



Population Estimates and Projections

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Comparison of Current Trends With the 1977 Population Projections of the United States

The Census Bureau revises population projections only as needed, usually every 2 or 3 years. Although the most recent set of Census Bureau projections of the U.S. population (Current Population Reports, Series P-25, No. 704) was produced over 3 years ago, revision is not yet necessary. Trends in fertility, mortality, and migration since the July 1, 1976, base date of these projections have been similar to the short-range changes projected in the middle series (Series II). More importantly, no subsequent information makes a convincing case for changing the long-range assumptions. Revised projections can thus await the results of the 1980 census. In the meantime, this report provides some guidance to the continued use of the 1977 national projections for both the short and long run.

TOTAL POPULATION

Series I, II, and III differ only in the assumed ultimate levels of completed cohort fertility (average number of lifetime births per woman): Series I—2.7, Series II—2.1, Series III—1.7. All three are within 0.6 percent of the July 1, 1979, population of 220,584,000 (table A). Series II yields the best fit as it is just 0.2 percent (352,000 people) below the July 1, 1979, population. Series I is 0.4 percent (911,000 people) too high, while Series III is 0.6 percent (1,263,000 people) below the July 1, 1979, population.

The primary reason for the small percentage differences between any of the projection series and the July 1, 1979, population is the sheer size of the U.S. population relative to

Table A. Comparison of the Projections of the Components of Change With Current Estimates: July 1, 1976 to July 1, 1979

(Numbers in thousands. Includes Armed Forces overseas)

Subject	Population July 1, 1979	Population July 1, 1976	Population change, 1976 to 1979			
			Net change	Births	Deaths	Immigration
Projections:						
Series I.....	221,495	215,118	6,376	11,148	5,971	1,200
Series II.....	220,232	215,118	5,114	9,867	5,953	1,200
Series III.....	219,321	215,118	4,202	8,942	5,939	1,200
Estimate.....	220,584	215,152	¹ 5,432	9,960	5,715	1,196
Difference (projection minus estimate):						
Series I.....	911	-34	¹ 944	1,188	256	4
Series II.....	-352	-34	¹ -318	-93	238	4
Series III.....	-1,263	-34	¹ -1,230	-1,018	224	4
Percent difference:						
Series I.....	0.41	-0.02	17.38	11.93	4.48	0.33
Series II.....	-0.16	-0.02	-5.85	-0.93	4.16	0.33
Series III.....	-0.57	-0.02	-22.64	-10.22	3.92	0.33

¹Net change is slightly different from the net result of births, deaths, and immigration because of an allowance for estimates of overseas admission into, and discharge from, the Armed Forces.

Source: Current Population Reports, Series P-25, No. 704; No. 870.

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any reasonable changes in it over a 3-year period. Average annual growth rates, controlling for this inherent stabilizing effect of population size, show more variation (figure 1). Although slightly low, the projected growth rates from Series II best fit the growth rates of the mid-1976 to mid-1979 period. For the immediate future, the Series II rates are more likely to correspond with actual rates than are those from Series I or III. Beyond 1980, all three series project positive growth rates for at least 40 more years, even though Series II and III both imply period total fertility rates that are below replacement level for much of that time. Analysis of the components of this growth shows it to be primarily due to the youthful age structure of the population and to the assumed annual net civilian immigration of 400,000 persons.

COMPONENTS OF CHANGE IN THE TOTAL POPULATION

The differing impacts of births, deaths, and net immigration on population change for the mid-1976 to mid-1979 period are also shown in table A. Since Series II provides the best fit with the total change in the population, and the three series differ only in their fertility assumption, it is clear that the number of births projected in Series II must fit best with the reported number of births. In fact, the projected number of births is only 93,000, or 0.9 percent too low. In Series I, on the other hand, the projected number of births was too high by 11.9 percent (1,188,000 births). Conversely, the number of births projected in series III was too low by 10.2 percent (1,018,000 births). All three series projected 3.9 to 4.5 percent (224,000 to 256,000) too many deaths, and all were 0.3 percent (4,000 people) higher than the reported amount of net civilian immigration. The overall effect of these errors in the components of population change is that Series II projected a total population growth that was 5.9 percent (318,000) below the population growth of 5,432,000 between mid-1976 and mid-1979. Much less accurate were Series I (17.4 percent, or 944,000 too high) and Series III (too low by 22.6 percent or 1,230,000).

