

Older workers in the 21st century: active and educated, a case study

Older adults in the next century will have higher levels of educational attainment and may surpass the labor force participation rates of today's older cohorts; Wisconsin's labor market illustrates why

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Will the massive baby-boom generation spend its "golden years" at leisure in the next century or will this group continue working well past the standard retirement age? Federal budget deficits and projected funding shortfalls for Social Security and medicare lead many to worry about their retirement years. Besides possible cuts in government programs for the elderly, growing numbers of employers have been terminating traditional defined benefit pension plans which provide a fixed income during retirement.¹ In tandem with low personal savings rates, these cuts could cause a swell in the number of older persons in the labor force by forcing many baby-boomers to continue working well beyond the ages at which their parents left the labor force.

Widespread discussions on expected growth in the older labor force (defined in this article as workers age 55 and older) have occurred for quite some time, however, this article takes on another aspect of this phenomenon. It focuses on anticipated change in the distribution of the older population on one demographic characteristic—education. As younger and more highly educated cohorts age and replace today's older population, the educational composition of the 55-and-older age group will inevitably change. The effect of this change on our future labor force has not been sufficiently explored, but is bound to have significant implications for both the quality and quantity of the future labor force.

Another factor to consider is that Social Security and pensions replace a smaller portion of income for workers in skilled occupations than for workers in unskilled jobs. As a result, the "opportunity cost" of leaving the labor force rises, on average, with increased years of schooling. In other words, a typical college-educated worker sacrifices more income by retiring than does a worker who failed to finish high school. Higher education thus creates a financial incentive to remain in the labor force, through these higher opportunity costs. In addition, intangible benefits such as enhanced job satisfaction, and tangible factors like cleaner and safer working environments, serve to bolster labor force participation among well-educated older persons.

The analysis in this article uses Wisconsin data to illustrate the affect of education on the older labor force, but the broad conclusions could be considered for the Nation as well. We first present a brief comparison of population and labor force composition for Wisconsin and the United States. Next, we examine the recent trend in labor force participation among older adults, and disaggregate the overall participation rate by level of education. The results of our Wisconsin analysis are presented next, followed by a discussion of other factors besides education which may be expected to influence the labor force attachment of older adults. A discussion of data sources and methodology is presented in the appendix.

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Wisconsin versus the Nation

Despite the State's image as "America's Dairyland," only 1 in 20 Wisconsin workers (4.5 percent) were employed in agriculture in 1990, according to the decennial census. This share was nevertheless discernibly higher than the comparable figure for the Nation as a whole, 2.5 percent. The manufacturing sector is likewise more dominant in Wisconsin than in the Nation at large. Manufacturing firms employed 24.5 percent of Wisconsin workers, compared with 17.7 percent of all U.S. workers. Employers in the service sector, on the other hand, accounted for 29.9 percent of 1990 total employment in Wisconsin, compared with 32.7 percent nationwide.

In comparison with the Nation as a whole, Wisconsin's population has relatively little diversity in either race or Hispanic origin. While blacks constituted 12 percent of the U.S. population, they accounted for only 5 percent of Wisconsin residents. Only 2 percent of Wisconsin's population identified themselves as Hispanic, compared with 9 percent of the total U.S. population. Approximately 1 in every 4 persons nationwide belonged to some minority group (either non-white or Hispanic); in contrast, fewer than 1 in 10 Wisconsin residents were in a minority group. The predominance of non-Hispanic whites in Wisconsin is even more evident in the labor force (persons 16 years and older, either working or seeking work). Fully 93.5 percent of Wisconsin's labor force in 1990 was non-Hispanic whites, compared with 77.9 percent of the total U.S. labor force.

Wisconsin closely mirrors the Nation in its 1990 age distribution. Median age was 32.9 in both the State and Nation, but Wisconsin had marginally higher shares in the age group under 18, as well as the 65-and-older age group.

Regarding the educational attainment of the adult population, the comparison is mixed. Wisconsin lagged somewhat behind the Nation in the proportion of adults who had completed a Bachelor's degree or higher, but at the same time, had a smaller share of adult residents who failed to complete high school. Among persons age 25 and older in 1990, 1 in 5 (20.3 percent) nationwide had earned a Bachelor's degree. In Wisconsin, college graduates constituted 17.7 percent of the population 25 and older. At the opposite end of the educational scale, however, 24.8 percent of all adults nationwide did not complete high school, compared with 21.4 percent of those in Wisconsin.

