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**Evaluation of
Population Estimation
Procedures for
States, 1980: an
Interim Report**

U.S. Department of Commerce
BUREAU OF THE CENSUS

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Evaluation of Population Estimation Procedures for States, 1980: an Interim Report

This is the first in a series of reports that will evaluate estimates of the population produced by the Bureau of the Census for the 1970 decade and test the methodologies used by the Bureau to produce these estimates. The series will include the results of tests of alternate methods and variations of the methods currently used. Later reports in the series will focus on estimating procedures for sub-State areas such as counties and places.

The focus of this report is the evaluation of State population estimates for April 1, 1980, against the results of the 1980 census. Estimates have been prepared for 1980 by the methods used in the estimates series published annually during the 1970's and published most recently for the years 1970 to 1979 in Current Population Reports, Series P-25, No. 876. Much consideration has been devoted to the problem of relating the estimates (based on the 1970 census) to a 1980 census count which itself appears to have inconsistencies with the 1970 census results. Evaluations have been made both with and without adjustments to compensate for these inconsistencies. Several alternatives of the three methodologies used are still being tested (including modifications of both data input and procedures), and other methods potentially available for use in preparing State estimates are being evaluated. Findings from these tests will be contained in later reports.

EARLIER EVALUATIONS

The first major evaluations of population estimates were carried out by the Bureau of the Census against the results of the 1950 census, and with each succeeding decennial census, an expanded and more detailed evaluation of the population estimates produced during the preceding decade was conducted. Not coincidentally, the Bureau's estimates program itself grew substantially, as interest in demographic estimates increased, the estimating procedure became more elaborate, and the number of areas being estimated expanded. From a modest experimental beginning for the United States and for States in the 1940's, the estimates program for these areas became firmly established and more methodologically secure during the 1950's. The State estimates began to be used extensively in Federal programs and grants-in-aid, and they were often legislatively required for use in the distribution of

funds. Component Method II¹ became the accepted method for developing the State estimates.

The 1960's saw a great expansion in the estimates program. The Ratio-Correlation method¹ was added as a second method used in preparing State estimates, and it was averaged with Component Method II to derive the estimate. The increased use of computers made the use of these complex estimating methods possible and permitted expansion to estimates for standard metropolitan statistical areas (SMSA's) and their component counties using Component Method II, the Composite method, and a variation of the Housing Unit method. Experimental estimates for all counties were produced for 1966 based on these three methods. The Federal-State Cooperative Program for Local Population Estimates (FSCPE) was established late in the decade to work cooperatively with State agencies to produce annual county estimates. One of its first objectives was a test of methods to be used in the program.

By the early 1970's, annual county population estimates were prepared under the FSCPE. In addition, passage of Federal revenue sharing legislation in 1972 brought with it a mandate for the Bureau to produce population updates for the 39,000 governmental units eligible for the program. The Bureau had experimented with a procedure using Federal tax return data during the late 1960's, and this evolved into the Administrative Records method,¹ which has been used since 1975 for place, county, and State estimates. At the end of the 1970's, the State estimates were developed by an average of Component Method II, the Ratio-Correlation method, and the Administrative Records method.

After each census, the estimates in use at that time are compared with the counts, and modifications to these methods and additional methods are tested to determine if the level of accuracy of the existing estimating procedure can be improved. If improvement can be demonstrated and the methodological change is a sound one, the estimating procedures are modified for the upcoming decade to incorporate the improvement.

Table A summarizes results of tests of the Bureau's methods for making population estimates at the State level for 1950, 1960, and 1970. The main measure of accuracy

¹Component Method II and the Ratio-Correlation method are discussed in some detail in Current Population Reports, Series P-25, No. 640, and the Administrative Records method in Current Population Reports, Series P-25, No. 699.

Table A. Summary Measures of the Accuracy of Provisional State Population Estimates: 1950, 1960, and 1970

Summary measure	1950 ¹	1960 ²	1970 ³	
			Original methodology	Revised methodology
Average absolute percent error ⁴	3.16	1.64	1.85	1.18
Number of States with:				
Positive errors.....	25	25	26	30
Errors of 3 percent or more.....	(NA)	6	10	1
Errors of 5 percent or more.....	8	2	2	-
Average absolute percent errors by size of State ⁵ :				
4 million or more.....	(NA)	1.40	1.75	1.02
1.5 million to 4 million.....	(NA)	1.28	2.59	1.20
Less than 1.5 million.....	(NA)	2.29	1.18	1.30

- Represents zero.

NA Not available.

¹Excludes Alaska, Hawaii, and the District of Columbia.

²Excludes Alaska and Hawaii, includes the District of Columbia.

³Includes Alaska, Hawaii, and the District of Columbia.

⁴Unweighted arithmetic average.

⁵Unweighted arithmetic average. Population size as of year estimated.

Source: Current Population Reports, Series P-25, No. 520, and Meyer Zitter and Henry S. Shryock, Jr., "Accuracy of Methods of Preparing Postcensal Population Estimates for States and Local Areas," *Demography*, Vol. 1, No. 1, 1964, pp. 227-241.

shown is the average absolute percent deviation (or error)—the sum of State deviations from the census count disregarding sign divided by the number of States. The average absolute percent error was 3.16 for the 1950 estimates (Component Method II only), 1.64 for the 1960 estimates, and 1.18 for the 1970 estimates (both 1960 and 1970 estimated by an average of Method II and the Ratio-Correlation method). Each value is for the revised estimates tested against the end census and incorporating improvements over the usage of the method during the preceding decade. The error for 1970 without improvements was 1.85 percent.

Substantial improvement is shown in the test values from each census to the next, reflecting both improved accuracy of the methods over time and improvements brought about by the addition of the Ratio-Correlation method. The methods underwent considerable modification to improve their accuracy, and review and edit of data input to the methods became much more sensitive and sophisticated. In fact, improvements in accuracy over time would have been even greater if all tests covered the 51 States and the District of Columbia. Alaska and Hawaii (whose estimates had been developed by a component procedure using passenger data to measure migration) were not included in the tests until 1970, and the District of Columbia was excluded from the 1950 test. All three have been problem areas to estimate by the standard methods because of their unique characteristics.

Component Method II had been the sole estimating methodology used by the Bureau during the 1950's. In its use for the 1960's, modification was made in the assumed

relationship between ages and school enrollment grades in developing the school-age population estimate, and adjustments were made at every feasible step to national control totals. For the 1970's, State-specified migration adjustment factors based on the 1970 census replaced the national adjustments based on the Current Population Survey, which had been used in the 1960's. The grades used in developing the school-age population estimate were expanded, and the procedure was limited to estimating the population under 65, with the population 65 and over being estimated by using change in Medicare recipients over time.

The Ratio-Correlation method was modified in the 1970's by having adjustments made to its data input to compensate for convergence in per capita values of its independent variables over time. This was intended to compensate for a pronounced regional bias noted in the method for the 1960's which resulted in overstatement of estimates for most States in the South. The method also was made specific to the population under 65.

In the past evaluations and tests of population estimation systems by the Bureau,² it was found that:

1. Size of population is a major element in determining the expected level of accuracy. The larger the area in terms of population, the more accurate the population estimates.

²Zitter, Meyer and Frederick J. Cavanaugh, "Postcensal Estimates of Population," an unpublished paper presented at the Annual Meeting of the American Association for the Advancement of Science, Session on the 1980 Census, San Francisco, California, January 5, 1980. Copies of this paper may be obtained by writing Chief, Population Division, Bureau of the Census, Washington, D.C. 20233.

