

## Population Trends and Problems

### Part I: Fertility In Perspective

The largest number of births in the United States during any one year was 4,332,000 in 1957. Thereafter, the number of babies born annually decreased at an average compound rate of about 2.0 percent, to 3,137,000 during 1973. The number of births changed little during 1974, 1975, and 1976.

A reliable estimate of births during 1977 is not yet available, but projections of data through September 30 indicate that the number of births last year was about 3.3 million. That would be the first substantial increase since 1970 and the largest number of births since 1971. Some commentators and analysts no doubt will interpret this development as a sign that the decline in births and fertility in the United States that began 20 years ago has ended. Although this later *may* prove to be the case, this conclusion is not warranted on the basis of data for one or a few years. Births and fertility rates increased during 1969 and 1970, but subsequently resumed their downward trends. Many population analysts made premature assertions about the reversal of trends at that time.

In this report, we describe various measures of fertility and examine changes in them from a long-term perspective. In the second part of this article we shall assess some of the important implications of recent population developments. Population changes in the past 35 years or so have had and will continue to have major economic effects.

#### *Births in the United States*

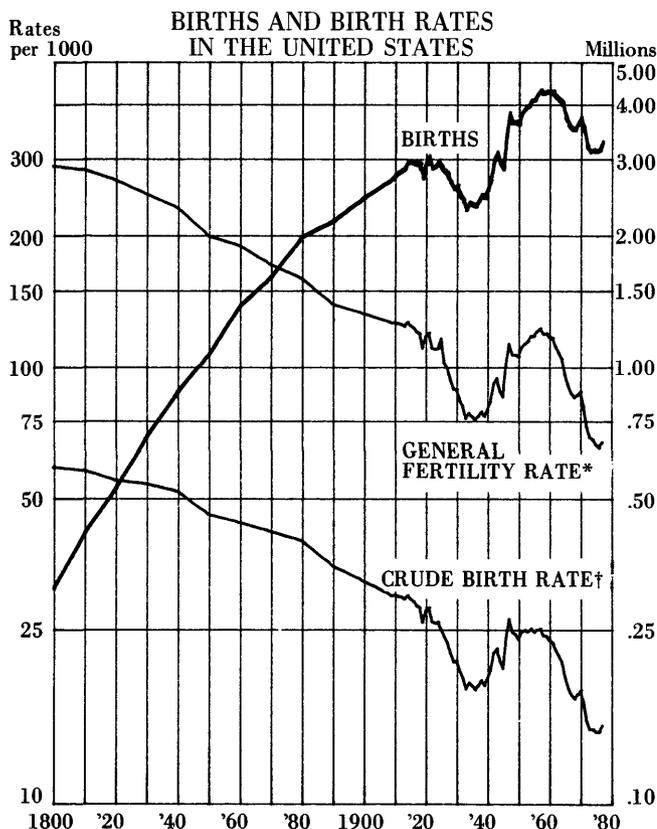
Chart 1 shows the number of births in the United States since 1800, the birth rate per 1,000 population (the crude birth rate), and the birth rate per 1,000 women of childbearing age (the general fertility rate). The chart shows that the absolute number of births increased continuously and rapidly from 1800 to 1915.\* A relatively high rate of natural increase (births minus deaths) augmented by immigration resulted in a rapidly growing population. This population growth produced an increasing number of births, in spite of downward trends in the birth and fertility *rates* throughout the period.

During the 1920's and early 1930's, births and birth rates decreased markedly. Between 1933 and 1939 the crude birth rate and the general fertility rate changed little, while the number of births increased moderately. After 1940, both the general fertility rate and the crude birth rate increased markedly. By 1957 the general fertility rate was nearly equal to its pre-World War I level, and the number of

births reached the 4,332,000 record noted at the beginning of this report. During the 1960's and 1970's to date, the number of births decreased markedly, and the crude birth rate and the general fertility rate plunged to the lowest levels in the Nation's history.

The capricious fluctuations in the number of births during this century have ruined most attempts to project the future population for as little as 10 years into the future. As Chart 1 reveals, the fluctuations in births since 1920 have been unprecedented (fluctuations of the magnitude that have occurred during the past 50 years would be evident if they occurred prior to 1910, even though only decennial data were collected then). Many explanations have been offered for these fluctuations; however, none of which we are aware has been useful for predicting changes in trends.

Chart 1



\* per 1000 women ages 15 to 44.

† per 1000 population.