Recent trends

Labor force participation among older adults has declined for many years.² Recent evidence suggests, however, that the trend toward lower participation rates has probably slowed and may have reversed in the early 1990's.³ Some analysts,

in fact, have projected that labor force participation rates among older adults will rise by a modest margin in the 1990–2005 period.⁴

In 1975, slightly more than 1 in 3 older adults (34.6 percent) were in the labor force, either working or actively seeking work. By 1990, this share had fallen to 30.2 percent.⁵ The decline of 4.4 percentage points masked substantial differences by sex and age, however. The labor force participation rate of men in the 55–64 age group fell from 76 percent in 1975 to 68 percent in 1990. Labor force participation actually rose among women in this age group, increasing from 41 percent to 45 percent over the 15-year period. Participation rates at ages 65 and older were much lower for both men and women, but again the direction of change varied by sex. Between 1975 and 1990, the participation rate of men ages 65 and older fell by 5 percentage points (21.6 to 16.4) while women in the same age group marginally increased their labor force attachment (8.2 percent to 8.7 percent).

The long-term decline in labor force participation at ages 55 and older has apparently leveled off in recent years. Results of the March 1993 Current Population Survey reflect marginal declines from 1990 rates, to 38.2 percent of older men and 22.7 percent of older women.

Several explanations have been offered for the long-term decline in labor force participation among older workers. The restructuring of the American economy over the last two decades has trimmed the number of blue-collar workers, whose productivity is most likely to decline with advancing age.⁶ Job growth has instead been concentrated in white-collar and service occupations—jobs in which age probably has a lesser impact on productivity. Another explanation for the decline involves the changing composition of the older work force by sex. Women currently make up a much larger proportion of the older labor force than they have at any point in the recent past. In 1990, women represented 43 percent of the older labor force, a gain of 5 percentage points since 1975. The women who are presently moving into the 55-and-older age group have demonstrated higher participation rates than earlier cohorts of women, and they are continuing their pattern of higher labor force participation.⁷

Labor force projections produced by the Bureau of Labor Statistics for the 1990–2005 period incorporate anticipated increases in labor force participation among older adults. The Bureau of Labor Statistics projects participation rates for the 55 and older age group in 2005 of 41.8 percent for men and 28.7 percent for women.⁸ These projected rates represent a gain of 2.5 percentage points for men and 5.7 points for women from the 1990 observed rates. The projected participation rates for men and women aged 55 and older in 2005, along with observed rates for 1975 and 1990, are shown in the following tabulation:⁹

	55 and older	55-64	65 and older
Men:			
1975	49.3	75.6	21.6
1990	39.3	67.7	16.4
2005	41.8	67.9	16.0
Women:			
1975	23.1	40.9	8.2
1990	23.0	45.3	8.7
2005	28.7	54.3	8.8

As stated earlier, this article focuses on an often overlooked aspect of labor force participation—the impact of education. Data from the 1990 census confirm a clear association between educational attainment and labor force participation among Wisconsin adults, regardless of age. (See chart 1.) Within each broad age group, labor force participation rises with each higher level of educational attainment. Among Wisconsin adults in the prime working ages of 25 to 54 in 1990, rates of labor force participation ranged from 71.2 percent for those who did not complete high school, to 91.6 percent for college graduates. The spread between participation rates for the lowest and highest educational levels was even wider at ages 55 to 64. Even at ages 65 and over, nearly 1 in 5 college graduates (18.6 percent) remained active in the labor force, compared with only 8.1 percent of those who did not finish high school. With the inevitable future change in the composition of the older population by level of education, we expect that aggregate labor force participation will grow substantially even if the 1990 age-and-education-specific participation rates depicted in chart 1 remain unchanged into the next century.