2. Rate of population change is also a major variable. Areas of less rapid change usually incur smaller average errors than those undergoing rapid population growth or decline.
3. Generally, estimates are improved when results of two or more estimation systems using independent data inputs are averaged.
4. Improvements in the estimation system occur when smaller or lower levels of geography are controlled to higher levels of geography.
5. There is some regional variation in the accuracy of estimates, although the differences may reflect more population size distribution differentials, rates of change, and other characteristics of subregional geographic units rather than actual regional geographic differences in estimation potentiality.
6. Estimates for all levels of geography seem to be more accurate in the more recent decade as opposed to earlier periods.

The results of the 1980 test for States bear out many, but not all, of the findings of previous tests. Before discussing these findings, however, some attention must be devoted to a review of some of the difficulties unique to the 1980 test.

PROBLEMS WITH 1980 ESTIMATES EVALUATION

Evaluation of the 1970-80 State estimates methodology represents a much more complex undertaking than did earlier evaluations because of the suspected lack of comparability in the 1970 and 1980 censuses. This lack of comparability is reflected in the large national error of closure in 1980. The error of closure, the difference between the census count and the estimate for the same date, was 4.7 million for the Nation in 1980. In contrast, the error of closure was quite small in 1960 and 1970, 3,000 and 379,000, respectively, and could effectively be ignored in the evaluation of the State estimates methodology. (Errors of closure by State are shown in table 4 in the "unadjusted difference" column.) Since the sum of the State estimates is forced to agree with the independently-derived national estimate, a portion of the error of closure for each State is attributable to the large national error of closure,

To evaluate effectively the estimates methodology for States, given the large error of closure, it is necessary to understand the potential sources of the error of closure and to eliminate those not directly related to the estimating methodology. The error of closure may theoretically result from inadequate estimating procedures and/or variations in the completeness of the census counts in 1970 and 1980. Based on analyses of the census results and knowledge of the estimating procedures, it appears likely that the large error of closure in 1980 stems more specifically from the omission of undocumented aliens in the estimates, some of whom were

counted in the 1980 census, and from an improvement in coverage in the 1980 census over the 1970 count. Also contributing to the error of closure was the possibility of double-counting of persons in some areas in 1980.

For the 1980 census, the Bureau of the Census made extra efforts to count difficult-to-enumerate groups such as undocumented aliens and minority groups. Preliminary analysis of coverage in 1980 suggests some degree of success was achieved in counting both groups. Among Blacks, preliminary estimates indicate that the undercount rate dropped from 7.6 percent in 1970 to 4.8 percent in 1980. Among all others (the White-and-other-races population), 1.5 percent were missed in 1970, but in 1980, the census count exceeded the estimate of the legally resident population by 1.1 percent or almost 2.2 million.³ This apparent overcount may be the result of duplication in the census count and/or of the counting of undocumented aliens in the census (who were not included in the estimate). Although research is continuing, it is too early to determine with any certainty the relative contributions of these various factors to the error of closure.

Nevertheless, it is possible to begin evaluation of the State estimates methodology before a full evaluation of the error of closure is completed. Three approaches are used here. The first is a comparison of the 1980 census counts and the 1980 estimates as computed. Although the comparison is affected by the large national error of closure, it does show how the estimates produced during the 1970's (with some corrections for data errors) looked in 1980. The second approach taken is to add the estimated 1970 undercount by State to the 1980 estimates. This approach is based on the assumption that the entire error of closure is due to differential coverage between the two censuses. Although it is highly unlikely that this is the case, it is a convenient assumption because it entirely eliminates the error of closure which, coincidentally, was of the same magnitude as the 1970 undercount. However, it should not be concluded that the error of closure is solely due to differential coverage. A more likely explanation is that all three factors mentioned above—undocumented aliens, differential coverage, and double-counting—contributed to the large error. A third approach involves controlling the 1980 State estimates to the 1980 census count for the United States rather than to the 1980 national estimate. This approach tests the estimating procedure to determine how accurately it predicts the percent distribution of the population, by State, compensating for the large national error of closure in the evaluation.

The full evaluation of the 1980 census (including the Post-Enumeration Program) will eventually yield substantially more information on the completeness of the 1980 census counts. Once these data are available, it will be possible to reevaluate the State estimates methodology if the additional information suggests such a reevaluation is warranted.

³Bureau of the Census, Current Population Reports, *Coverage of the National Population in the 1980 Census, by Age, Sex, and Race: Preliminary Estimates by Demographic Analysis*, Series P-23, No. 115.

**Table B. Summary of Average Absolute Percent Error of State Population Estimates, by Method Used in Estimates:
April 1, 1980¹**

(Base is 1980 census population, Advance Reports)

Method	Average absolute percent error		Number of errors (unweighted)		
	Unweighted	Weighted	Positive	3 percent or more	5 percent or more
UNADJUSTED					
Component Method II.....	2.92	2.42	11	21	7
Ratio-Correlation method.....	2.82	2.31	9	22	8
Administrative Records method.....	2.47	2.43	6	20	3
Average of above methods ¹	2.48	2.31	10	19	5
Average, CMII and R-C.....	2.74	2.33	10	23	6
Average, CMII and AR.....	2.42	2.33	11	18	5
Average, R-C and AR.....	2.52	2.32	8	21	4
ADJUSTED FOR 1970 UNDERCOUNT					
Component Method II.....	1.85	1.34	25	11	2
Ratio-Correlation method.....	1.77	1.12	25	7	2
Administrative Records method.....	1.45	1.18	23	4	2
Average of above methods ¹	1.46	0.98	23	5	1
Average, CMII and R-C.....	1.67	1.11	23	5	2
Average, CMII and AR.....	1.43	1.00	25	5	3
Average, R-C and AR.....	1.47	1.03	24	5	2
ADJUSTED PRO RATA TO 1980 CENSUS U.S. TOTAL					
Component Method II.....	2.28	1.89	23	14	3
Ratio-Correlation method.....	2.09	1.70	21	13	2
Administrative Records method.....	1.79	1.85	28	6	2
Average of above methods ¹	1.78	1.67	22	7	1
Average, CMII and R-C.....	2.00	1.64	23	11	2
Average, CMII and AR.....	1.80	1.75	27	9	1
Average, R-C and AR.....	1.80	1.70	24	7	1

¹Procedure used in published estimates.

Source: Tables 1, 2, and 3.

1980 TEST RESULTS

Raw test results. With the addition of the Administrative Records method in the middle 1970's to reinforce the two other estimating methods used in the State estimates, the Bureau of the Census was confident that it strengthened its estimates procedure. The raw test results against the 1980 census, however, appear to show a deterioration (tables A and B). The average absolute percent error of the provisional April 1, 1980, State population estimates was 2.48 percent, higher than at any time during the period of evaluations of population estimates with the exception of 1950 and reversing the past trend towards improvement of accuracy with each decade. Only 10 States had errors in a positive direction, indicating a very strong negative bias. Previous evaluations indicated little or no bias in either direction. Further, 19 States had population estimates with errors in excess of 3 percent and 5 had errors of over 5 percent, all of them negative. At no other time in the history

of the Bureau's State population estimation evaluations had there been so many States with extreme estimation errors.

There seems to be a great regional disparity in error rates in 1980 using the methodology of the 1970's. In 1980, the absolute average percent error of State population estimates for the average of these methods used was 3.48 percent in the South and 3.35 in the West as compared with a 1.12 percent error rate in the North (table C). Twelve of the seventeen States in the South had an error rate in excess of 3 percent while only 1 of the 21 States in the North and 6 of 13 in the West had error rates of this magnitude (table 1). The South and West showed a strong negative bias, with only the District of Columbia having a positive error. By contrast, 9 of the 21 Northern States showed positive errors.