BIRTHS

Between 1976 and the late-1980's, Series I and Series II projected an annual increase in births, while Series III projected a decline until 1979 and then an increase until the mid-1980's (figure 2). The reported number of births did increase steadily between mid-1976 and mid-1979, totaling 9,960,000 for the period. The projected number of births for the same period was 11,148,000 (11.9 percent too high) in Series I; 9,867,000 (0.9 percent too low) in Series II; and 8,942,000 (10.2 percent too low) in Series III. Although the number of births in Series II was slightly below the reported number for the 3-year period, the projected number of births in Series II from mid-1978 to mid-1979 (3,412,000) were above the reported number (3,382,000). For the immediate future, the reported number of births is more apt to be closer to the number projected by Series II than to the number projected in either Series I or III.

One measure of the level of fertility in the population is the total fertility rate (figure 3). This indicates the number of children that women would have in their lifetime if, at each year of age, they experienced the age-specific birth rates occurring in a specified year. Total fertility rates (TFR's) in the mid-1970's were less than half what they were in the early 1960's. All three series of projected TFR's are assumed to remain significantly below their projected ultimate levels until the early to mid-1980's.¹ In the case of Series I, this is true mostly because of the time assumed necessary to move from mid-1970's TFR's (approximating 1.8) to the ultimate TFR level of 2.7. While this is true for Series II (ultimate TFR equals 2.1) and for Series III (1.7), an additional reason in Series II and III is the assumption that the TFR would continue to decline for several years after 1975 before moving toward its ultimate level.

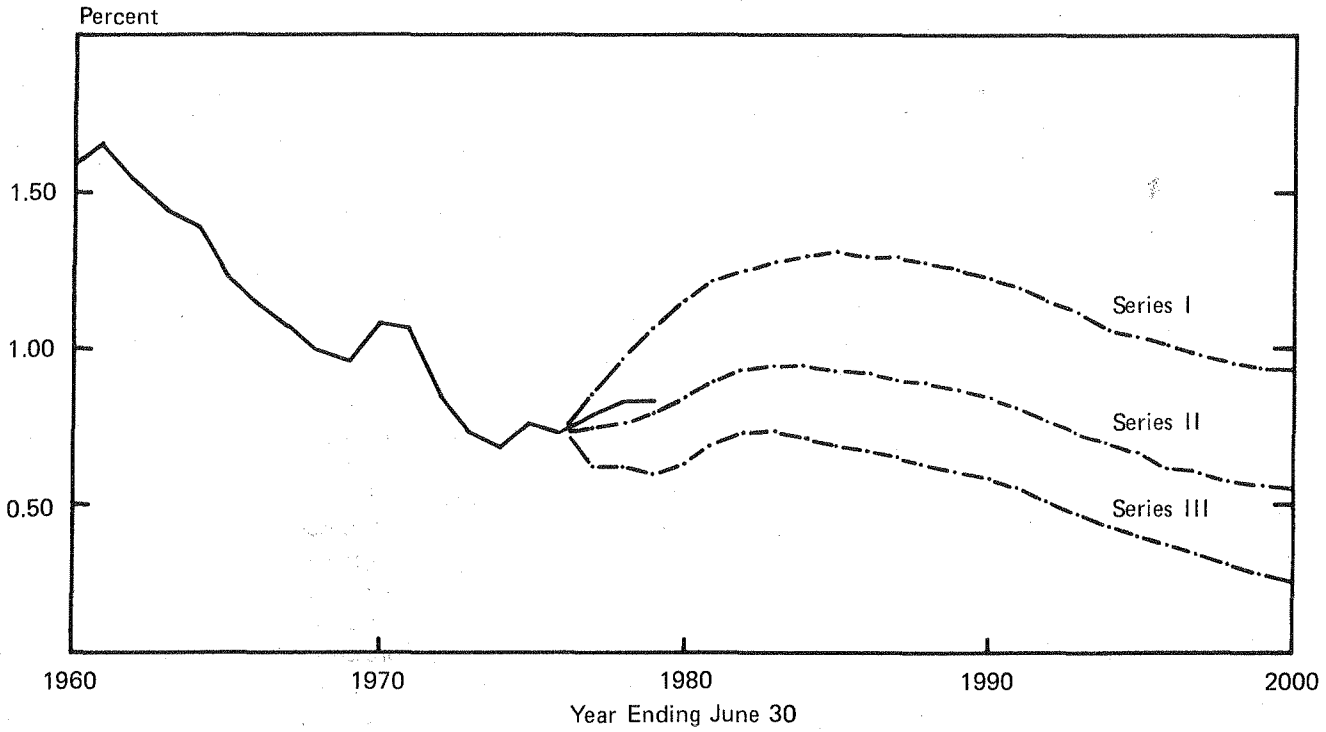
Although somewhat low for the 1975-78 period (the most recent year for which a reported TFR is available), the Series II projections of the TFR have shown the best fit with reported TFR's. The TFR in 1978 was 1.77 as was the projected Series II TFR. Because the total births in 1979 are close to the number projected in Series II, it is likely that the TFR in 1979 was also close to that projected in Series II. For the immediate future, it appears that total fertility rates will be closer to those projected in Series II than to those projected in either of the other series. Naturally, the trends in fertility in the last few years do not determine which series will provide the best fit with the reported TFR's in the long run.

