New worklife estimates reflect changing profile of labor force

*The worklife expectancy of men continued
to level off between 1970 and 1977,
while that of women increased significantly*

SHIRLEY J. SMITH

The Bureau of Labor Statistics has developed a new set of working life tables based on labor force patterns observed in 1977. On the basis of these patterns, the Bureau estimates that the average man 16 years of age can expect to spend 38.5 years in the labor force while a typical woman of that age can expect 27.7 years of labor force involvement.

Patterns of lifetime labor force attachment for both men and women are constantly changing. Comparisons of labor force participation rates from year to year suggest evolving patterns of labor force entry and withdrawal, as well as significant changes in economic activity at midlife. However, it is difficult to identify the current "lifetime pattern of labor force involvement" from these rates alone.

Working life tables were developed to isolate such lifetime patterns. The results of the model are synthetic. That is, they summarize the behavior of all age groups in the population during a given year, rather than trace the history of any one group through its lifetime. The tables estimate how frequently members of a population would enter and leave the labor force, and how long the average person would remain economically active, if

Shirley J. Smith is a demographic statistician in the Division of Labor Force Studies, Bureau of Labor Statistics.

rates of behavior remained as they were in the reference year.

Recent participation trends affect methodology

Of course, these rates do not remain constant over time. In fact, activity rates of men and women have changed substantially since 1970, the reference year of the Bureau's previous working life tables. Between 1970 and 1977, the entire cross-sectional profile of participation for both sexes changed. (See table 1.) Persons age 16 to 24 became increasingly active; those above age 55 showed a weakening attachment to the labor force. The participation rates of younger women showed the most remarkable change, increasing by more than one percentage point per year. The rate for those 25 to 34 increased by 14.5 percentage points in just 7 years. At the same time, rates of older persons were dropping, with that of men 60 to 64 declining by 12.1 percentage points.

In the prime working ages, the labor force attachment of men slackened somewhat, while that of women increased substantially. The net effect was a decline in the mean age of labor force members, reinforcing the drop related to the age structure of the population itself. The magnitude and character of these changes have rendered the 1970 worklife estimates obsolete.

Table 1. Civilian labor force participation rates by sex and age, annual averages, 1970 and 1977

Age	Men		Change	Women		Change
	1970	1977	1970-77	1970	1977	1970-77
16–19	56.1	61.0	4.9	44.0	51.4	7.4
20–24	83.3	85.7	2.4	57.7	66.5	8.8
25–34	96.4	95.4	−1.0	45.0	59.5	14.5
35–44	96.9	95.7	−1.2	51.1	59.6	8.5
45–54	94.2	91.2	−3.0	54.4	55.8	1.4
55–59	89.5	83.2	−6.3	49.0	48.0	−1.0
60–64	75.0	62.9	−12.1	36.1	32.9	−3.2
65 and over ...	26.8	20.1	−6.7	9.7	8.1	−1.6

Moreover, there is now much evidence that adults, particularly women, move in and out of the labor force repeatedly during their lifetimes. This movement contradicts a basic assumption of conventional worklife methodology, that workers remain in the labor force continuously from age of entry to age of final withdrawal. The growing conflict between model and reality appears to have adversely affected estimates published for the years 1950–70.

The new worklife estimates for 1977 are drawn from a dynamic new model known as the increment-decrement working life table. This model is markedly different from the original (or conventional) worklife technique used to produce the estimates previously published by the Bureau. The new values are not entirely comparable with previously published figures,[1] because they reflect not only changes in the behavior of American adults, but also several fundamental changes in modeling procedures.[2]

The key feature of this model is that it rests on observed probabilities of movement into and out of the labor force—a flow variable, rather than labor force participation rates, which are a measure of stocks. In the new tables, persons are assumed to pass through life, at each age facing the "probabilities of transition" observed for that age group in the base population during the reference year. Worklife expectancies summarize the length of time the average adult would spend in the labor force during his or her lifetime, if these probabilities did not change. Rates of labor force accession and separation summarize the volume of labor turnover which would occur within each age group if mobility patterns remained constant.