A superficial review would suggest that the estimating procedures worked well in the North but failed badly in the South and West, markedly understating their population level. This would appear to reverse the bias in estimating the Southern States that occurred in the 1960's and suggests that

Table C. Average Absolute Percent Error of State Population Estimates and Number of Extreme Errors, by Regions and Divisions: 1980

(Average of Component Method II, Ratio-Correlation method, and Administrative Records method)

Region, division, and State	Population April 1, 1980 (Census)	Number of States	Average absolute percent error in State estimates			Number of errors of 3% or more/5% or more		
			Unad- justed	Under- count adjust- ment	Pro rata adjust- ment	Unad- justed	Under- count adjust- ment	Pro rata adjust- ment
United States.....	226,504,825	51	2.48	1.46	1.78	19/5	5/2	7/1
Regions:								
Northeast.....	49,136,667	9	1.59	1.28	1.47	1/-	-	1/-
North Central.....	58,853,804	12	0.77	1.03	1.86	-	-	1/-
South.....	75,349,155	17	3.48	1.44	1.81	12/3	1/1	3/-
West.....	43,165,199	13	3.35	2.00	1.88	6/2	4/1	2/1
Northeast:								
New England.....	12,348,493	6	2.02	1.42	1.35	1/-	-	1/-
Middle Atlantic.....	36,788,174	3	0.73	1.02	1.71	-	-	-
North Central:								
East North Central.....	41,669,738	5	1.13	0.58	1.39	-	-	1/-
West North Central.....	17,184,066	7	0.52	1.36	2.21	-	-	-
South:								
South Atlantic.....	36,943,139	9	3.39	2.17	2.06	5/3	1/1	3/-
East South Central.....	14,662,882	4	3.75	0.59	1.70	4/-	-	-
West South Central.....	23,743,134	4	3.43	0.66	1.37	3/-	-	-
West:								
Mountain.....	11,368,330	8	3.86	2.35	2.27	4/2	3/1	2/1
Pacific.....	31,796,869	5	2.53	1.44	1.26	2/-	1/-	-

- Represents zero.

Source: Tables 1, 2, and 3.

the modified procedures for the 1970's which were designed to avoid overstating the South's population may have succeeded too well.

As mentioned earlier, however, the national estimates total fell far below the census count in 1980, the 4.7 million error of closure representing a shortfall of 2.1 percent. This national bias explains the low bias of the State estimates, which were routinely adjusted to U.S. controls. Since there was no appreciable error of closure in 1960 or 1970, no national bias needed to be considered in the evaluations of the State estimates for these years.

Two procedures have been explored for adjusting the 1980 estimated to compensate for the error of closure. Both procedures deserve consideration, but both have some flaws in their conception and use in this evaluation. Since, for the first time in three decades, the national population count was not comparable in level with the previous counts, it is strongly believed that some adjustment must be made to the State estimates for the test to be meaningful.

Adjusted estimates. Table 2 shows the relationship of the 1980 census count to estimates of the population of States for April 1, 1980, adjusted for the 1970 census undercount. An estimate of each State's numerical undercount in 1970 was added to the State's 1980 estimate. The undercount

adjustment was developed in an unpublished modification of undercount estimates contained in Current Population Reports, Series P-23, No. 65, *Developmental Estimates of the Coverage of the Population of States in the 1970 Census*, December 1977. This adjusting procedure brings the expected U.S. total to within less than 0.1 percent of the count, automatically raising the estimates for all States. It makes the assumption that the error of closure in the estimates is distributed geographically the way the population which was missed in the 1970 census was distributed. To the extent that the error of closure in 1980 was not distributed like the 1970 undercount, this assumption would be erroneous. The share of the closure error attributed to duplication would not be likely to have any relation to the undercount pattern. Also, by relating the 1980 counts to estimates based on the 1970 census adjusted for undercount, this method implies that there was no 1980 census undercount.⁴

Table 3 presents a parallel State table relating the 1980 census count to State estimates adjusted pro rata to the national census total. Like the other adjustment, this automatically raises all the State estimates, but the implicit

⁴Ideally adjustments would be made to both censuses, but sufficient analysis on the completeness of the 1980 counts is not yet available for use.

assumption is that the missed population has the distribution of the counted population. Since the census evaluations to date suggest that most of the 1980 error of closure was due to improved census coverage and to the counting of a large number of undocumented aliens, these groups would not be distributed throughout the Nation in the proportions of the population as a whole. The Black and Spanish populations—the groups likely to be disproportionately represented in the undercounted population and in the undocumented alien population—have a different distributional pattern from the general population (as well as from one another).

Both adjusting procedures markedly alter the test results, with the average absolute percent error for the average of 3 methods declining from 2.48 unadjusted to 1.78 for the pro rata adjustment and to 1.46 for the undercount adjustment. Both had the effect of eliminating the negative bias apparent in the unadjusted series, with positive errors of 22 (pro rata) and 23 (undercount) out of 51. The number of errors above 3 percent declined from 19 (unadjusted) to 7 (pro rata) and 5 (undercount), and the number of errors above 5 percent declined from 5 to 1 (pro rata) and 2 (undercount).

Regional test results were affected dramatically by either adjustment (table C), but the change was quite different depending on the adjusting procedure. The pro rata adjustment had the effect of raising all percent differences upward by about 2 percent, resulting in average absolute percent errors much improved for the South and West and worsened for the North, particularly for the North Central States. Regional differentials largely disappeared, with a range of only 0.41 percent between the highest error (West) and the lowest (Northeast) as compared with a range of 2.71 percent unadjusted. The worst estimated States were Nevada (-6.70 percent) and Arizona (-4.75 percent).

Using the adjustment for 1970 undercount, errors for the South are much lower, and the Northeast shows more improvement than the pro rata adjustment, but the West is somewhat less improved. The accuracy of the estimates for the States in the North Central Region deteriorated somewhat (from 0.77 percent in the unadjusted series to 1.03 percent), but not nearly as much as it declined in the pro rata adjustment (to 1.86 percent). The range of the regional average absolute percent error was less than the unadjusted series but far more pronounced than in the pro rata series, amounting to 0.97 percent. The West had by far the largest

error (2.00 percent) and the North Central the smallest. The worst estimated States or equivalents were the District of Columbia (+9.14 percent), Nevada (-5.16 percent), and Alaska (+4.87 percent).

As a result of the adjustments, all or nearly all the States in the North Central Region had positive errors (table D). Most of the States in the South and West still had negative errors, but this was not so pronounced in the undercount adjustment as in the pro rata adjustment.

When looking at the accuracy of the State population estimates for 1980 by population size, large States had the smallest average absolute percent error whether or not the estimates were adjusted (table E). Only in the undercount adjustment did the smallest States have the largest error, however. In both the unadjusted estimates and the pro rata adjustment, middle-sized States recorded much larger errors than the larger or smaller States.

In a review of the accuracy of the States by percent increase, the unadjusted series suggested that accuracy decreased with increasingly rapid growth (table E). With either adjustment procedure, however, this progression is not as evident. States with 20 percent or more growth during the 1970's (two or more times the national growth rate) appear to be the worst estimated in each case, but those States, growing 10 to 19 percent during the period showed the smallest errors. In all series there was a heavy concentration of fast-growing States having large percent errors.

Comparison of individual methods. Regardless of the adjusting procedure, the Administrative Records method proved to be the most accurate of the three methods used to develop the State estimates, followed by the Ratio-Correlation method and last by Component Method II (table B). Both adjustments suggest that all three methods have a tolerable level of error, however, ranging from 1.45 to 1.85 average absolute percent error by the undercount adjustment and from 1.79 to 2.28 by the pro rata adjustment, a difference of less than half a percent in each case. The Administrative Records methods was the most accurate or second most accurate estimating procedure in 39 or 41 states, depending on adjustment (table F). It proved to be especially effective in the North, where it was the poorest method for only 2 or 3 States out of 21. Component Method II was least effective in the North Central States, where it was the worst method in 8 or 9 of the 12 States, and in the West (7 of 13 States).