Since the number of women aged 18 to 34 years is projected to rise from 32.1 million in 1979 to 33.9 million in 1985, increases in the number of births will occur unless the total fertility rate declines even further. On the other hand, from 1985 to 2000 the number of women 18 to 34 will decrease as the aging baby boom cohorts are replaced by the smaller cohorts born during the 1960's and 1970's. During this period, total births will decline if the total fertility rate does not rise. In fact, all three projection series show a decline in births during the 1990's (figure 2).

Another important factor in determining fertility—the timing pattern—is undergoing a change. The percentage of births to women 25 years and over increased from 46.2 in 1975 to 49.2 in 1978. This shift in pattern to later births has been so rapid that recent mean ages at childbearing do not fall within the range produced by the three series of projections. All three series assumed that the mean age at childbearing would move from an estimated 1975 level of 25.66 towards an ultimate mean age of childbearing of 26.0 in the mid-1990's. The reported 1978 mean age at childbearing was 25.91. All of the projection series were too low: Series I—25.62, Series II—25.68, Series III—25.69. In fact, none of the projection series reach the reported 1978 mean age at childbearing until 1986 (Series III), and Series II does not reach it until 1990. One reason for these errors is that the series were already in error by 0.1 in their base year. The base year estimated mean age at childbearing was 25.66, but