While differences in labor force participation by age and sex have been extensively examined, the effect of education on a group's tendencies to leave or stay in the labor force has received comparatively little attention. The March supplement of the Current Population Survey has collected data on the educational attainment and labor force status of the U.S. population for many years. When labor force attachment among older adults is examined by years of school completed, a clear pattern is evident since about 1980. Chart 2 depicts labor force participation rates for older adults by years of school completed, from 1975 to 1993. Persons with more years of schooling are more likely to continue working past age 55. The long-term decline in labor force participation has slowed at each level of education, and has begun to rise in recent years among persons completing 4 years or more of college.

Wisconsin's projected population

Educational attainment. The number of older adults without a high school diploma will decline over the 1990–2020 projection period, while each of the other segments in the educational

attainment spectrum (high school graduate, some college/associate degree, and Bachelor's degree or higher) are expected to grow. In 1990, persons who did not graduate high school were the largest education segment of the 55-and-older age group, almost four times larger than the number of college graduates. (See chart 3.) By 2020, the number of high school dropouts will decline by more than one-third and make up the smallest education segment among Wisconsin's older adults.

Among the population ages 65 and older, high school dropouts outnumbered college graduates by better than 5 to 1 in 1990. Thirty years later, however, college graduates are expected to surpass those who failed to complete high school.

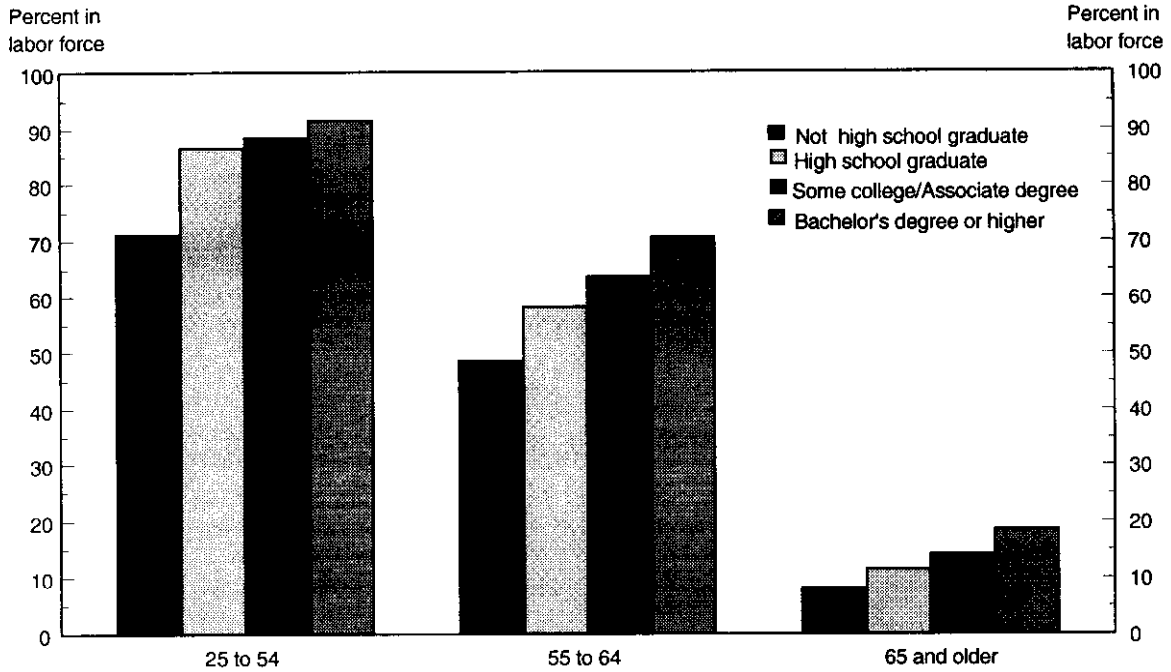
Chart 4 shows the percent distribution of the State's older population by educational attainment in 1990 and the two selected projection years. The educational composition of the older population will shift dramatically over the 30-year projection horizon. In 1990, persons without a high school diploma constituted 40 percent of Wisconsin's population aged 55 and over, but by 2020, their share is expected to drop to 15 percent. The proportion of persons with at least some postsecondary education is expected to almost double between 1990 and 2020, from 25 percent to 47 percent. For persons age 65 and older, the proportion without a high school diploma will drop from nearly 1 in 2 (48.4 percent) in 1990 to less than 1 in 5 (18.5 percent) by 2020. One important assumption built into the model holds that members of each cohort have completed their education by age 25, that is, the education distribution of each cohort remains fixed over the 30-year horizon. (See the appendix for a complete discussion of model assumptions and limitations.) The limiting effect of this assumption is conspicuous in the almost identical share of college graduates within the two age groups (55 and over; and 65 and over) in 2020. Fifteen years earlier, the share of college graduates in the broad age group, 55 and over, was 18 percent, 5 percentage points more than the corresponding share in the 65-and-over group, but this advantage disappears by 2020.