Table D. Number of Positive and Negative Errors in the State Estimates, by Regions: 1980

Region	Unadjusted		Undercount adjustment		Pro rata adjustment	
	Positive	Negative	Positive	Negative	Positive	Negative
United States.....	10	41	23	28	22	29
Northeast.....	3	6	4	5	5	4
North Central.....	6	6	10	2	12	-
South.....	1	16	5	12	2	15
West.....	-	13	4	9	3	10

- Represents zero.

Source: Tables 1, 2, and 3.

Table E. Average Absolute Percent Error of State Population Estimates and Number of Extreme Errors, by Population Size and Percent Change in Population: 1980

Category	Number of States	Average absolute percent error			Number of errors of 3% or more/5% or more		
		Unad-justed	Under-count adjust-ment	Pro rata adjust-ment	Unad-justed	Under-count adjust-ment	Pro rata adjust-ment
All States.....	51	2.48	1.46	1.78	19/5	5/2	7/1
POPULATION SIZE, 1980							
4 million or more.....	21	2.09	0.88	1.61	5/2	-	2/-
1.5 to 4 million.....	14	3.02	1.23	2.11	9/2	1/-	3/-
Less than 1.5 million.....	16	2.51	2.42	1.71	5/1	4/2	2/1
PERCENT CHANGE, 1970-80							
+20 percent or more.....	15	3.91	2.04	2.14	10/4	4/1	4/1
+10 to +19 percent.....	15	3.16	0.87	1.34	9/1	-	-
Less than 10 percent increase or loss.....	21	0.97	1.46	1.84	-	1/1	3/-

- Represents zero.

Source: Tables 1, 2, and 3.

Table F. Best, Worst, and Middle Estimates in Terms of Accuracy of State Population Estimates: 1980

Region	Number of States	Administrative Records method			Ratio-Correlation method			Component Method II		
		Best	Middle	Worst	Best	Middle	Worst	Best	Middle	Worst
UNDERCOUNT ADJUSTMENT										
United States.....	51	22	19	10	14	20	17	15	12	24
Northeast.....	9	5	3	1	-	4	5	4	2	3
North Central.....	12	7	4	1	5	5	2	-	3	9
South.....	17	6	6	5	4	6	7	7	5	5
West.....	13	4	6	3	5	5	3	4	2	7
PRO RATA ADJUSTMENT										
United States.....	51	18	21	12	17	20	14	16	10	25
Northeast.....	9	4	4	1	1	4	4	4	1	4
North Central.....	12	6	4	2	4	6	2	2	2	8
South.....	17	4	6	7	5	8	4	8	3	6
West.....	13	4	7	2	7	2	4	2	4	7

- Represents zero.

Source: Tables 1, 2, and 3.

Patterns of change. In addition to the traditional comparisons of population estimates to census counts as just discussed, the patterns of the estimates during the decade were examined in an effort to assess the stability of the series of estimates produced by each method. That is, the evaluation was concerned not only with accuracy at the end of the 10-year period, but also with the path taken by each estimating method in producing the 10-year series of annual figures. The intent here was to evaluate the degree to which the individual methods are able to eliminate false fluctua-

tions in a series of estimates while retaining the sensitivity to reflect real change.

Since a comparable series of annual censuses is not available for each year of the decade, the analysis was limited to comparing the population change shown by each method each year to the change estimates in adjoining years and to the patterns indicated by the other two methods. Small variations in pattern from year to year and from what was shown in the other methods were eliminated so that only moderate or extreme variations not confirmed by the other

methods were examined. Since estimates are available for all estimating methods only since 1973, the comparisons were restricted to the 1973-80 period.

Meaningful differences were found between the methods in their abilities to resist fluctuations that do not reflect genuine population change. The estimates from the Administrative Records method contain the least unwanted fluctuations, approximately half of the variation found in Component Method II:

Average of methods	1.7 percent
Administrative Records method	3.4 percent
Component Method II	6.2 percent
Ratio-Correlation method	14.8 percent

The Ratio-Correlation method was the most unstable, with approximately double the fluctuation found in Component Method II. The number of the instances in which the Administrative Records method and Component Method II produce unwarranted fluctuations are acceptable. However, the fact that the Ratio-Correlation method produces estimates containing what may be spurious fluctuations approximately 15 percent of the time indicates a need to reexamine the method for possible improvements that would help to stabilize the results over time.

Averaging of methods. The average of three methods proved to be about as accurate than the best of the individual methods (Administrative Records method) in either adjustment (table B). When compared to the average of pairs of methods used in the estimates (Component Method II and Ratio-Correlation method, Component Method II and Administrative Records method, and Ratio-Correlation method and Administrative Records method), the average of three methods is superior to the first and about equal to the other two.

Although all pairs of methods were not examined in the evaluation of fluctuations in the annual series of estimates, it was found that the average of all three methods results in annual estimates that are more stable than any of the individual methods alone. The averaged estimates result in unwanted fluctuations only 2 percent of the time and apparently mask the movement of individual methods in different directions in the annual estimates.

Conclusion. Although neither of the adjusting procedures is perfect, some type of adjustment for comparability in the 1970 and 1980 counts appears to be necessary in the evaluation of estimating methods for the 1970's. The undercount adjustment appears to be a more logical assumption concerning the distribution of the population that must be accounted for in the 1980 error of closure than is the pro rata adjustment, and the average percent errors are much smaller (1.46 compared to 1.78). Both adjustments, however, result in patterns of error similar to one another and very different from the unadjusted series, thus reinforcing one another.

The adjusted estimates generally display the patterns expected from the earlier tests and outlined earlier. Largest States were the best estimated, fastest-growing States the poorest estimated, and averaging of methods was superior to any single method. The pronounced regional bias in the unadjusted estimates largely disappeared in the adjustments. The average percent errors are an improvement over the original 1970 estimates (1.85 percent). The expected improvement in the estimates resulting from adjustment to a U.S. control, however, obviously did not materialize in 1980 because of problems in the national estimating procedures and lack of comparability between the two census levels.

As the information accumulates regarding the accuracy of the state population estimates during the 1970's, the Bureau is approaching the time when a final selection of the methods to be used for the 1980's must be made. Work is continuing on evaluation of variations of each of the three methods currently used. Several alternative independent variables and variations in approach are being tested in the regression procedure. Additional methods are also being tested, including an extension of the administrative records procedure.

When the bulk of the evaluation of alternative methods has been completed, a choice of procedures will be selected and the new procedures put in place. Even though the nature and scope of the changes are unknown now, it is likely that some modification of the estimating procedures will be made for the 1980's either in terms of refinement of existing methods or some change in methods. The changes will be reflected in the State population estimates released in the fall of 1983, and revisions will be made in the figures for earlier years.