Unlike previously published estimates for women, the new tables do not spell out expectancies separately by marital or parental status. Such tables imply a fixed status for life. Instead, the new model presents a summary table for all women. The transition probabilities underlying this table reflect the impact of normal life cycle changes on labor force attachment at each age.

For purposes of comparison, 1970 estimates have been reestimated using the new increment-decrement

methodology. Selected revised values are included in this report.

New estimates and trends in worklife expectancy

Tables of working life for 1977, estimated by the increment-decrement method, indicate that given a continuation of mortality and labor force behavior observed at that time, a boy born in 1977 was likely to spend 37.9 years in the labor force and a girl, 27.5 years. (See table 2.) Those surviving to age 16 would have slightly higher average worklife expectancies—38.5 and 27.7 years, respectively. At age 50, the average man could anticipate 11.7 more years of labor force involvement, the average woman, 7.5 years.

Within any age group, persons currently active have a higher worklife expectancy than those not in the labor force. Although previous studies have hinted at this relationship, the new estimates for the first time spell out the magnitude of the differential. Among teenagers it is relatively small; most are likely to enter and leave the labor force repeatedly before settling into adult roles. However, at midlife the active and inactive groups are no longer so similar. For those not in the labor force, the probability of reentry declines with age. At age 45 the active group is expected to work about 4 years longer than its inactive counterpart.

Historic comparisons of the worklife index are impeded by the fact that patterns of labor force attachment have changed, forcing a revision in methodology. During the first half of this century, when worklives tended to be more continuous, the conventional model gave relatively unbiased estimates of their duration. However, as work patterns became increasingly irregular after World War II, the quality of the estimates declined. The problem was greatest for groups having high rates of labor turnover. For such groups, the conventional model tended to underestimate the size of the labor force, and to overstate the average worklife duration. Estimates for women workers were especially tenuous,

Table 2. Worklife expectancies of the population and of active and inactive persons by age and sex, 1977

[In years]

Age	Men			Women		
	Total	Active	Inactive	Total	Active	Inactive
At birth	37.9	—	37.9	27.5	—	27.5
16	38.5	39.6	38.1	27.7	28.8	27.4
20	36.8	37.3	35.9	26.0	26.7	25.2
25	33.4	33.7	32.0	23.0	23.7	21.7
30	29.2	29.3	27.2	19.9	20.9	18.2
35	24.7	24.9	21.7	16.8	17.9	14.8
40	20.3	20.4	16.9	13.7	14.9	11.4
45	15.9	16.2	12.0	10.5	11.9	8.0
50	11.7	12.2	7.2	7.5	9.3	4.9
55	7.8	8.5	3.6	4.8	6.8	2.5
60	4.3	5.2	1.9	2.5	4.4	1.2
65	1.9	3.4	1.1	1.1	3.1	.6
70	.9	2.6	.6	.5	2.4	.2

