Effects of Reduced Birth Rates on U. S. Milk Consumption

by

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Recent Changes in Birth Rates

A significant reduction in the number of births has occurred in recent years, following the baby-boom after World War II. Over the last decade the total number of births has declined sharply. Total annual births were only slightly larger during the early 1970's than the number in 1945.

Recent changes in the birth rate have had a direct impact on the rate of growth in total U. S. resident population even though there is not a direct relationship between the two items because of variation in mortality, net immigration, and number of Armed Forces stationed outside the United States. Between 1973 and 1974 the annual rate of increase in resident population was .73 percent. This compares to rates of increase which were more than twice as large during the 1950's and early 1960's. From the mid 60's until the early 70's resident population increased about 1 percent per year. In the last two or three years, population appears to have increased at a slower rate. In addition to the decline in birth rate, there appears to have been some decrease in the number of immigrants during 1972 and 1973 compared to the seven previous years which has had a slight dampening effect on the annual rate of change in total resident population.

Changes in Age Composition

In addition to a changing birth rate affecting the annual rate of change in total population, the age composition of the population is also directly affected. The distribution of the total U. S. population among particular age groups for selected years since 1930 is presented in Table 1. Changes in the composition of the younger age groups are of particular interest when considering recent changes in milk consumption.

Table 1. Distribution of total U.S. population by age groups for selected years, 1930-74.[a]

Year[a]	Item	Age groups						Totals
		<5	5-9	10-14	15-19	20-64	65 & older	
		thousand						
1930	No.	11,372	12,590	12,041	11,572	68,797	6,705	123,077
	percent	9.2	10.2	9.8	9.4	55.9	5.5	100.0
1935	No.	10,170	11,789	12,424	11,813	73,250	7,804	127,250
	percent	8.0	9.3	9.7	9.3	57.6	6.1	100.0
1940	No.	10,579	10,648	11,715	12,343	77,806	9,031	132,122
	percent	9.0	8.2	8.2	8.8	58.9	7.9	100.0
1945	No.	12,979	10,822	10,777	11,669	83,187	10,494	139,928
	percent	9.3	7.7	7.7	8.3	59.5	7.5	100.0
1950	No.	16,410	13,375	11,213	10,675	88,201	12,397	152,271
	percent	10.8	8.8	7.4	7.0	57.9	8.1	100.0
1955	No.	18,566	16,749	13,638	11,039	91,412	14,527	165,931
	percent	11.2	10.1	8.2	6.7	55.1	8.8	100.0
1960	No.	20,341	18,810	16,925	13,442	94,478	16,675	180,671
	percent	11.3	10.4	9.4	7.4	52.3	9.2	100.0
1965	No.	19,824	20,378	19,049	17,027	99,574	18,451	194,303
	percent	10.2	10.5	9.8	8.8	51.2	9.5	100.0
1970	No.	17,156	19,898	20,835	19,315	107,590	20,085	204,879
	percent	8.4	9.7	10.2	9.4	52.5	9.8	100.0
1974	No.	16,304	17,592	20,719	20,824	114,655	21,815	211,909
	percent	7.7	8.3	9.9	9.8	54.1	10.3	100.0

[a]Resident population prior to 1940 and total population including Armed Forces overseas thereafter. Alaska and Hawaii data included beginning in 1950.

Sources:

U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 519, "Estimates of the Population of the United States by Age, Sex, and Race: April 1, 1960 to July 1, 1973," U.S. Government Printing Office, Washington, D.C., April 1974.

U.S. Bureau of the Census, Current Population Reports, Population Estimates, Series P-25, No. 311, "Estimates of the Population of the United States by Single Years of Age, Color and Sex: 1900 to 1959," U.S. Government Printing Office, Washington, D.C., July 1965.

U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 529, "Estimates of the Population of the United States, by Age, Sex and Race: July 1, 1974 and April 1, 1970," U.S. Government Printing Office, Washington, D.C., September 1974.

ogeneous products are aggregated on a milk equivalent or final product weight basis. Another problem in analyzing trends is the difference in civilian consumption and sales estimates. The former series includes indirect estimates of fluid milk consumption by farm households but excludes military utilization. Sales data reflect purchases for military use but exclude on-farm fluid milk consumption. Actually there are two series of sales data since a new series has been developed by the Economic Research Service. Alternative per capita consumption and sales estimates of fluid milk and cream products for selected years are presented in Table 2. The decline of nearly 40 pounds in civilian consumption on a milk equivalent basis between 1965 and 1972 represents approximately a 13 percent decline over the seven year period. Both series of sales data in terms of milk equivalent indicate a decline of around 12 percent during this period. On a product weight basis however civilian consumption appears to have declined about 12 pounds or about 4.1 percent between 1965 and 1972. The declines in both series of sales data on a product weight basis are substantially less than sales data on a milk equivalent basis. The major reason for the significant difference in the rates of decline depending on the units of aggregation is the increase in sales and consumption of low-fat milk products concurrent with decreases in fluid whole milk.