**Table 1. Percent Error of State Population Estimates, by Method Used in Estimates (Unadjusted):
April 1, 1980**

(CM=Component Method II, RC=Ratio Correlation method, AR=Administrative Records method)

Region, division, and State	Population April 1, 1980 (census) ¹	Component Method II	Ratio- Correlation method	Administrative Records method	Average of--			
					CM, RC, and AR ²	CM and RC	CM and AR	RC and AR
United States.....	226,504,825	-2.08	-2.08	-2.08	-2.08	-2.08	-2.08	-2.08
Regions:								
Northeast.....	49,136,667	-0.61	-0.26	0.20	-0.22	-0.43	-0.20	-0.03
North Central.....	58,853,804	-0.35	-0.79	-0.85	-0.67	-0.57	-0.60	-0.82
South.....	75,349,155	-4.21	-3.48	-3.73	-3.81	-3.85	-3.97	-3.61
West.....	43,165,199	-2.41	-3.49	-3.50	-3.13	-2.95	-2.95	-3.49
Northeast:								
New England.....	12,348,493	-0.82	0.30	0.13	-0.13	-0.26	-0.34	0.22
Middle Atlantic.....	36,788,174	-0.54	-0.44	0.22	-0.25	-0.49	-0.16	-0.11
North Central:								
East North Central.....	41,669,738	-0.83	-1.08	-0.70	-0.87	-0.95	-0.77	-0.89
West North Central.....	17,184,066	0.81	-0.11	-1.21	-0.17	0.35	-0.20	-0.66
South:								
South Atlantic.....	36,943,139	-4.66	-3.68	-3.46	-3.94	-4.17	-4.06	-3.57
East South Central.....	14,662,882	-3.54	-4.17	-3.56	-3.76	-3.85	-3.55	-3.86
West South Central.....	23,743,134	-3.94	-2.75	-4.24	-3.64	-3.34	-4.09	-3.49
West:								
Mountain.....	11,368,330	-4.13	-5.03	-3.15	-4.10	-4.58	-3.64	-4.09
Pacific.....	31,796,869	-1.79	-2.93	-3.63	-2.78	-2.36	-2.71	-3.28
New England:								
Maine.....	1,124,660	-2.18	-3.28	-1.61	-2.36	-2.73	-1.89	-2.45
New Hampshire.....	920,610	-4.02	-2.52	-2.46	-3.00	-3.27	-3.24	-2.49
Vermont.....	511,456	-2.84	-3.61	-1.23	-2.56	-3.23	-2.04	-2.42
Massachusetts.....	5,737,037	-0.12	1.49	0.92	0.76	0.68	0.40	1.20
Rhode Island.....	947,154	-6.10	-0.23	-0.96	-2.43	-3.17	-3.53	-0.60
Connecticut.....	3,107,576	1.28	1.04	0.64	0.99	1.16	0.96	0.84
Middle Atlantic:								
New York.....	17,557,288	-0.08	-0.03	1.57	0.49	-0.05	0.74	0.77
New Jersey.....	7,364,158	-0.72	-0.08	-0.81	-0.54	-0.40	-0.77	-0.45
Pennsylvania.....	11,866,728	-1.10	-1.29	-1.13	-1.17	-1.20	-1.12	-1.21
East North Central:								
Ohio.....	10,797,419	-1.39	-0.62	-0.01	-0.67	-1.01	-0.70	-0.31
Indiana.....	5,490,179	-1.60	-2.49	-1.34	-1.81	-2.04	-1.47	-1.91
Illinois.....	11,418,461	-2.22	-1.41	-1.60	-1.74	-1.82	-1.91	-1.51
Michigan.....	9,258,344	0.07	-1.24	-0.06	-0.41	-0.59	0.00	-0.65
Wisconsin.....	4,705,335	2.97	0.66	-0.62	1.00	1.82	1.17	0.02
West North Central:								
Minnesota.....	4,077,148	1.14	0.51	-0.87	0.26	0.82	0.13	-0.18
Iowa.....	2,913,387	0.83	-0.14	-2.04	-0.45	0.35	-0.60	-1.09
Missouri.....	4,917,444	-0.54	-1.75	-1.02	-1.11	-1.15	-0.78	-1.39
North Dakota.....	652,695	-0.12	2.31	-1.21	0.32	1.09	-0.67	0.55
South Dakota.....	690,178	2.66	-0.73	-0.72	0.41	0.97	0.97	-0.72
Nebraska.....	1,570,006	1.13	0.51	-0.34	0.43	0.82	0.40	0.08
Kansas.....	2,363,208	2.52	1.36	-1.88	0.67	1.94	0.32	-0.26
South Atlantic:								
Delaware.....	595,225	-3.01	-3.53	-0.63	-2.39	-3.27	-1.82	-2.08
Maryland.....	4,216,446	-1.36	-0.96	-0.67	-1.00	-1.16	-1.01	-0.82
District of Columbia.....	637,651	-2.96	3.75	2.90	1.23	-0.39	-0.03	3.32
Virginia.....	5,346,279	-2.04	-2.57	-1.70	-2.10	-2.30	-1.87	-2.13
West Virginia.....	1,949,644	-3.11	-4.15	-4.36	-3.87	-3.63	-3.73	-4.26
North Carolina.....	5,874,429	-4.71	-3.05	-3.62	-3.79	-3.88	-4.16	-3.33
South Carolina.....	3,119,208	-6.23	-5.59	-4.71	-5.51	-5.91	-5.47	-5.15
Georgia.....	5,464,265	-6.86	-4.97	-3.17	-5.00	-5.92	-5.02	-4.07
Florida.....	9,739,992	-6.28	-4.92	-5.73	-5.64	-5.60	-6.01	-5.32
East South Central:								
Kentucky.....	3,661,433	-2.44	-6.01	-3.56	-4.00	-4.22	-3.00	-4.78
Tennessee.....	4,590,750	-3.32	-4.43	-4.47	-4.07	-3.88	-3.90	-4.45
Alabama.....	3,890,061	-3.10	-3.07	-3.23	-3.14	-3.09	-3.17	-3.15
Mississippi.....	2,520,638	-6.19	-2.70	-2.43	-3.77	-4.45	-4.31	-2.57
West South Central:								
Arkansas.....	2,285,513	-2.59	-5.47	-3.99	-4.02	-4.03	-3.29	-4.73
Louisiana.....	4,203,972	-4.39	0.21	-3.68	-2.62	-2.09	-4.04	-1.74
Oklahoma.....	3,025,266	-3.05	-2.03	-4.10	-3.06	-2.54	-3.57	-3.06
Texas.....	14,228,383	-4.21	-3.34	-4.47	-4.01	-3.77	-4.34	-3.91
Mountain:								
Montana.....	786,690	1.20	-2.20	0.04	-0.32	-0.50	0.62	-1.08
Idaho.....	943,935	-2.01	-5.86	-3.35	-3.74	-2.68	-3.61	-4.61
Wyoming.....	470,816	0.66	-3.50	-4.29	-2.38	-1.42	-1.81	-3.90
Colorado.....	2,888,834	-3.47	-2.92	-1.29	-2.56	-3.20	-2.38	-2.11
New Mexico.....	1,299,968	0.79	-3.32	-3.57	-2.03	-1.27	-1.39	-3.44
Arizona.....	2,717,866	-8.03	-7.53	-4.65	-6.74	-7.78	-6.34	-6.09
Utah.....	1,461,037	-3.72	-6.80	-2.78	-4.43	-5.26	-3.25	-4.79
Nevada.....	799,184	-12.60	-6.40	-6.94	-8.65	-9.50	-9.77	-6.67
Pacific:								
Washington.....	4,130,163	-3.06	-2.78	-2.89	-2.91	-2.92	-2.97	-2.83
Oregon.....	2,632,663	-2.23	-3.77	-3.37	-3.12	-3.00	-2.80	-3.57
California.....	23,668,562	-1.39	-2.77	-4.03	-2.73	-2.08	-2.71	-3.40
Alaska.....	400,481	-4.63	-2.46	6.70	-0.13	-3.55	1.04	2.12
Hawaii.....	965,000	-3.87	-5.61	-1.85	-3.78	-4.74	-2.86	-3.73

¹Advance Reports, PHC80-V-1.

²Procedure used in published estimates, with the exception of Alaska.