Source: Bureau of the Census.

\* The only significant decrease in the number of births in the U.S. in the 19th century occurred during the Civil War, when many families were separated. The chart is based on data only for the years of the decennial census prior to 1910; therefore, the Civil War episode is not evident in the chart.

Many views have been widely disseminated about the "baby boom" and its causes and about changes in fertility rates and their causes. We shall examine these for their consistency with the data, but first we shall describe a number of fertility measures and what these mean and do not mean for future population changes.

### Measures of Fertility

The crude birth rate (births per 1,000 population) is the simplest measure of fertility. As long as it is larger than the death rate (deaths per 1,000 population) the population will increase. The crude birth rate currently is about 15 per 1,000 and the death rate is about 9 per 1,000; therefore, the natural increase in population is about 6 per thousand, or about 0.6 percent per year. However, the crude birth rate (and also the death rate) is greatly influenced by changes in mortality and life expectancy. As life expectancy increases, the total population tends to increase; consequently, the crude birth rate tends to decrease even during periods when the number of births is unchanged.

The general fertility rate eliminates these influences as they apply to males and to females younger than 15 or older than 44. This fertility rate spotlights fertility among women of common childbearing ages. The recent general fertility rate, about 67, might seem to indicate that every 1,000 women will have about 2,000 children in their lifetimes (67 multiplied by the 30 childbearing years). However, women as a group do not bear the same number of children at every age from 15 to 44; consequently, the general fertility rate is affected by the age structure of the women comprising the population of women of childbearing ages. At present women at the recent "prime" childbearing ages (19 to 28 years old) comprise a comparatively large proportion of that population; therefore, one would expect that as this large proportion passes the prime childbearing years, the general fertility rate (and births) will decrease further. But what if this group of women simply has postponed having children until later?

The "total fertility rate" eliminates the age structure problem mentioned above. The total fertility rate is the sum of the female age-specific birth rates; that is, it is the sum of the number of births to 14 year old women per thousand 14 year old women, plus that for 15 year olds, plus that for 16 year olds, and so forth through 49 year old women. The total fertility rate is a relatively new and sophisticated series. It is available only for the years since 1930, and it is shown in Chart 2. If the age-specific birth rates remained constant, the total fertility rate would be the total number of children that 1,000 women would have in their lifetimes, and it is often thought of in that way. The total fertility rate currently is about 1,775.

The total fertility rate remains an annual measure of fertility, even though it is viewed in terms of hypothetical lifetime births. This rate is affected by changes in the timing of childbearing. The total fertility rate peaked at 3,760 in 1957, but the highest fertility rate of any age cohort (women born in the same year) then of childbearing age was about 3,200, for women born in 1930.

In Chart 2 we also have plotted the lifetime births per 1,000 women of the same age (age cohorts). This series is plotted at 5 year intervals with the lifetime births of each age cohort shown at the year when that group was 25 years old (very roughly the average age of childbearing). This series correlates reasonably well with the total fertility rate, and it is available for earlier years.

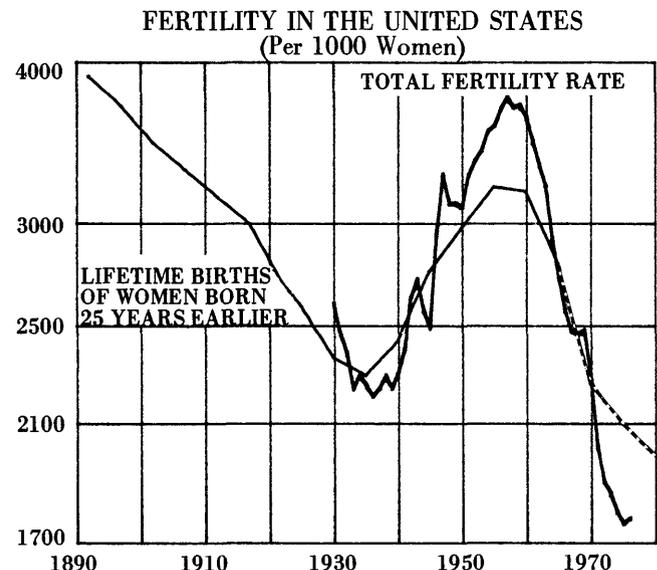
Readers should note that the dashed portion of the curve is based in part on a recent survey of birth expectations rather than actual births. For example, the lifetime birth rate plotted for 1980 is based on 1976 survey results indicating that women then 21 years old had already had 454 children (per 1,000) and expected to have 1,534 additional children in their lifetimes. Of course, the number of children those women actually have during their remaining 25 childbearing years could differ greatly from their expectations as 21 year old women in 1976. The birth expectations of older age cohorts, such as women born in 1940 (plotted as 1965), who were 36 at the time of the survey, probably would differ from actual births by a smaller amount than that for the 21 year olds. In 1976, 36 year old women had already had about 2,680 children (per 1,000) and expected to have only about 115 more. They were past their prime childbearing years.