There appears to be little question that per capita consumption and sales of fluid milk and cream products have decreased in recent years. The magnitude of this decrease however depends on whether comparisons are based on data expressed in terms of whole milk equivalent or on a final product weight basis.

Aggregate sales and consumption estimates of fluid milk and cream are reported in Table 3. The overall increase in total population was sufficient to offset the decline in per capita sales on a product weight basis resulting in approximately a 5 percent increase in total sales between 1965 and 1972.

Table 2. Alternative U. S. per capita consumption and sales estimates of fluid milk and cream products for selected years.

Year	Milk Equivalent			Product Weight		
		Sales[b]			Sales	
	Civilian consumption[a]	Former Series	New Series	Civilian consumption[c]	Former Series[d]	New Series[e]
	(lbs./capita)					
1960	322	309	287	321		286
1965	302	294	275	311	306	282
1970	264	260	246	296	292	270
1971	259	255	241	296	292	269
1972	263	259	241	299	296	271
1973	259	253	f	295	293	268

[a]Reported in Table 6 of Dairy Situation, DS-352, USDA, ERS, September, 1974.

[b]Data reported in Table 20 by Alden Manchester, Research Estimates of Fluid Milk Sales Since 1954 in Dairy Situation, DS-345, May, 1973 and Table 3 in Dairy Situation, DS-356, July, 1975.

[c]Reported in Table 11 of Food Consumption, Prices and Expenditures, Supplement for 1973 to Agricultural Economic Report No. 138, USDA, ERS, Washington, D. C.

[d]1965-1973 values reported in Table 3 in Dairy Situation, DS-356, July, 1975, USDA, ERS.

[e]Data reported in Table 8 in Dairy Situation, DS-356, July, 1975.

[f]Not available.

Total on-farm use of milk in terms of final product weight is estimated to have declined between 1965 and 1972 resulting in an increase in overall total fluid milk and cream consumption of approximately half the increase in sales.

An additional series of data that reflects consumption trends in the dairy industry is information on beverage milk sales, Table 4. This series essentially removes the cream and specialty products from the total fluid milk and cream category discussed above. The beverage milk component is especially relevant for this analysis because of similarity with the products included in the 1965 age-sex specific consumption rates since the latter are used in estimating the effects of changes in the age composition of the population.

Table 3. Total U. S. fluid milk and cream sales (new series) and on-farm consumption for selected years on a milk equivalent (fat solids basis) and product weight basis.

Year	Sales[a]		On-Farm Consumption		Total Fluid Milk and Cream Consumption	
	Milk equivalent	Product weight	Milk equivalent[b]	Adjusted product weight[c]	Milk equivalent[d]	Adjusted product weight[e]
	(Billion Pounds)					
1960	49.16	49.03	5.27	5.26	54.43	54.29
1965	51.73	53.10	3.44	3.53	55.17	56.63
1970	49.24	54.31	2.17	2.39	51.41	56.70
1971	48.93	54.67	2.03	2.27	50.96	56.94
1972	49.46	55.76	1.94	2.19	51.50	57.95
1973	f	55.63	1.78	f	f	f

[a]Reported in Table 19 by Alden Manchester, Research Estimates of Fluid Milk Sales Since 1954 in Dairy Situation, DS-345, May, 1973, Table 6 and 7 in Dairy Situation, DS-356, July, 1975, in Table 13 in Dairy Situation, DS-316, July, 1967 and Table 16 in Dairy Situation, DS-326, July, 1969.

[b]Reported in Table 5 in Dairy Situation, DS-351, July, 1974, and Table 5 of Dairy Situation, DS-356, July, 1975, U.S.D.A.

[c]Adjusted milk equivalent based on relationship between total sales reported on a milk equivalent and product weight basis.

[d]Total of columns 2 and 4.

[e]Total of columns 3 and 5.

[f]Not available.