Wisconsin's projected labor force

Impact of educational attainment. The higher levels of education achieved by today's younger persons in comparison with older cohorts will have a notable impact on the labor force status of older persons in the next century. (See table 1.) When the effects of education on labor force participation are accounted for, the size of Wisconsin's older labor force in 2005 is 21,000 larger than the preliminary projection which ignores the coming changes in educational composition. By 2020, the gain among the older labor force reaches 38,500, an increase of 6.8 percent over the preliminary projection.

The impact of educational composition increases with age for both men and women. Among men, the gain from the 2020 preliminary to the revised projection is 2.4 percent for

Chart 1. Labor force participation in Wisconsin, by age and educational attainment, 1990



SOURCE: Census of Population and Housing, 1990, Public Use Microdata Sample, Wisconsin 5 percent file.

Chart 2. U.S. labor force participation rates of persons age 55 and older, by years of school completed, 1975-93, selected years

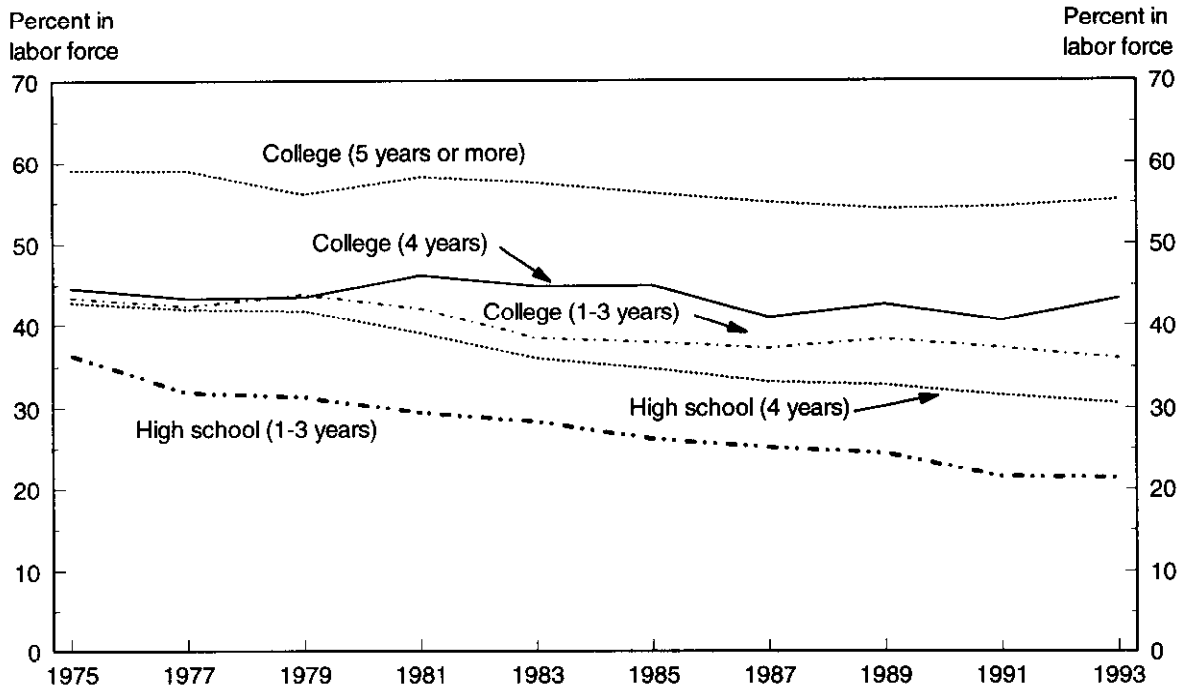


Table 1. Preliminary and revised labor force projections for older persons by age and sex, Wisconsin, 2005 and 2020