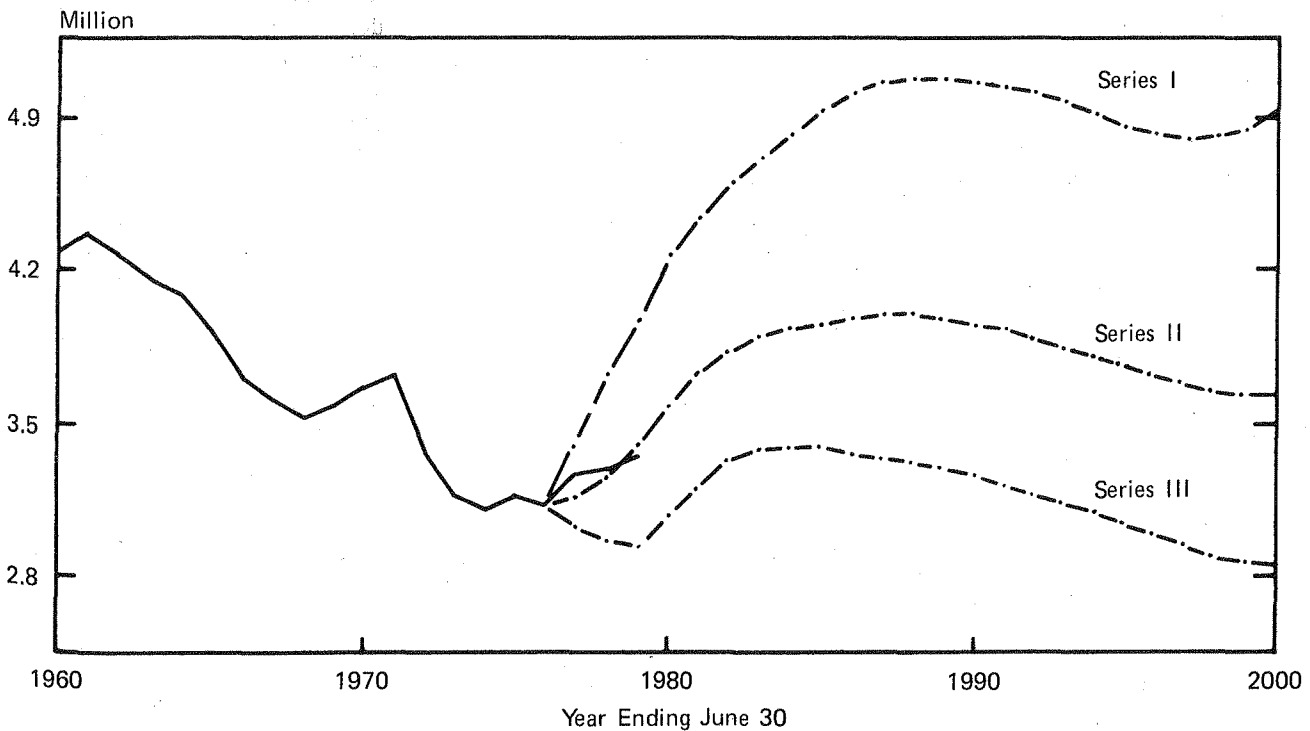
¹U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 704, appendix table A-5.

FIGURE 1.
Estimates and Projections of Average Annual Percent Change
in Total Population: 1960 to 2000



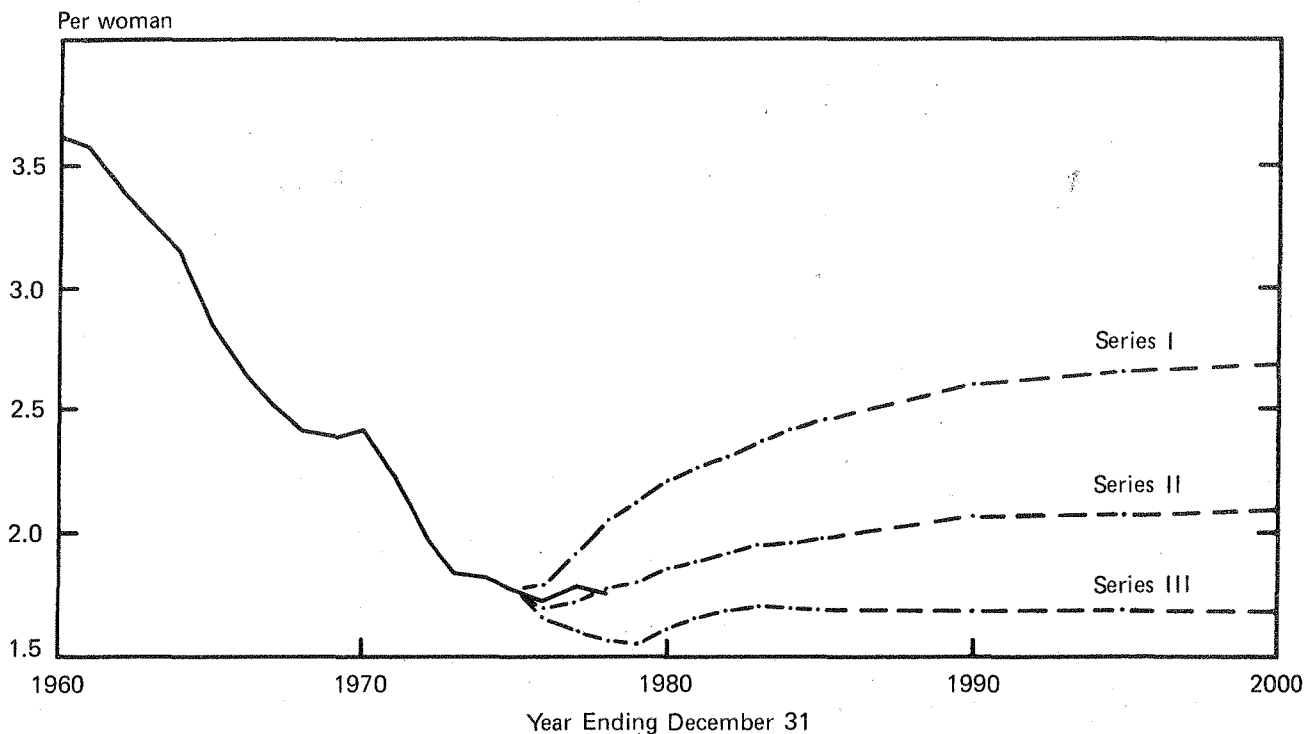
Source: Current Population Reports, Series P-25, No.704; No. 870.