Procedure

In order to examine the effects of recent changes in the age composition of the population on total beverage milk consumption, the number of people in different age and sex groups for given years can be combined with estimated consumption rates by age and sex. Estimates obtained by combining age-specific consumption rates with age distributions of the population indicate the amount of change that would have occurred in aggregate consumption due only to changes

Table 4. Total U. S. beverage milk sales and on-farm consumption on a product weight basis.[a]

Year	Total beverage milk sales[b]	On farm beverage milk consumption[c]	Total beverage milk consumption[d]
		(billion pounds)	
1960	47.56	5.10	52.66
1965	51.74	3.44	55.18
1970	53.07	2.34	55.41
1971	53.36	2.21	55.57
1972	54.39	2.14	56.53
1973	54.19	e	e

[a]Includes plain whole milk, low fat milk, skim milk, filled and imitation milk, flavored milk drinks, and buttermilk.

[b]Reported in Table 6 in Dairy Situation, DS-356, July, 1975

[c]Estimated from column 5 of Table 3 assuming the same proportion of beverage utilization as reflected in total sales.

[d]Total of columns 2 and 3.

[e]Not available.

in the number of people at different ages. The extent to which resulting estimates are related to changes in aggregate estimates of milk consumption such as those reported in Table 4 suggest the extent to which total consumption has been affected by changes in the age composition. The extent to which changes in the age composition of the population do not account for all of the observed changes in milk consumption is likely to indicate the extent to which age specific consumption rates have been modified. Discrepancies would also result due to any nonsystematic errors in aggregate milk consumption or population data. The consumption rates used in this study were those for milk and milk drinks reported by age-sex groups in the 1965-1966 U. S. Household Food Consumption Survey, Table 5.[1]

Table 5. Average quantity of milk consumed per person per day by sex and age groups in 1965.[a]

Sex group	Age	All urbanization	Urban	Rural
		(grams)		
Both	Under 1	696	708	666
	1-2	592	592	593
	3-5	509	523	477
	6-8	538	548	520
Male	9-11	572	588	544
	12-14	595	627	535
	15-17	601	620	572
	18-19	558	611	445
	20-34	318	319	317
	35-54	236	221	266
	55-64	203	187	238
	65-74	231	224	241
	75 & over	209	194	236
Female	9-11	500	510	483
	12-14	475	482	464
	15-17	383	388	374
	18-19	300	311	275
	20-34	204	211	184
	35-54	152	148	161
	55-64	151	151	151
	65-74	153	146	168
	75 & over	165	164	167

[a]Reported in Tables 1, 6 and 7 of Food and Nutrient Intake of Individuals in the United States, Spring, 1965, Household Food Consumption Survey, 1965-66, Report No. 11, Consumer and Food Economics Research Division, Agricultural Research Service, U. S. Department of Agriculture, January, 1972.

Results

Combining the age-sex specific consumption rates for all urbanizations in Table 5 with estimates of the number of people in particular sex and age groups in the resident population of July 1 resulted in aggregate estimates of milk consumption reflecting only the effects of changes in the age composition.[2] These values are expressed on a per capita basis in Table 6. The last column in Table 6 indicates how per capita beverage milk consumption would have changed relative to 1965 because of changes only in the age composition of the population. The values are calculated by applying the relative changes

Table 6. Per capita estimates of total beverage milk consumption assuming constant age-sex specific consumption rates and aggregate estimates of actual total beverage milk consumption.

Year	Per Capita Estimates		
	Using Constant Age-Sex Specific Rates[a]	Using Aggregate Milk Consumption Data[b]	Adjusted Rate[c]
	(lbs./capita)		
1960	269.65	292.59	284.51[c]
1965	270.24	285.13	285.13
1970	266.07	271.87	280.73
1971	265.32	269.48	279.94
1972	263.99	271.48	278.54
1973	262.40		276.86
1974	260.71		275.07

[a]Obtained by dividing annual estimate based on consumption rates in Table 5 by July 1 estimates of resident population.

[b]Obtained by dividing last column of Table 4 by July 1 estimates of resident population.

[c]Adjusted estimates of second column using adjustment indicated by 1965 relationship, e.g., 269.65 (for 1960) x (285.13/270.24) = 284.51 (for 1960).

since 1965 implied by the per capita estimates in column 2 of Table 6 based on constant age-sex specific consumption rates. Data in the second and last columns indicate that changes in the age composition of the population appear to have had little affect on the implied rate of change in per capita consumption between 1960 and 1965. Thus most of the decline of over 7 pounds per capita between 1960 and 1965 must be attributed to changes in individual consumption rates. This rate of decline is equivalent to 1.4 pounds per year per capita.