Age group	2005				2020			
	Labor force projection		Change due to education		Labor force projection		Change due to education	
	Preliminary ¹	Revised ²	Number	Percent	Preliminary ¹	Revised ²	Number	Percent
All persons, 55 and older	417,393	438,419	21,026	5.0	568,414	606,870	38,456	6.8
55 to 64	345,270	361,759	16,489	4.8	453,009	475,493	22,484	5.0
55 to 59	232,725	241,849	9,124	3.9	272,667	281,338	8,671	3.2
60 to 64	112,545	119,910	7,365	6.5	180,342	194,155	13,813	7.7
65 and older								
Men, 55 and older	241,257	252,862	11,605	4.8	329,481	349,300	19,819	6.0
55 to 64	197,836	206,683	8,847	4.5	259,039	269,902	10,863	4.2
55 to 59	133,385	137,633	4,248	3.2	155,239	158,917	3,678	2.4
60 to 64	64,451	69,050	4,599	7.1	103,800	110,985	7,185	6.9
65 and older	43,421	46,179	2,758	6.4	70,442	79,398	8,956	12.7
Women, 55 and older	176,136	185,557	9,421	5.4	238,933	257,570	18,637	7.8
55 to 64	147,434	155,076	7,642	5.2	193,970	205,591	11,621	6.0
55 to 59	99,340	104,216	4,876	4.9	117,428	122,421	4,993	4.3
60 to 64	48,094	50,860	2,766	5.8	76,542	83,170	6,628	8.7
65 and older	28,702	30,481	1,779	6.2	44,963	51,979	7,016	15.6

¹ Derived with 1990 age-sex-specific labor force participation rates.

² Derived with 1990 age-sex-education-specific labor force participation rates.

ages 55 to 59, 6.9 percent for ages 60 to 64, and 12.7 percent for the age range 65 and older. The same pattern by age prevails among older women in the labor force.

In general, the impact of education on labor force attachment is greater for older women than for older men. The difference between the 2005 preliminary and revised projection is 5.4 percent for women in the larger age group 55 and older, compared with 4.8 percent for men. When the age bands are more narrowly defined, however, gains are greater for men than for women at some ages. In the 60–64 age group in 2005, the difference in the two sets of projections is 7.1 percent for men and 5.8 percent for women. At ages 65 and older, the labor force increase attributable to education is 6.4 percent for men, compared with 6.2 percent for women. The projections for 2020 exhibit a clearer pattern. The percent change is higher for women than for men at all ages in 2020.

Wisconsin's older labor force is expected to change substantially in size and educational composition over the projection period, as exhibited in chart 5. In 1990, high school dropouts outnumbered college graduates in the State's older labor force. Fifteen years later, however, college graduates in the work force are expected to reach 115,000 in number, more than twice the size of the labor force segment without a high school diploma. The share of high school dropouts is expected to fall by two-thirds between 1990 and 2020, from about 27 percent of the older labor force to only 9 percent. (See

chart 6.) Two out of three older workers in 1990 had not attended college, but by 2020, a slight majority (55.4 percent) of Wisconsin's older work force can be expected to have at least some postsecondary education.

Chart 6 shows that the share of older persons with a Bachelor's degree or higher is projected to decline marginally from 2005 to 2020. This outcome is attributable in large part to our assumption which holds that each individual's education is completed by age 25. A large proportion of workers in the 55 and older age group in 2020 will be composed of persons who were age 25 to 34 in 1990. Our assumption holds the share of college graduates in this cohort artificially low. (See appendix.)

At ages 65 and older, college graduates in the labor force are expected to close the gap and slightly outnumber high school dropouts as early as 2005. By 2020, college graduates will outnumber the least-educated group by more than three to one. In spite of the impressive overall growth forecast for the labor force at ages 65 and older, the relatively small numerical contribution made by workers of this age within the entire older work force is immediately evident when comparing the bar heights on the left and right sides of chart 5. (A detailed tabulation of 1990 base data and projections for 2005 and 2020 by age, sex, and educational attainment is presented in table A in the appendix.)