FIGURE 2.
Estimates and Projections of Annual Number of Births: 1960 to 2000



Source: Current Population Reports, Series P-25, No. 704; No. 870.

FIGURE 3.
Estimates and Projections of Annual Total Fertility Rate: 1960 to 2000



Source: 1960 to 1973 from: Robert L. Heuser, *Fertility Tables for Birth Cohorts by Color: United States, 1917-73*.
1974 to 1978 from: Unpublished tabulations of the National Center for Health Statistics.

the reported level was 25.75. Even making allowances for this, it is still true that the mean age at childbearing is rising faster than was projected. The absolute effect of this change is not very large at present, but it does imply an increase in the mean length of generation. It also suggests that a contributing factor to the current low TFR's is a rise in the usual ages of childbearing.

DEATHS

A single set of mortality projections, assuming a slow and steady reduction in future mortality, is used in these population projections. Because the three series contain identical assumptions about the course of future mortality, the total numbers of deaths (table A) differ only because of differences in the size and age distribution of future populations.

It is obvious that mortality declined more than was anticipated between mid-1976 and mid-1979. All three projection series projected too many deaths. While the three series projected between 5,939,000 (Series III) and 5,971,000 deaths (Series I), only 5,715,000 deaths were reported in this period. The rapid improvement in mortality conditions is shown more precisely in table B, where, for each sex, a comparison is made of the estimated and projected changes in life expectancy at birth and at age 65.

The estimated and projected 1976 base year life expectancies are different because those in the projection

series were derived from 1974 mortality data and a population adjusted for census undercount. Naturally, because the estimated and projected life expectancies differ in the base year, they would also differ in 1979. However, the projected and estimated 1979 life expectancies differ for two additional reasons.

First, since 1974 the tempo of mortality reduction has been more rapid than was anticipated. In the projections, the assumption was that slow and steady reductions in mortality would continue. The pace of the past trends is indicated by the average annual improvement, from 1951 to 1973, of 0.4 percent in male central death rates and 1.1 percent in female central death rates. From 1974 to 1977, however, male mortality fell an average of 2.4 percent each year while female mortality declined 2.9 percent each year. These rapid improvements in mortality are primarily due to two groups of causes of death: diseases of the heart and vascular diseases. Together, these causes are responsible for about 73 percent of the decline in the overall death rate between 1974 and 1977.²

Second, the assumption in the projections was that the gap in life expectancy between the sexes would continue to increase (table B). This clearly has not occurred at age 65. Male life expectancy at birth is also increasing slightly more

²These statistics were derived from unpublished data from the Office of the Actuary, Social Security Administration.

rapidly than is female life expectancy, even though the absolute gap did widen. Although this table refers only to a 3-year period, still this goes against the long-term historical increase in the life expectancy gap between males and females. Nevertheless, these inaccuracies in the mortality projections are small and have not greatly affected the projected population change, except for the population over age 75.