Since 1965 however, per capita milk consumption has been significantly affected by the changing age composition. Between 1965 and 1972, beverage milk consumption per capita declined by 13.65 pounds, but nearly 6.6 pounds or approximately 48 percent of this can be attributed to the changes in age-composition of the population. The effects of the changing age composition

are approximately 1 pound per year. The remaining change of 7.0 pounds per capita over the seven year period implies continuation of a slightly smaller rate of decline in per capita consumption due to factors other than age composition observed between 1960 and 1965.

During the last three years (1971-1974), average per capita milk consumption appears to have decreased as much as during the previous six years (1965-1971) due to changes in the age composition of the population.

Another way of expressing the effect of the changes in age composition on milk consumption is to analyze changes in the age-group distribution of total consumption estimates based on constant age-sex specific consumption rates. These results indicate that in 1960, individuals eight years of age and younger accounted for nearly 33 percent of total estimated milk consumption compared to less than 25 percent in 1974.

Future Effects of Reduced Birth Rates

In order to examine future effects on milk of recent changes in birth rates in conjunction with various expectations about future birth rates, the age-sex specific consumption rates used above can be combined with projected age distributions of the population based on different fertility assumptions. An obvious shortcoming of this procedure is having estimates based on 1965 consumption rates that appear to already have been modified by the early 1970's. There appears to be no other comparable source of data on age specific consumption rates, however, until information from the next U.S.D.A. National Household Food Consumption Survey becomes available. As long as relative differences in consumption among age groups remain fairly constant, use of the 1965 rates provides at least a relative measure of changes in milk consumption that might be associated with changes in the age distribution.

Table 7. Estimated total and per capita beverage milk consumption based on constant age-sex specific consumption rates for 1974 and alternative distributions of 1980 and 1990 population.

Year	Fertility Rate[a]	Total beverage milk consumption (billion pounds)	Index of total consumption (base period = 1974)	Per capita beverage milk consumption (pounds)	Index of per capita consumption (base period = 1974)
1974		55.11	100	260.71	100
1980	Low (F)	56.00	101.6	253.02	97.1
1990	Low (F)	58.69	106.5	246.02	94.4
1980	High (C)	60.15	109.1	261.02	100.1
1990	High (C)	70.56	128.0	265.56	101.9

[a]Fertility rates F assume 1.8 births per woman upon completion of childbearing. Rate C assumes 2.8 births per woman and currently is the highest rate used by Census Bureau in making projections.

The results of combining 1980 and 1990 population projections based on high and low fertility behavior with the age-sex specific milk consumption rates used above are presented in Table 7. A continuation of low fertility rates would result in an increase of less than one billion pounds of milk between 1974 and 1980. This is an increase of 1.6 percent compared to a 4.7 percent increase in total population. The implied decrease in average per capita beverage milk consumption is a little more than seven pounds over the six year period. The projected change in per capita consumption between 1980 and 1990 is a little less than what would be expected between 1974 and 1980. This is the result of smaller changes in the age distribution when a given level of fertility behavior has assumed to have existed for a longer period of time.

A sudden reversal in fertility behavior resulting in population expanding at the rate implied by 2.8 births per woman would result in total milk consumption increasing at about the same rate or just a little faster than changes in total population. An increase in the birth rate over the next six years to

the level associated with Series C projections would be sufficient to offset some of the likely decreases in milk consumption resulting from effects of changes in age distribution already underway as a result of reduced births during the last decade. Under higher fertility rates, the age distribution in 1990 would be more favorable for increased milk consumption resulting in an average per capita value approximately equal to the 1970 value reported in Table 6.

In summary these estimates suggest that the recent decrease in the birth rate and continuation of low fertility rates resulting in significant shifts in the age distribution of the population are very likely to result in very little growth in total beverage sales and a declining average per capita consumption. On the other hand, a large and sudden reversal in fertility rates would be required to result in 1980 average consumption levels not being any lower than those estimated for 1974.

Footnotes

[1]This aggregate category includes the following products: (1) whole and skim milk, (2) reconstituted dry skim milk, (3) buttermilk, (4) chocolate milk, (5) yogurt, (6) evaporated and other processed milk, (7) milk-based diet beverages, and (8) baby formulas with milk base. This category therefore excludes fluid milk that may have been consumed in the process of eating foods that include milk as an ingredient in their preparation. Quantities were aggregated on a product weight basis in the form as reported used.

[2]Since the daily consumption rates in Table 5 were in terms of grams, total daily estimates were multiplied by 365 and then divided by 454 to obtain values that could be compared to aggregate estimates of total beverage milk consumption.

References

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