Table 2. Percent Error of State Population Estimates, by Method Used in Estimates (Adjusted for 1970 Census Undercount): April 1, 1980

(CM=Component Method II, RC=Ratio Correlation method, AR=Administrative Records method)

Region, division, and State	Population April 1, 1980 (census) ¹	Component Method II	Ratio- Correlation method	Administrative Records method	Average of--			
					CM, RC, and AR ²	CM and RC	CM and AR	RC and AR
United States.....	226,504,825	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06
Regions:								
Northeast.....	49,136,667	0.25	0.61	1.06	0.64	0.43	0.66	0.83
North Central.....	58,853,804	0.78	0.34	0.28	0.47	0.56	0.53	0.31
South.....	75,349,155	-1.05	-0.32	-0.56	-0.64	-0.68	-0.81	-0.44
West.....	43,165,199	0.17	-0.91	-0.92	-0.55	-0.37	-0.38	-0.91
Northeast:								
New England.....	12,348,493	0.02	1.14	0.97	0.71	0.58	0.49	1.05
Middle Atlantic.....	36,788,174	0.33	0.43	1.09	0.62	0.38	0.71	0.76
North Central:								
East North Central.....	41,669,738	0.22	-0.03	0.35	0.18	0.09	0.28	0.16
West North Central.....	17,184,066	2.15	1.23	0.13	1.17	1.69	1.14	0.68
South:								
South Atlantic.....	36,943,139	-1.86	-0.88	-0.67	-1.14	-1.37	-1.26	-0.78
East South Central.....	14,662,882	-0.19	-0.82	-0.21	-0.41	-0.50	-0.20	-0.51
West South Central.....	23,743,134	-0.32	0.87	-0.62	-0.02	0.28	-0.47	0.12
West:								
Mountain.....	11,368,330	-1.62	-2.51	-0.63	-1.59	-2.06	-1.12	-1.57
Pacific.....	31,796,869	0.81	-0.33	-1.03	-0.18	0.24	-0.11	-0.68
New England:								
Maine.....	1,124,660	-0.93	-2.03	-0.36	-1.11	-1.48	-0.64	-1.20
New Hampshire.....	920,610	-2.74	-1.23	-1.17	-1.71	-1.99	-1.96	-1.20
Vermont.....	511,456	-1.56	-2.33	0.05	-1.28	-1.95	-0.76	-1.14
Massachusetts.....	5,737,037	0.58	2.19	1.62	1.46	1.38	1.10	1.90
Rhode Island.....	947,154	-4.98	0.89	0.16	-1.31	-2.05	-2.41	0.53
Connecticut.....	3,107,576	1.92	1.69	1.29	1.63	1.81	1.60	1.49
Middle Atlantic:								
New York.....	17,557,288	1.39	1.44	3.03	1.95	1.42	2.21	2.24
New Jersey.....	7,364,158	-0.10	0.54	-0.19	0.08	0.22	-0.15	0.17
Pennsylvania.....	11,866,728	-0.96	-1.14	-0.98	-1.03	-1.05	-0.97	-1.06
East North Central:								
Ohio.....	10,797,419	-0.47	0.31	0.91	0.25	-0.08	0.22	0.61
Indiana.....	5,490,179	-0.41	-1.30	-0.15	-0.62	-0.86	-0.28	-0.73
Illinois.....	11,418,461	-0.69	0.12	-0.06	-0.21	-0.28	-0.37	0.03
Michigan.....	9,258,344	0.95	-0.36	0.82	0.47	0.29	0.88	0.23
Wisconsin.....	4,705,335	3.30	0.99	-0.30	1.33	2.14	1.50	0.34
West North Central:								
Minnesota.....	4,077,148	1.44	0.82	-0.57	0.57	1.13	0.44	0.13
Iowa.....	2,913,387	1.67	0.70	-1.20	0.39	1.18	0.23	-0.25
Missouri.....	4,917,444	1.86	0.66	1.39	1.30	1.26	1.02	1.02
North Dakota.....	652,695	1.25	3.68	0.16	1.70	2.46	0.71	1.92
South Dakota.....	690,178	3.80	0.41	0.42	1.54	2.10	2.11	0.41
Nebraska.....	1,570,006	2.42	1.79	0.94	1.72	2.10	1.68	1.37
Kansas.....	2,363,208	4.15	3.00	-0.24	2.30	3.57	1.95	1.38
South Atlantic:								
Delaware.....	595,225	-1.91	-2.44	0.46	-1.30	-2.18	-0.73	-0.99
Maryland.....	4,216,446	0.08	0.47	0.76	0.43	0.27	0.42	0.61
District of Columbia.....	637,651	4.95	11.66	10.81	9.14	8.31	7.88	11.24
Virginia.....	5,346,279	-	-0.52	0.35	-0.06	-0.26	0.18	-0.09
West Virginia.....	1,949,644	-1.02	-2.07	-2.27	-1.79	-1.55	-1.65	-2.17
North Carolina.....	5,874,429	-1.88	-0.22	-0.79	-0.96	-1.05	-1.33	-0.50
South Carolina.....	3,119,208	-2.54	-1.90	-1.02	-1.82	-2.22	-1.78	-1.46
Georgia.....	5,464,265	-3.09	-1.20	0.60	-1.23	-2.15	-1.25	-0.30
Florida.....	9,739,992	-3.42	-2.05	-2.86	-2.78	-2.74	-3.14	-2.46
East South Central:								
Kentucky.....	3,661,433	0.71	-2.85	-0.41	-0.85	-1.07	0.15	-1.63
Tennessee.....	4,590,750	-0.20	-1.30	-1.34	-0.95	-0.75	-0.77	-1.32
Alabama.....	3,890,061	0.11	0.14	-0.02	0.08	0.13	0.05	0.06
Mississippi.....	2,520,638	-1.94	1.55	1.83	0.48	-0.19	-0.06	1.69
West South Central:								
Arkansas.....	2,285,513	0.95	-1.93	-0.45	-0.48	-0.49	0.25	-1.19
Louisiana.....	4,203,972	-0.17	4.43	0.53	1.60	2.13	0.18	2.48
Oklahoma.....	3,025,266	-0.12	0.90	-1.16	-0.13	0.39	-0.64	-0.13
Texas.....	14,228,383	-0.61	0.26	-0.87	-0.41	-0.17	-0.74	-0.30
Mountain:								
Montana.....	786,690	3.56	0.17	2.41	2.05	1.86	2.99	1.29
Idaho.....	943,935	0.06	-3.79	-1.28	-1.67	-1.86	-0.61	-2.53
Wyoming.....	470,816	2.89	-1.27	-2.06	-0.15	0.81	0.42	-1.67
Colorado.....	2,888,834	-1.44	-0.89	0.74	-0.53	-1.17	-0.35	-0.07
New Mexico.....	1,299,968	4.99	0.88	0.64	2.17	2.94	2.81	0.76
Arizona.....	2,717,866	-5.10	-4.60	-1.71	-3.80	-4.85	-3.41	-3.16
Utah.....	1,461,037	-2.59	-5.67	-1.65	-3.30	-4.13	-2.12	-3.66
Nevada.....	799,184	-9.11	-2.91	-3.46	-5.16	-6.01	-6.28	-3.19
Pacific:								
Washington.....	4,130,163	-0.98	-0.70	-0.81	-0.83	-0.84	-0.89	-0.75
Oregon.....	2,632,663	-0.34	-1.88	-1.48	-1.23	-1.11	-0.91	-1.68
California.....	23,668,562	1.28	-0.09	-1.36	-0.06	0.60	-0.04	-0.72
Alaska.....	400,481	0.37	2.53	11.70	4.87	1.45	6.03	7.11
Hawaii.....	965,000	0.12	-1.61	2.15	0.22	-0.75	1.13	0.27

- Represents zero or rounds to zero.

¹Advance Reports, PHC80-V-1.

²Procedure used in published estimates, with the exception of Alaska.