International Migration

All three projection series assume net civilian immigration to be 400,000 per year. In most recent years, the reported amount of net immigration has seldom been 400,000 for any given year, although the overall amount in the last 3 years has been close to an average of 400,000 (table A). Between July 1, 1976, and June 30, 1979, the only fiscal year (July-June) in which net immigration exceeded 400,000 was 1978. The net immigration of 487,000 in this year resulted in part from the court decision (*Silva vs. Levi*) which permitted a great many nonimmigrant aliens to adjust their status to that of permanent resident alien (immigrant). Of all the components of change, net migration is the most easily influenced by legal or political decisions. The level also varies because of unpredictable factors such as refugee movements and changes in the net flow of Puerto Ricans. For example, it now appears

that net immigration in fiscal year 1980 will be considerably higher than projected as a result of large refugee inflows from Indochina and Cuba. The 400,000 estimate assumes a constant outmigration of 36,000 per year, but this doubtless is quite variable also and may be underestimated.³ Finally, the projections assume that there is no net inflow of illegal aliens. Although this assumption is undoubtedly not realistic, no reliable estimates are available to permit either the establishment of a more realistic assumption or an evaluation of the differences between projected and reported values.

PROJECTIONS BY AGE

Only among the very young (under 5 years) and the old (65 years and older) is the projected July 1, 1979, population more than 0.1 percent different from the July 1, 1979, population estimates. The Series II projected population under age 5 was 0.2 percent too low, primarily because too few births were projected in Series II between 1976 and 1979. Nevertheless, the Series II projection of the population under 5 years is much closer to the 1979 figure than were either Series I (7.9 percent too high) or Series III (6.0 percent too low).

³ Robert Warren and Jennifer Peck. "Foreign Born Emigration from the United States: 1960-1970." *Demography*, Vol. 17, No. 1 (February 1980).

Table B. Comparison of Estimated and Projected Life Expectancies

Life expectancy	1976		1979		Percent change, 1976 to 1979	
	Male	Female	Male	Female	Male	Female
ESTIMATED						
e_0	69.00	76.65	69.94	77.68	1.36	1.34
e_{65}	13.73	18.03	14.37	18.61	4.66	3.22
PROJECTED						
e_0	69.09	76.96	69.20	77.12	0.16	0.21
e_{65}	13.80	18.36	13.84	18.45	0.29	0.49

Source:

1976 Estimated--National Center for Health Statistics, Monthly Vital Statistics Report, Advance Report. Final Mortality Statistics, 1976.

1979 Estimated--Final mortality statistics by age and by sex from: National Center for Health Statistics, Monthly Vital Statistics Report, Advance Report. Final Mortality Statistics, 1977.

Provisional mortality statistics by age and by sex from: National Center for Health Statistics, Monthly Vital Statistics Report, Provisional Statistics. Annual Summary for the United States, 1978.

Provisional mortality statistics by age and by sex from: National Center for Health Statistics, Monthly Vital Statistics Report, Provisional Statistics. Births, Marriages, Divorces, and Deaths for January 1980.

Bureau of the Census, Current Population Reports, Series P-25, No. 870, "Estimates of the Population of the United States, by Age, Race, and Sex: 1976 to 1979."

1976 and 1979 Projected--Derived from Current Population Reports, Series P-25, No. 704.

All three projection series have identical projections of the population over age 5 in 1979 since they only differ in their fertility assumptions. Aside from the 18 to 24 age group, where the projections overstate the population by 0.1 percent, the projection series understate the actual population of each age group under 65 years by a maximum of 0.1 percent. The understatements are primarily because mortality conditions improved more than was assumed in the projection series. These improvements in mortality caused more serious discrepancies at older ages: understating the population aged 65 years and over by 0.9 percent and the population aged 75 years and over by 1.8 percent.