Chart 3. Older population in Wisconsin, by age and educational attainment, 1990 and projected 2005, 2020

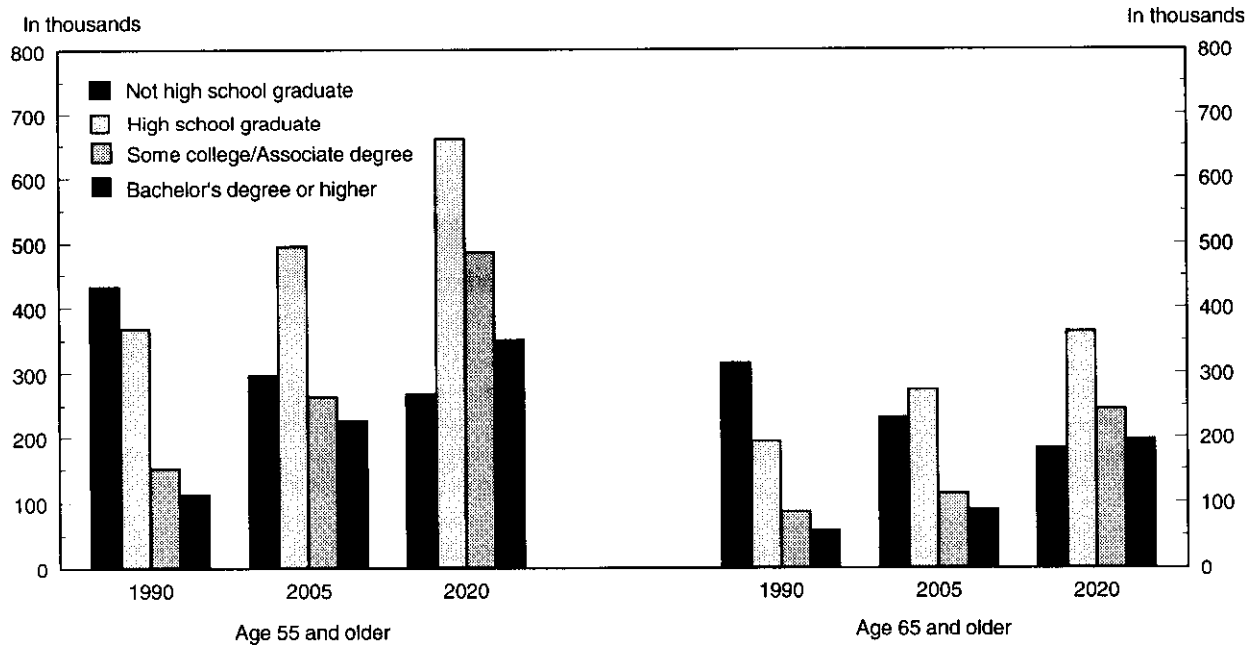
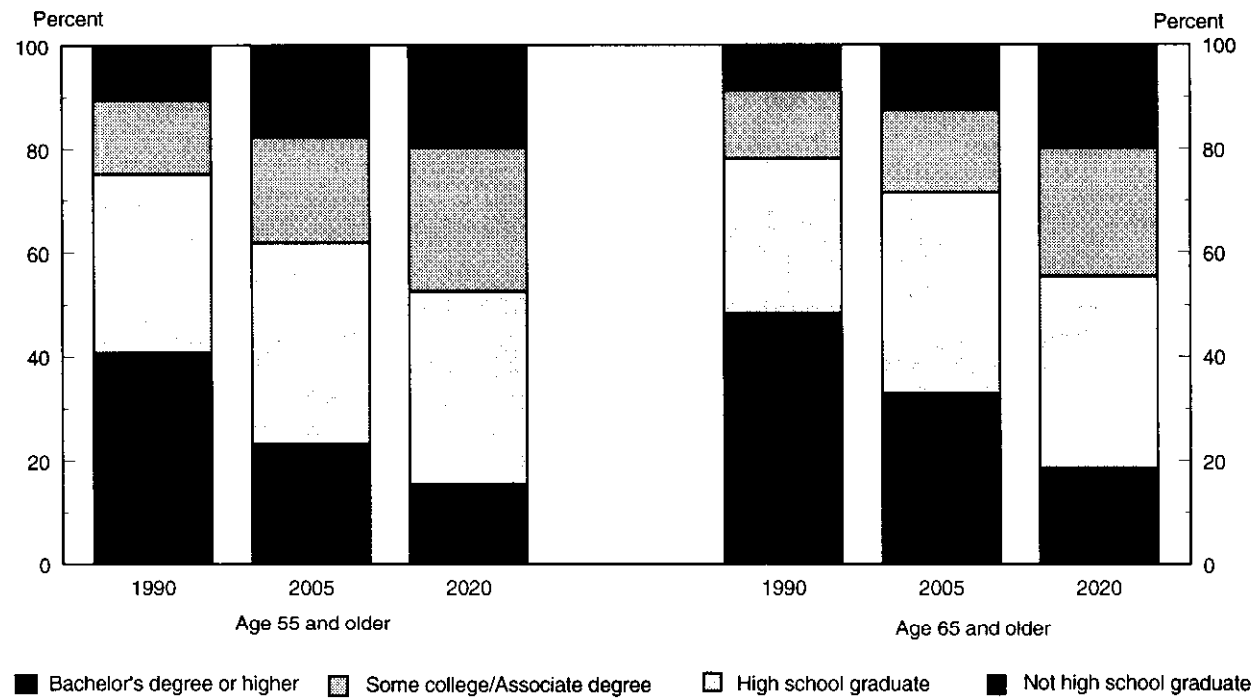