Let us summarize the measures of fertility described above. The crude birth rate usually is used with the death rate for their combined effect on population changes. The general fertility rate is a measure of fertility among women of childbearing age at the time of data collection and it is influenced by the age structure of women then of childbearing age. This problem is overcome in the total fertility rate, which is the sum of the female age-specific birth rates. However, all of the foregoing are annual measures that are influenced by the timing of childbearing within the lifetimes of women. The lifetime birth rate of age cohorts probably provides the best indication of long-term trends of fertility, but it lacks timeliness, inasmuch as the lifetime births of women cannot be known with certainty until those women have completed their childbearing.

### What Affects Changes In Fertility Rates?

Fertility has decreased in societies as the societies have advanced economically. The rapid population growth that usually accompanies secular economic growth is attrib-

Chart 2



Note: Lifetime births are the number of children ever born to 1000 women of the same age. Plotted data are lagged by 25 years, roughly the average age of childbearing. For example, the level plotted for 1960 is the number of children per 1000 women born in 1935.

Source: Bureau of the Census.

utable to increased life expectancy in general and reduced infant mortality in particular. These occur sooner and proceed faster than fertility decreases. In the United States, fertility decreased continuously until the 1930's.

Many analysts have attributed the low fertility of the 1930's to the depression then. This conclusion is highly questionable, because, as Chart 1 shows, the marked decreases in the crude birth rate and the general fertility rate occurred during most of the 1920's, when cyclical economic conditions generally were good. Moreover, these series changed little during the 1930's after 1933, although the economy remained depressed then.

An explanation more consistent with the decrease in the number of births during the 1920's and early 1930's is that it probably reflects decreased immigration after the U.S. entered World War I combined with a continuation of the long-term downward trend in fertility. Immigrants as a group had larger families than U.S. nationals, which is why a reduction in immigration would cause a decrease in births.

The "baby boom" of the 1940's and 1950's often has been said to reflect a postponement of childbearing during the depression and World War II. This is supported somewhat by the fluctuations of the total fertility rate below the curve for lifetime births during much of the 1930's and above it after the mid-1940's to the mid-1960's. However, during the "baby boom," the women with the highest completed fertility rate were those born in 1930. These women were children during the depression and 15 years old on V-J day. Clearly, the babies they had in the 1950's were not postponed from their depression or war experiences.

As of this time, there is no generally accepted explanation of the "baby boom," of the subsequent "baby bust," or of many other fertility changes. Why did women born in the 1930's have more children, on average, than those born in the 1890's? Why do women born in the 1950's indicate that they will have fewer children than any generation in U.S. history? Answers to these questions clearly are conjectures. Little is understood about the primary determinants of fertility changes, the causes of fluctuations in fertility during the last 50 years, or about the probable future trends in fertility. However, some effects of recent trends in fertility, for example, the number of persons now alive, are known and have important implications for the future. These will be discussed in the second part of this article.

## PRICES CONSUMER PRICES

Note: Data other than the percent changes from a year earlier are seasonally adjusted unless indicated otherwise.

According to the Department of Labor, the Consumer Price Index (CPI) increased 1.1 percent, or at a compound annual rate of 4.7 percent, before seasonal adjustment during the 3 months ended in November. The unadjusted level of the index for November, 185.4 (1967=100), was 6.7 percent more than that a year earlier. (During 1976 the unadjusted CPI increased 4.8 percent.) Adjusted for seasonal variation, the compound annual rate of increase during the 3 months ended in November was 4.4 percent, which was only slightly higher than those during the 3 month periods ended in September and October. The rates of increase during those 3 month periods were the smallest during 1977.