PROJECTIONS BY RACE

The differences in the accuracy of the projections for the White and Black population are striking (table C). In every component, and overall, Series II is the best series to use for

the White population. In nearly every case also, the differences between the reported and projected (under Series II) components of change are much less for the White population than they are for the total population (table B). For example, the projected number of White births in Series II are 0.4 percent above the actual number. In the total population, conversely, this series projected 0.9 percent too few births. Finally, the Series II projection of the total White population on July 1, 1979, was too low by only 0.1 percent, as compared to the case for the total population in which Series II was too low by 0.2 percent (table B).

The growth of the Black population does not fit with Series II nearly as well since the number of births projected in Series II were much below (7.2 percent) the reported number of Black births in the 1976-79 period. This poor fit of the Series II fertility projection with reported Black fertility is partly a result of an assumption that Black and White fertility levels would rapidly move toward convergence. For example, by 1978 the Black TFR was projected to be

Table C. Comparison by Race of the Projections of Total Population Components of Change With Current Estimates: July 1, 1976 to July 1, 1979

(Numbers in thousands. Includes Armed Forces overseas)

Subject	Population July 1, 1979	Population July 1, 1976	Population change, 1976 to 1979			
			Net change	Births	Deaths	Immigration
WHITE						
Projections:						
Series I.....	191,249	186,603	4,646	9,155	5,218	711
Series II.....	190,194	186,603	3,591	8,084	5,204	711
Series III.....	189,407	186,603	2,805	7,287	5,192	711
Estimate.....	190,329	186,622	13,707	8,054	5,011	672
Percent difference (difference divided by estimate):						
Series I.....	0.48	-0.01	25.33	13.67	4.13	5.80
Series II.....	-0.07	-0.01	-3.13	0.37	3.85	5.80
Series III.....	-0.48	-0.01	-24.33	-9.52	3.61	5.80
BLACK						
Projections:						
Series I.....	25,995	24,841	1,154	1,708	688	135
Series II.....	25,808	24,841	967	1,516	684	135
Series III.....	25,702	24,841	861	1,409	681	135
Estimate.....	25,969	24,845	1,124	1,634	658	149
Percent difference (difference divided by estimate):						
Series I.....	0.10	-0.02	2.67	4.63	4.56	-9.40
Series II.....	-0.62	-0.02	-13.97	-7.22	3.95	-9.40
Series III.....	-1.03	-0.02	-23.40	-13.77	3.50	-9.40

¹Includes estimates of overseas admission into and discharge from the Armed Forces.

Source: Current Population Reports, Series P-25, No. 704; No. 870.

19.1 percent above the White TFR (Series P-25, No. 704, tables A-6 and A-7). The difference was actually 30.3 percent.⁴ It is obvious that the assumed degree of convergence did not occur. In fact, at least through 1978, estimates derived from National Center for Health Statistics data seem to indicate that no convergence whatsoever is occurring. This is a source of concern for the more long-term projections since, by 1985, the Black and White total fertility rates are projected to be within 6 percent of one another (Series P-25, No. 704, tables A-6 and A-7). Such a close relationship by 1985 no longer seems likely.

Given the unforeseen high level of Black fertility between 1976 and 1979, it is no surprise that Series I did better than Series II in projecting the Black population (table C). In fact, the Series I projection of the July 1, 1979, Black population was too high by only 0.1 percent. This should not be interpreted as implying that future Black fertility will follow

⁴ Estimate derived from unpublished tabulations of the National Center for Health Statistics.

Series I, since Black fertility has been relatively constant for the past 4 years, while Series I projected a slight initial decline and then a sharp increase through the late 1980's.

SUMMARY

In the 3 years since the last national population projections (Series P-25, No. 704) were done, fertility and immigration trends have closely matched the middle series of projections (Series II). Mortality, however, has been substantially lower than projected. For the near future, Series II will prove the best of the three series for projecting the total population and its age distribution. This is especially true for the White population under age 75. For the population over 75 years and for racial minorities, the projections should be used with more caution.

The first 3 years of trends tell little about the distant future. By the year 2000, the population totals or fertility levels of any of the three series are still possible, although the exact age structure projected in Series I and III is no longer obtainable.