Table 3. Changes in life and worklife expectancies, by sex, 1900-77

Worklife model, sex, and year	Life expectancy		Worklife expectancy			Inactive years (total population)		Percent of lifespan active		Ratio of female to male worklife expectancies
	At birth	At age 20	All persons		Workers	From birth	From age 20	From birth	From age 20	At age 20
			At birth	At age 20	At age 20					
Men										
Conventional model:										
1900	46.3	42.2	32.1	37.8	39.4	14.2	4.4	69.3	89.6	(1)
1940	61.2	48.6	38.1	39.7	41.3	23.1	7.1	62.3	84.8	(1)
1950	65.5	48.9	41.5	41.4	43.1	24.0	7.5	63.4	84.7	(1)
1960	66.8	49.6	41.1	40.9	42.9	25.7	8.7	61.5	82.5	(1)
1970	67.1	49.6	40.1	39.4	41.5	27.0	10.2	59.8	79.4	(1)
Increment-decrement model:										
1970	67.1	49.6	37.8	37.3	38.0	29.4	12.3	56.3	75.2	(1)
1977	69.3	51.3	37.9	36.8	37.3	31.5	14.5	54.7	71.7	(1)
Change:										
1900-77[2]	23.0	9.1	5.7	-1.0	-2.1	17.3	10.1	-14.8	-17.9	(1)
1970-77[3]	2.2	1.7	0.1	-0.5	-0.7	2.1	2.2	-1.7	-3.5	(1)
Women										
Conventional model:										
1900	48.3	43.8	6.3	(4)	(4)	42.0	(4)	13.0	13.7	(4)
1940	65.7	50.4	12.1	11.9	(4)	53.6	38.5	18.4	23.6	30.0
1950	71.0	53.7	15.1	14.5	(4)	55.9	39.2	21.3	27.0	35.0
1960	73.1	55.7	20.1	18.6	37.3	53.0	37.1	27.5	33.4	45.0
1970	74.8	56.7	22.9	22.0	40.6	51.9	34.7	30.6	38.8	55.8
Increment-decrement model:										
1970	74.8	56.7	22.3	21.3	22.1	52.4	35.4	29.8	37.6	57.1
1977	77.1	58.6	27.5	26.0	26.7	49.7	32.6	35.7	44.4	70.7
Change:										
1900-77[2]	28.8	14.8	21.1	(3)	(3)	7.7	(3)	22.5	30.7	(4)
1970-77[3]	2.3	1.9	5.0	4.7	4.6	-2.7	-2.8	5.6	6.8	13.6

[1] Not applicable.
[2] Based on conventional model estimates for 1900 and increment-decrement model estimates for 1977.
[3] Based on the increment-decrement model.
[4] Data not available.

growing increasingly biased from 1950 to 1970. Only the 1970 values have been reestimated using the increment-decrement model. Conventional estimates for 1950 through 1970 seriously overstate work durations for women in the labor force during that period. When these data are excluded, however, the results of previous models give a credible picture of the evolution of labor force attachments in this century. (See table 3.)

In 1900, the life and worklife expectancies of men were very similar. At age 20, the average man could expect to spend only 4.4 years outside of the labor force. During the next 77 years, men's life span increased by 23 years, with the bulk of the increase—about 17 years —going into nonlabor force activities. The growth in worklife expectancy was less than 6 years. Between 1970 and 1977, virtually the entire increase in life expectancy (2.2 years) went to nonlabor force activities. At the turn of the century, the average man spent 69 percent of his lifetime in the labor force, but by 1977, this figure had dropped to about 55 percent.

In contrast, the formal worklife of women has increased dramatically during this century. In 1900, women averaged little more than 6 years of formal labor force involvement. Over the next 77 years, their average life span increased by almost 29 years, of which 21 were allocated to labor market activities. The shift has been especially pronounced in recent years. Between 1970 and 1977, worklife durations rose by 5 years, while life expectancy increased by only 2.3 years. This was accomplished by a reallocation of time—nearly 3 years per woman—from home to labor market activities. At the turn of the century, women spent an average of 13 percent of their lifetimes in the labor force, compared to nearly 36 percent in 1977.

Because of these countervailing trends, the worklife durations of men and women have been converging. It is estimated that in 1940, the average expectation of working life for young women was just 30 percent of that for men. By 1970, it was 57 percent and by 1977, it represented 71 percent that for men. While these figures do not take account of differences in hours worked, an important distinction, they do illustrate how fundamentally the roles of men and women have changed.

Measures of labor force mobility

A second function of the working life table is to quantify movements into and out of the labor force. The conventional model derived aggregate estimates of

these flows from age-to-age comparisons of labor force participation rates. The results, taken to describe net flows, gave little insight into the process of labor turnover. The new model rests on observed probabilities of labor force entry and exit at each age. It estimates both net and gross rates of mobility, and provides information on the frequency and timing of these movements in the average person's life.

The new estimates indicate that most people establish their first contact with the labor force as teenagers. In the 1977 life table population, half of all young men had become members of the labor force by age 16.4. (See table 4.) The median age of first entry for women was marginally higher, 16.6 years. Because entries and reentries occur at all ages, the mean age of male labor force entrants was 26.9 years, and that of female entrants was even higher, 28.7 years.