Early in 1977 many economic analysts forecast that general price levels would increase between 5.5 percent

and 6.5 percent during the year. The *WPI* (Wholesale Price Index) increased 5.9 percent during 1977, which was about in the middle of the forecast range. During the first 11 months, the CPI increased 6.4 percent, near the upper limit of the forecast range. Increases in consumer prices during 1977 well might exceed these rates. Many economists have concluded that price increases of this magnitude reflect an "underlying rate of inflation," that is, they expect prices to rise on average at least 5 to 6 percent per year. At a 6 percent annual rate of increase, prices would double (and purchasing power would halve) in less than 12 years, hardly a situation conducive to economic efficiency and sound growth. Yet, this situation now is deemed acceptable by economists having substantial influence on Government policies.

The accompanying table shows the annual rates of change of the CPI and of various subcomponent indexes during the 3 month spans ended in February, May, August, and November 1977. The rates of increase in the total CPI during the periods ended in May, August, and November were less than those during each of the preceding 3 month periods. This moderation in the rate of increase of the CPI was due in large part to reduced rates of increase in food prices during those periods. Readers should note that neither the CPI nor food prices decreased during these periods; they continued to increase, but at a smaller rate.

There are two major components of food prices: prices of food at home (groceries) and prices of food away from home (restaurants). The trends in the prices of these component groups do not always coincide. At times, grocery prices have decreased over short periods while restaurant prices have increased. However, during the four periods shown in the table, the trends of prices of food at home and of food away from home were similar. Thus, the trend in general food prices reveals trends in both components.

The index of prices received by farmers, which had decreased substantially during each of the 4 months ended September 15, increased 1 percent per month during the three months ended December 15. Although the cost of food to the consumer also includes the costs of processing and distribution, increased costs of the raw farm products usually are passed on to the consumer through higher prices. Therefore, we expect that the rate of increase in consumer food prices will accelerate within the next few months.

### ANNUAL RATES OF CHANGE IN CONSUMER PRICE INDEXES

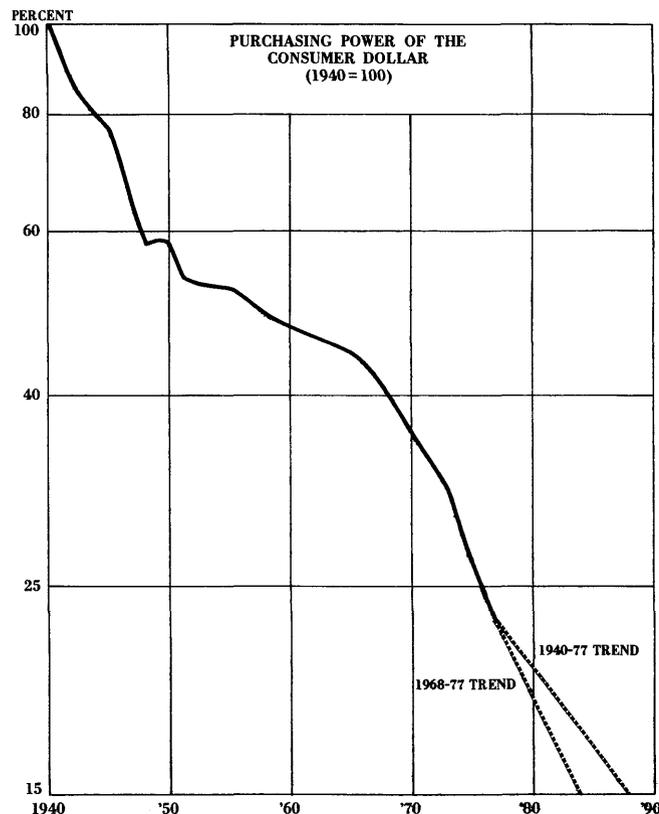
Proportion Of Total	Index	Over Span of 3 Months Ended in:			
		Feb. 1977	May 1977	Aug. 1977	Nov. 1977
1.00	All items	+9.1	+8.4	+5.2	+4.4
	<i>Expenditure Groups</i>				
.25	Food	+12.4	+11.8	+4.4	+3.3
.34	Housing	+8.2	+7.4	+8.4	+6.9
.09	Apparel & upkeep	+5.7	+3.2	+5.9	+2.3
.13	Transportation	+9.4	+8.0	-1.6	+1.6
.19	Health & Recreation	+6.1	+6.0	+5.7	+7.5
	<i>Commodity &amp; Service Groups</i>				
1.00	All Commodities	+9.9	+7.4	+3.5	+3.7
.25	Food	+12.4	+11.8	+4.4	+3.3
.39	Other commodities	+8.0	+5.0	+2.7	+4.2
.36	Services	+8.0	+9.2	+8.8	+5.2
	<i>Memo:</i>				
	Wholesale Price Index	+9.8	+11.4	+1.2	+5.0

Note: All rates are compounded and based on seasonally adjusted data except those for housing and for health and recreation, which are based on unadjusted data.

