of the population age five and older. The population younger than age five was projected by multiplying the child/woman ratio in 1990 (i.e., the ratio of children less than age 5 / females age 15–44) by the number of females age 15–44 in 1995. They were divided into males and females using historical ratios (52% male and 48% female). The 1995 age/sex/race projection for each county was controlled to the 1995 estimate of total Hispanic population described above. As a final step, the state estimate was calculated as the sum of the county estimates.

Several adjustments to this basic methodology were made during the actual production of the age/sex/race estimates. Progression rates were found to be extremely variable across age groups in many small counties, casting doubt on their reliability. Consequently, for counties with fewer than 160 Hispanic residents in a racial category in 1980, we used state-level progression rates instead of county-specific rates; for larger counties we used the county-specific rates calculated in the manner described above. For counties with more than 10,000 Hispanic residents in a racial

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[4]It should be noted that estimates based on the Current Population Survey (CPS) have been adjusted upward to account for the estimated undercount in the 1990 census. This is part of the reason the CPS Hispanic estimate for Florida is higher than the estimates produced by the authors and the Census Bureau.

[5]The Census Bureau produced a set of modified age, race, and sex counts following both the 1980 and 1990 censuses. These modifications were designed to correct for problems regarding the age and race distribution of the population; they did not affect the counts of total population [5].

category in 1980, we used separate progression rates for males and females; for smaller counties we used an average of male and female progression rates. To control for outliers, we constrained the progression rates for individual age groups to vary by no more than 30% from the average for all age groups in that county. In two counties (Alachua, Leon), we held the age/sex/race distribution constant at 1990 levels because of the influence of large university student populations, which tend to retain a constant age structure over time. We believe these adjustments improved the quality of the final estimates.

4. Conclusion

We believe this experimental methodology has the potential to produce useful estimates of the Hispanic population for states and local areas. It is based on data that reflect postcensal changes in the Hispanic population and are available for most places. It can be extended to include other data series (e.g., drivers license files, Hispanic surname lists) and does not require that the same types of data be used everywhere. It can accommodate a variety of techniques for relating symptomatic data series to changes in the Hispanic population, including several not discussed in this article (e.g., ratio-correlation). Preliminary evidence has shown this methodology to produce reasonable estimates of the total Hispanic population at the state level in Florida.

Due to the experimental nature of the methodology, however, estimates may be subject to large errors, especially for individual age/sex/race groups and for places with small numbers of Hispanic residents. Thorough empirical testing must be performed before we can draw any firm conclusions regarding its general validity.

The 2000 Census will provide an excellent opportunity for performing such tests. Are some techniques generally more accurate than others? Do characteristics such as population size and growth rate affect the relative accuracy of different techniques? Does the use of symptomatic postcensal data (e.g., births, deaths, school enrollment) lead to more accurate estimates than can be achieved by the extrapolation of intercensal trends? Does the application of professional judgment lead to more accurate estimates than can be achieved by the mechanical application of one specific technique or some combination of techniques? We believe that future research will help us refine the methodology described in this article, making it increasingly useful for producing postcensal estimates of the Hispanic population of states and local areas.

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