Given a continuation of the work life patterns observed in 1977, it is estimated that the average man would enter the labor force 3 times in his lifetime. The average woman would do so 4.5 times. Men are likely to complete the phase of intermittent work more quickly than women. At age 25, they would anticipate an average of just 1.1 more labor force entries, while women could look forward to 2.7 additional entries.

According to the 1977 tables, men would average 12.6 years of labor force involvement for every entry

Table 5. Population-based rates of labor force accession and separation by age and sex, 1977

[Per 1,000 persons in the stationary population]

Age	Accessions		Separations		Net flow	
	Men	Women	Men	Women	Men	Women
16–19	211.6	207.2	124.3	127.9	87.3	79.3
10–24	136.3	158.3	93.9	142.0	42.5	16.2
25–29	54.4	109.6	38.6	116.0	15.8	−6.5
30–34	23.8	88.4	23.0	84.1	0.8	4.3
35–39	14.9	75.2	17.6	73.5	−2.7	1.7
40–44	15.5	66.3	21.6	69.0	−6.1	−2.7
45–49	16.4	57.9	28.2	68.1	−11.8	−10.2
50–54	17.1	46.8	37.1	63.7	−20.0	−16.9
55–59	19.1	37.4	59.3	66.2	−40.2	−28.8
60–64	30.8	32.0	113.1	77.8	−82.3	−45.8
65–69	44.5	27.8	92.9	52.2	−48.4	−24.4
70–74	35.7	16.1	56.3	27.1	−20.6	−11.1

during their lifetime. The average duration per entry for women was expected to be less than half this figure, or 6.1 years. Because most men were firmly attached to the job market by age 25, they would spend an average of 29.1 years in the labor force for every entry beyond that age, but the typical woman would engage in several shorter periods of activity, averaging just 8.6 years per entry.

Working life tables show two forms of labor force withdrawal: voluntary separation and death. Given the work and mortality patterns of 1977, the average young man could expect to leave the labor market voluntarily 2.7 times. About 27 percent of men would die before reaching retirement. The average young woman was likely to leave the labor force voluntarily 4.4 times, and fewer than 1 in 10 were likely to die before retiring.

Because the age distribution of labor force withdrawals is bimodal, with heavy outflows at both ends of the age spectrum, the mean age of all exits (38.7 years for men and 33.9 years for women) tells us little about final retirement. It is very difficult to identify retirement norms, because the retiree can and often does reenter the labor force. However, the 1977 tables indicate that among persons leaving the labor market at or beyond the age of 50, the life table median age of exit was 63.4 years for men, and 60.6 years for women. It appears that the age at retirement has dropped for both sexes since 1970. This may help to explain the concurrent drop in proportions likely to die as members of the labor force.

At the aggregate level, the new tables show a much greater volume of movement in and out of the labor force than has been quantified in the past. Although men and women in their teens have roughly comparable rates of labor force entry and withdrawal, the retention of young men exceeds that of women in this age group. (See table 5.) The pace of labor force entries for both sexes slows by age 20. However, as men begin to settle into their role as workers—as evidenced by a drop in their separation rate—female labor force exits actually

Table 4. Selected indexes of working life by sex, 1970 and 1977

Worklife measure	Men		Women	
	1970	1977	1970	1977
Median age at first labor force entry	16.5	16.4	16.8	16.6
Mean age of all first and repeat labor force entrants	26.6	26.9	29.2	28.7
Worklife expectancy (in years):				
At birth	37.8	37.9	22.3	27.5
At age 25	34.4	33.4	19.0	23.0
Number of labor force entries per:				
Person born	2.9	3.0	4.6	
Person age 25	1.2	1.1	2.8	4.5
				2.7
Expected duration in labor force per entry remaining (in years):				
At birth	13.0	12.6	4.8	6.1
At age 25	29.4	29.1	6.8	8.6
Number of voluntary exits from labor force per:				
Person born	2.6	2.7	4.5	4.4
Person age 25	1.9	2.0	3.3	3.3
Percent of workers expected to die while in the labor force	36.3	27.0	10.8	9.5
Mean age of all persons leaving the labor force:				
Total first and repeat exits	38.7	38.7	33.5	33.9
Voluntary withdrawals	36.1	37.0	32.9	33.4
Deaths of workers	57.3	55.6	58.1	56.3
Median age of persons leaving labor force at age 50 and above	65.0	63.4	61.4	60.6