The prices of commodities other than food accelerated somewhat during the 3 months ended in November to an annual rate of 4.2 percent. During the preceding 3 month period, those prices increased at the smallest rate (2.7 percent) since late in 1973. The most recent acceleration of these prices was attributable in part to rapid increases in the prices of gasoline and motor oil. Those prices had decreased 1.7 percent during the 3 months ended in August, but they increased at a compound annual rate of 11.7 percent during the subsequent 3 months. New car price increases also accelerated (to an 11.0 percent rate) during the most recent 3 months. During each of the preceding 3 month periods, those prices had risen at rates from 4.3 to 4.6 percent. Used car prices continued to fall rapidly, however. They fell at 16.7 percent and 25.6 percent rates, respectively, during the most recent and preceding 3 month periods.

The rate of increase in prices of services has abated during recent months. Except for the rate during the 3 months ended in December 1976, the increase in service prices during the 3 months ended in November was the smallest since mid-1973. Reduced rates of increase in the costs of household services other than rent and in the costs of transportation services accounted for all of the recent abatement in the rate of increase of service prices.

The estimated average purchasing power of the consumer dollar (as measured by the CPI) was 23.1 cents during 1977 compared to \$1.00 during 1940. (The estimate was made from the CPI data for the first 11 months of 1977.) During the 37 years since 1940, the average annual rate of erosion of consumer purchasing power has been 3.9 percent per year. At that rate the purchasing power of the dollar is reduced by one-half every 17 1/2 years. During the most recent 10 years, the purchasing power of the consumer dollar has eroded at an annual average rate of 5.4 percent. If continued,



purchasing power would halve again in 12 1/2 years, or by 1990. These possibilities are indicated by dashed lines in the accompanying chart.

The history of fiat money inflating suggests that abatements of the rate of price increases should be viewed as temporary interruptions of a trend toward acceleration. Therefore, continued erosion of the purchasing power of the dollar at a larger rate than that during the past 10 years seems probable. That many members of the Carter administration and of the economics profession seem to believe that the current 5 to 6 percent rate of price increases is "not a major problem" suggests that there is little chance that prices in general will rise less than this rate in anything but the short run. It also suggests that currency turmoil, both domestically and internationally, probably will continue, albeit less from time to time, as well as more.

For about 7 years the Bureau of Labor Statistics has been in the process of revising the CPI. Three major reasons have been given for these revisions: (1) to account for changes in spending patterns since the last revision in 1964; (2) to reflect the buying habits of *all urban households* (80 percent of the population) rather than those of the current CPI's *urban wage earners and clerical workers* (40 percent of the population); and (3) to expand the survey base from which data are collected. This new CPI is scheduled to begin with January 1978 data, which will be released in early March.

The Bureau of Labor Statistics will publish three separate CPI's for 6 months thereafter to allow time for conversion by users from the old CPI to the new. The third index that will be reported will be the old CPI with an expanded survey base. After 6 months elapse, only the new CPI will be reported, which we then will have to use for measuring consumer prices. That will make historical analysis of comparable consumer prices impossible, because the new CPI series will not have historical data. When we convert from using the old CPI to using the new index for analyzing consumer price data, we shall report the change in more detail.

*Although the rate of increase in consumer prices varies over short periods, we expect that it will accelerate over the long term. Because prices received by farmers recently increased substantially, we should not be surprised to see consumer price increases accelerate in the short term as well.*

#### COMMODITIES PRICES

Index	1977		1978	
	Jan. 10	Jan. 3	Jan. 9	Jan. 19
Spot-market, 22 commodities*	552	556	564	
Commodity-futures	776	707	709	
Steel-scrap	\$72.57	\$69.83	\$69.83	
Gold		Jan. 20	Jan. 12	Jan. 19
		\$133.10	\$173.55	\$173.45

\*For the preceding Tuesday.

Note: The indexes are, respectively, those of the U.S. Bureau of Labor Statistics, Dow-Jones, and *Iron Age*. The spot-market and futures indexes are converted so that their August 1939 daily averages equal 100. The steel-scrap index is a composite price for No. 1 heavy melting scrap. The gold price is the final fixing in London.

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