Table 3. Percent Error of State Population Estimates, by Method Used in Estimates (Adjusted Pro Rata to 1980 Census U.S. Total): April 1, 1980

(CM=Component Method II, RC=Ratio Correlation method, AR=Administrative Records method)

Region, division, and State	Population April 1, 1980 (census) ¹	Component Method II	Ratio- Correlation method	Administrative Records method	Average of--			
					CM, RC, and AR ²	CM and RC	CM and AR	RC and AR
United States.....	226,504,825	--	--	--	--	--	--	--
Regions:								
Northeast.....	49,136,667	1.51	1.87	2.33	1.90	1.69	1.92	2.10
North Central.....	58,853,804	1.77	1.32	1.26	1.45	1.54	1.51	1.29
South.....	75,349,155	-2.17	-1.43	-1.68	-1.76	-1.80	-1.93	-1.55
West.....	43,165,199	-0.33	-1.43	-1.45	-1.07	-0.88	-0.89	-1.44
Northeast:								
New England.....	12,348,493	1.29	2.44	2.27	2.00	1.86	1.78	2.35
Middle Atlantic.....	36,788,174	1.58	1.68	2.35	1.87	1.63	1.97	2.02
North Central:								
East North Central.....	41,669,738	1.28	1.03	1.41	1.24	1.16	1.35	1.22
West North Central.....	17,184,066	2.95	2.02	0.89	1.95	2.48	1.92	1.45
South:								
South Atlantic.....	36,943,139	-2.63	-1.63	-1.41	-1.89	-2.13	-2.02	-1.52
East South Central.....	14,662,882	-1.48	-2.13	-1.51	-1.71	-1.81	-1.50	-1.82
West South Central.....	23,743,134	-1.89	-0.68	-2.20	-1.59	-1.29	-2.05	-1.44
West:								
Mountain.....	11,368,330	-2.09	-3.01	-1.08	-2.06	-2.55	-1.59	-2.05
Pacific.....	31,796,869	0.30	-0.87	-1.57	-0.71	-0.28	-0.64	-1.22
New England:								
Maine.....	1,124,660	-0.09	-1.22	0.48	-0.28	-0.66	0.19	-0.37
New Hampshire.....	920,610	-1.98	-0.44	-0.38	-0.93	-1.21	-1.18	-0.41
Vermont.....	511,456	-0.78	-1.56	0.87	-0.49	-1.17	0.05	-0.34
Massachusetts.....	5,737,037	2.01	3.65	3.07	2.91	2.83	2.54	3.36
Rhode Island.....	947,154	-4.10	1.89	1.15	-0.35	-1.11	-1.48	1.52
Connecticut.....	3,107,576	3.43	3.20	2.78	3.14	3.31	3.11	2.99
Middle Atlantic:								
New York.....	17,557,288	2.05	2.10	3.73	2.63	2.07	2.89	2.91
New Jersey.....	7,364,158	1.39	2.05	1.30	1.58	1.72	1.34	1.67
Pennsylvania.....	11,866,728	1.00	0.81	0.98	0.93	0.91	0.99	0.90
East North Central:								
Ohio.....	10,797,419	0.70	1.50	2.12	1.44	1.10	1.41	1.81
Indiana.....	5,490,179	0.49	-0.41	0.76	0.28	0.04	0.63	0.18
Illinois.....	11,418,461	-0.14	0.69	0.50	0.35	0.27	0.18	0.59
Michigan.....	9,258,344	2.20	0.86	2.07	1.71	1.53	2.13	1.46
Wisconsin.....	4,705,335	5.16	2.81	1.49	3.15	3.98	3.33	2.15
West North Central:								
Minnesota.....	4,077,148	3.29	2.65	1.24	2.39	2.97	2.26	1.94
Iowa.....	2,913,387	2.98	1.99	0.05	1.67	2.48	1.51	1.02
Missouri.....	4,917,444	1.57	0.34	1.09	1.00	0.96	1.33	0.71
North Dakota.....	652,695	2.01	4.48	0.89	2.46	3.24	1.45	2.69
South Dakota.....	690,178	4.85	1.39	1.40	2.54	3.12	3.12	1.39
Nebraska.....	1,570,006	3.29	2.65	1.78	2.57	2.97	2.53	2.21
Kansas.....	2,363,208	4.70	3.52	0.21	2.81	4.11	2.46	1.87
South Atlantic:								
Delaware.....	595,225	-0.94	-1.48	1.48	-0.31	-1.21	0.27	--
Maryland.....	4,216,446	0.74	1.15	1.44	1.11	0.95	1.09	1.29
District of Columbia.....	637,651	-0.89	5.96	5.09	3.38	2.53	2.10	5.52
Virginia.....	5,346,279	0.05	-0.49	0.40	-0.02	-0.22	0.22	-0.05
West Virginia.....	1,949,644	-1.05	-2.11	-2.32	-1.83	-1.58	-1.69	-2.22
North Carolina.....	5,874,429	-2.68	-0.99	-1.56	-1.75	-1.84	-2.17	-1.28
South Carolina.....	3,119,208	-4.23	-3.58	-2.68	-3.50	-3.90	-3.46	-3.13
Georgia.....	5,464,265	-4.88	-2.95	-1.11	-2.98	-3.91	-3.00	-2.03
Florida.....	9,739,992	-4.29	-2.90	-3.72	-3.63	-3.59	-4.00	-3.31
East South Central:								
Kentucky.....	3,661,433	-0.36	-4.00	-1.51	-1.96	-2.18	-0.93	-2.76
Tennessee.....	4,590,750	-1.27	-2.39	-2.44	-2.03	-1.83	-1.85	-2.42
Alabama.....	3,890,061	-1.04	-1.01	-1.17	-1.07	-1.03	-1.11	-1.09
Mississippi.....	2,520,638	-4.20	-0.63	-0.35	-1.73	-2.41	-2.27	-0.49
West South Central:								
Arkansas.....	2,285,513	-0.52	-3.46	-1.95	-1.97	-1.99	-1.23	-2.70
Louisiana.....	4,203,972	-2.35	2.35	-1.63	-0.55	--	-1.99	0.36
Oklahoma.....	3,025,266	-0.99	0.05	-2.05	-1.00	-0.47	-1.52	-1.00
Texas.....	14,228,383	-2.17	-1.28	-2.44	-1.96	-1.73	-2.30	-1.86
Mountain:								
Montana.....	786,690	3.35	-0.12	2.17	1.80	1.62	2.76	1.03
Idaho.....	943,935	0.07	-3.86	-1.30	-1.69	-1.89	-0.61	-2.58
Wyoming.....	470,816	2.81	-1.45	-2.25	-0.30	0.68	0.28	-1.85
Colorado.....	2,888,834	-1.42	-0.85	0.81	-0.49	-1.14	-0.30	-0.02
New Mexico.....	1,299,968	2.94	-1.26	-1.51	0.05	0.84	0.71	-1.39
Arizona.....	2,717,866	-6.07	-5.56	-2.62	-4.75	-5.82	-4.35	-4.09
Utah.....	1,461,037	-1.67	-4.81	-0.71	-2.40	-3.24	-1.19	-2.76
Nevada.....	799,184	-10.74	-4.41	-4.96	-6.70	-7.57	-7.85	-4.69
Pacific:								
Washington.....	4,130,163	-0.99	-0.71	-0.82	-0.84	-0.85	-0.91	-0.77
Oregon.....	2,632,663	-0.15	-1.72	-1.31	-1.06	-0.94	-0.73	-1.52
California.....	23,668,562	0.71	-0.70	-1.99	-0.66	0.01	-0.64	-1.34
Alaska.....	400,481	-2.60	-0.39	8.97	2.00	-1.49	3.19	4.29
Hawaii.....	965,000	-1.83	-3.60	0.24	-1.73	-2.71	-0.79	-1.68

-- Represents zero or rounds to zero.

¹Advance Reports, PHC80-V-1.

²Procedure used in published estimates, with the exception of Alaska.