rise. By age 25, the share of all men in the labor force substantially exceeds that of all women. Because a larger proportion of the female population remains outside the job market but may enter at any time, the accession rates of women are greater than those of men throughout midlife. Net retirements peak between the ages of 60 and 64. Thereafter, men are more likely than women to reenter the labor force. The rise in male entry rates at age 60 highlights the fact that retirement is often a temporary state.

The separation rates shown in table 5 are expressed as a ratio of withdrawals to population. A more common form is the ratio of withdrawals to labor force members. (See table 6.) Changing the denominator in this way has little effect on the rates of separation for prime working-age men, because most members of this population are also in the labor force. However, because of the disparity between population and labor force counts for other groups, the change to a labor force base inflates the rates of these other groups. This gives a better illustration of their relative propensities to leave the job market. Among persons working in the prime ages, women are as much as five times more likely than men to withdraw from economic activity. Only at age 65 and above do working men show a greater propensity to retire.

Trends in mobility rates

The pace of net labor force entries for young people increased markedly between 1970 and 1977. (See table 7.) Although the gross accession rates of teenagers rose slightly during this period, they had less bearing on the net influx than did the drop in labor force withdrawals. As young people showed increasing reluctance to leave the job market, the process of labor force expansion with age became more efficient. At the same time, the pace of net labor force withdrawals among persons age 45 and older accelerated. The separation rates of men 45 to 64 increased sufficiently to outweigh (and perhaps to have caused) slight increases in labor force entries.

Table 6. Labor force based rates of separation by age and sex, 1977

[Per 1,000 workers in the stationary labor force]

Age	Men	Women
16–19	254.7	290.5
20–24	125.0	226.3
25–29	42.7	182.9
30–34	24.3	134.7
35–39	18.5	112.8
40–44	22.9	105.3
45–49	30.5	107.7
50–54	42.1	110.8
55–59	74.6	136.2
60–64	209.7	251.9
65–69	376.2	369.7
70–74	441.9	388.7

Table 7. Comparison of labor force mobility rates by age and sex, 1970 and 1977

[Life table rates per 1,000]

Sex and age	Accessions in population		Separations in labor force		Net flows in population	
	1970	1977	1970	1977	1970	1977
Men:						
16–19	191.9	211.6	299.0	254.7	66.9	87.3
20–24	145.7	136.3	160.6	125.0	41.7	42.5
25–29	72.0	54.4	47.1	42.7	32.4	15.8
30–34	27.6	23.8	20.5	24.3	8.0	0.8
35–39	14.8	14.9	20.6	18.5	−5.1	−2.7
40–44	13.5	15.5	24.3	22.9	−9.5	−6.1
45–49	14.6	16.4	27.6	30.5	−11.0	−11.8
50–54	14.5	17.1	35.3	42.1	−17.3	−20.0
55–59	18.8	19.1	58.7	74.6	−31.1	−40.2
60–64	32.2	30.8	137.5	209.7	−64.9	−82.3
65–69	38.2	44.5	264.2	376.2	−75.1	−48.4
70–74	36.7	35.7	343.1	441.9	−38.1	−20.6
Women:						
16–19	204.1	207.2	455.7	290.5	54.3	79.3
20–24	164.6	158.3	321.0	226.3	14.5	16.2
25–29	102.2	109.6	231.2	182.9	−7.6	−6.5
30–34	90.7	88.4	206.3	134.7	−1.1	4.3
35–39	83.7	75.2	162.6	112.8	7.2	1.7
40–44	72.3	66.3	132.7	105.3	4.7	−2.7
45–49	60.3	57.9	121.9	107.7	−2.9	−10.2
50–54	49.7	46.8	115.4	110.8	−8.7	−16.9
55–59	43.3	37.4	131.5	136.2	−17.4	−28.8
60–64	38.9	32.0	200.8	251.9	−33.0	−45.8
65–69	29.4	27.8	308.9	369.7	−33.4	−24.4
70–74	16.0	16.1	402.8	388.7	−19.9	−11.1

The increased frequency of retirement in these age groups contributed to a drop in participation rates.