Table 4. Comparison of State Population Estimates for April 1, 1980 With 1980 Census

(Average of Component Method II, Ratio-Correlation method, and Administrative Records method)

Region, division, and State	Population April 1, 1980 (census) ¹	Estimated population, April 1, 1980			Difference, estimate from census		
		Unadjusted	Undercount adjustment	Pro rata adjustment	Unadjusted	Undercount adjustment	Pro rata adjustment
United States.....	226,504,825	221,783,138	226,372,057	226,504,824	-4,721,776	-132,773	-
Regions:							
Northeast.....	49,136,667	49,027,462	49,451,749	50,071,262	-109,206	315,081	934,595
North Central.....	58,853,804	58,462,323	59,129,694	59,706,901	-391,570	275,888	853,099
South.....	75,349,155	72,479,885	74,863,916	74,022,981	-2,869,270	-485,241	-1,326,166
West.....	43,165,199	41,813,468	42,926,698	42,703,680	-1,351,730	-238,501	-461,519
Northeast:							
New England.....	12,348,493	12,332,720	12,435,959	12,595,285	-15,774	87,465	246,792
Middle Atlantic.....	36,788,174	36,694,742	37,015,790	37,475,977	-93,432	227,616	687,803
North Central:							
East North Central.....	41,669,738	41,307,584	41,744,037	42,187,025	-362,154	74,299	517,289
West North Central.....	17,184,066	17,154,739	17,385,657	17,519,876	-29,416	201,589	335,810
South:							
South Atlantic.....	36,943,139	35,489,234	36,522,768	36,244,796	-1,453,905	-420,371	-698,336
East South Central.....	14,662,882	14,112,157	14,603,367	14,412,607	-550,725	-59,517	-250,275
West South Central.....	23,743,134	22,878,494	23,737,781	23,365,578	-864,640	-5,353	-377,555
West:							
Mountain.....	11,368,330	10,901,888	11,188,027	11,133,990	-466,441	-180,303	-234,340
Pacific.....	31,796,869	30,911,580	31,738,671	31,569,690	-885,289	-58,198	-227,179
New England:							
Maine.....	1,124,660	1,098,163	1,112,222	1,121,543	-26,497	-12,438	-3,117
New Hampshire.....	920,610	893,000	904,825	912,012	-27,610	-15,787	-8,598
Vermont.....	511,456	498,350	504,895	508,960	-13,106	-6,561	-2,496
Massachusetts.....	5,737,037	5,780,810	5,820,932	5,903,884	43,773	83,896	166,847
Rhode Island.....	947,154	924,130	934,753	943,805	-23,025	-12,401	-3,349
Connecticut.....	3,107,576	3,138,267	3,158,332	3,205,081	30,691	50,756	97,505
Middle Atlantic:							
New York.....	17,557,288	17,642,714	17,900,521	18,018,330	85,426	343,233	461,042
New Jersey.....	7,364,158	7,324,462	7,370,210	7,480,400	-39,696	6,052	116,242
Pennsylvania.....	11,866,728	11,727,566	11,745,059	11,977,247	-139,162	-121,669	110,519
East North Central:							
Ohio.....	10,797,419	10,724,625	10,824,129	10,952,954	-72,794	26,710	155,535
Indiana.....	5,490,179	5,390,869	5,455,990	5,505,641	-99,310	-34,189	15,462
Illinois.....	11,418,461	11,219,320	11,394,555	11,458,178	-199,141	-23,906	39,719
Michigan.....	9,258,344	9,220,262	9,301,517	9,416,563	-38,082	43,173	158,219
Wisconsin.....	4,705,335	4,752,508	4,767,846	4,853,689	47,173	62,511	148,354
West North Central:							
Minnesota.....	4,077,148	4,087,639	4,100,229	4,174,666	10,491	23,081	97,518
Iowa.....	2,913,387	2,900,324	2,924,716	2,962,073	-13,063	11,329	48,686
Missouri.....	4,917,444	4,863,188	4,981,536	4,966,635	-54,345	64,090	49,191
North Dakota.....	652,695	654,814	663,772	668,755	2,119	11,077	16,060
South Dakota.....	690,178	692,982	700,824	707,736	2,804	10,646	17,558
Nebraska.....	1,570,006	1,576,819	1,596,955	1,610,389	6,813	26,949	40,383
Kansas.....	2,363,208	2,378,973	2,417,625	2,429,622	15,765	54,417	66,414
South Atlantic:							
Delaware.....	595,225	580,992	587,501	593,361	-14,233	-7,724	-1,864
Maryland.....	4,216,446	4,174,421	4,234,763	4,263,295	-42,025	18,317	46,849
District of Columbia.....	637,651	645,484	695,942	659,227	7,833	58,291	21,576
Virginia.....	5,346,279	5,233,989	5,343,170	5,345,421	-112,290	-3,109	-858
West Virginia.....	1,949,644	1,874,104	1,914,787	1,914,004	-75,540	-34,857	-35,640
North Carolina.....	5,874,429	5,651,587	5,817,808	5,771,910	-222,842	-56,621	-102,519
South Carolina.....	3,119,208	2,947,408	3,062,358	3,010,158	-171,800	-56,850	-109,050
Georgia.....	5,464,265	5,190,939	5,396,973	5,301,454	-273,326	-67,292	-162,811
Florida.....	9,739,992	9,190,310	9,469,466	9,385,966	-549,682	-270,526	-354,019
East South Central:							
Kentucky.....	3,661,433	3,514,939	3,630,313	3,589,773	-146,494	-31,120	-71,660
Tennessee.....	4,590,750	4,403,699	4,547,201	4,497,454	-187,051	-43,551	-93,296
Alabama.....	3,890,061	3,768,035	3,893,091	3,848,257	-122,026	3,030	-41,804
Mississippi.....	2,520,638	2,425,484	2,532,762	2,477,123	-95,154	12,124	-43,515
West South Central:							
Arkansas.....	2,285,513	2,193,681	2,274,577	2,240,385	-91,832	-10,936	-45,128
Louisiana.....	4,203,972	4,093,849	4,271,037	4,181,007	-110,123	67,065	-22,965
Oklahoma.....	3,025,266	2,932,713	3,021,438	2,995,151	-92,553	-3,828	-30,115
Texas.....	14,228,383	13,658,251	14,170,729	13,949,035	-570,132	-57,654	-279,347
Mountain:							
Montana.....	786,690	784,172	802,786	800,867	-2,518	16,096	14,177
Idaho.....	943,935	908,614	928,178	927,958	-35,321	-15,757	-15,977
Wyoming.....	470,816	459,623	470,127	469,408	-11,193	-689	-1,408
Colorado.....	2,888,834	2,814,858	2,873,523	2,874,787	-73,975	-15,311	-14,047
New Mexico.....	1,299,968	1,273,543	1,328,197	1,300,657	-26,425	28,229	689
Arizona.....	2,717,866	2,534,751	2,614,515	2,588,716	-183,115	-103,351	-129,150
Utah.....	1,461,037	1,396,262	1,412,762	1,425,989	-64,775	-48,275	-35,048
Nevada.....	799,184	730,065	737,939	745,608	-69,119	-41,245	-53,576
Pacific:							
Washington.....	4,130,163	4,010,035	4,095,984	4,095,409	-120,128	-34,179	-34,754
Oregon.....	2,632,663	2,550,441	2,600,208	2,604,740	-82,222	-32,455	-27,923
California.....	23,668,562	23,022,580	23,655,405	23,512,733	-645,982	-13,157	-155,829
Alaska.....	400,481	399,958	419,967	408,473	-523	19,486	7,992
Hawaii.....	965,000	928,566	967,107	948,335	-36,434	2,107	-16,665

- Represents zero or rounds to zero.

¹Advance Reports, PHC80-V-1.

* U.S. GOVERNMENT PRINTING OFFICE: 1983-380-998:550