The situation for women was more complex. They too showed a rise in net labor force separations between the ages of 45 and 64. However, the increased net outflow of those 45 to 54 was evidence of a tightening, rather than a loosening of female labor force attachments. Below the age of 55, working women showed a drop in propensity to leave the job market. The slowdown of youthful separations limited the size of the labor reserve from which to draw older entrants. Hence, entries at midlife also declined. The decrease in labor turnover led to higher participation rates for women 45 to 54. Nonetheless, the share of women attached to the labor force, and at risk of leaving, had increased. Between 1970 and 1977, the ratio of withdrawals to population increased, and with it net labor force losses for women in this age range. Only among women over 55 is there evidence that intentions to retire were becoming stronger. Within this group, an increase in separation rates was accompanied by a drop in rates of labor force reentry.

THE WORKLIFE EXPECTANCIES of men and women in the United States have been converging since the end of World War II. This trend accelerated between 1970 and 1977, primarily because of the strengthening of female labor force attachments. Although the average worklife duration of men remained nearly constant, that for women increased by about 12 years. There remained

significant differences in time allocation by sex; women were far more likely than men to withdraw from and reenter the labor force at midlife. Nevertheless, by 1977, women spent an average of 70 percent as many years in the labor force as did men.

The new worklife model quantifies a substantial flow of persons into and out of the labor force for both sexes at every age. The pace of entries for teenagers increased between 1970 and 1977. For men 20 to 34, and for

most women above age 20, entries actually slowed. However, a greater drop in withdrawals brought about the net expansion of the labor force seen as increased participation rates for many age groups during this period.

The complete increment-decrement working life tables for men and women, 1970 and 1977, are available upon request from the Bureau of Labor Statistics and will appear in reprints of this article. □

―――― *FOOTNOTES* ――――

[1] Previous BLS publications on this subject include Howard N Fullerton, Jr. and James J. Byrne, "Length of working life for men and women, 1970," *Monthly Labor Review*, Feburary 1976, pp. 31–35; Howard N Fullerton, Jr., "A new type of working life table for men," *Monthly Labor Review*, July 1972, pp. 20–27; Howard N Fullerton, Jr., "A table of expected working life for men, 1968," *Monthly Labor Review*, June 1971, pp. 49–55; Stuart H. Garfinkle, *Work life expectancy and training needs of women*, Manpower Report No. 12 (Bureau of Labor Statistics, 1967); Stuart H. Garfinkle, "Table of working life for men, 1960," *Monthly Labor Review*, July 1963, pp. 820–23; Stuart H. Garfinkle, *The length of working life for males, 1900–60,* Manpower Report No. 8 (Bureau of Labor Statistics, 1963); Stuart H. Garfinkle, *Tables of working life for women, 1950,* Bulletin 1204

(Bureau of Labor Statistics, 1957); and Seymour L. Wolfbein and Harold Wool, *Tables of working life: the length of work life for men,* Bulletin 1001 (Bureau of Labor Statistics, 1950).

[2] They are comparable with estimates published by Robert Schoen and Karen Woodrow in "Labor Force Status Life Tables for the United States, 1972," *Demography*, August 1980, pp. 297–322. The technical details of the increment-decrement model are described in a forthcoming BLS report. For other discussions of multistate working life tables, see Jan Hoem and Monica Fong, "A Markov Chain Model of Working Life Tables," Working Paper 2 (Laboratory of Actuarial Mathematics, University of Copenhagen, 1976), and Frans Willekens, "Multistate Analysis: Tables of Working Life," *Environment and Planning*, Vol. 12, pp. 563–88.

A note on communications

The *Monthly Labor Review* welcomes communications that supplement, challenge, or expand on research published in its pages. To be considered for publication, communications should be factual and analytical, not polemical in tone. Communications should be addressed to the Editor-in-Chief, *Monthly Labor Review*, Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C. 20212.