Chart 4. Percent distribution of older population in Wisconsin, by age and educational attainment, 1990 and projected 2005, 2020



Labor force participation rates. The impact of education on labor force participation among older persons can also be viewed in the changes in labor force participation rates. Age-sex-specific labor force participation rates for 1990 were compared with participation rates implied from the revised labor force projection for both 2005 and 2020. The projection year labor force participation rates are termed "implied" because they are derived after the distributions of population and civilian labor force, by level of education, are calculated. Wisconsin's labor force participation rates for 1990, 2005, and 2020 are shown in table 2. The implied rates in 2005 and 2020 are discernibly higher than those in 1990 for both sexes. The largest rate increase between 1990 and 2020 is observed at age 60-64, for both men and women. The participation rate in 2020 for men at ages 60-64 is 57.8, a gain of 3.7 percentage points over the 1990 rate. Women in this age group are expected to boost their participation rate by 3.3 percentage points over the same period.

The increases in labor force participation rates attributable to changes in educational composition were somewhat greater for men than for women. For the broad age group 55 and older, the increase in participation rates between 1990 and 2020 is 5.1 percentage points for men and 4.8 points for women. For ages 65 and older, the participation rate gains are projected to be 2.9 percentage points for men and 1.8 points for women. In the 55-64 age group, however, gains in labor force participation between 1990 and 2020 are virtually equal for men and women.

Table 2. Labor force participation rates, Wisconsin, observed 1990 and implied 2005 and 2020

Characteristic	Labor force participation rate			Change, 1990-2005	Change, 1990-2020
	1990	2005	2020		
All persons, 55 and older	29.2	34.2	34.4	5.0	5.2
55 to 64	58.0	63.0	61.0	5.0	3.0
55 to 59	70.5	73.5	72.9	3.0	2.4
60 to 64	45.8	48.8	49.4	3.0	3.6
65 and older	10.8	10.8	13.3	.0	2.5
Men, 55 and older	38.2	44.2	43.3	6.0	5.1
55 to 64	67.8	73.1	70.6	5.3	2.8
55 to 59	81.6	84.2	83.5	2.6	1.9
60 to 64	54.1	57.9	57.8	3.8	3.7
65 and older	15.8	16.0	18.7	.2	2.9
Women, 55 and older	22.1	26.2	26.9	4.1	4.8
55 to 64	48.9	53.1	51.8	4.2	2.9
55 to 59	60.0	63.0	62.6	3.0	2.6
60 to 64	38.1	40.3	41.4	2.2	3.3
65 and older	7.4	7.3	9.3	-.1	1.8

Race and ethnicity

One limitation of our analysis relates to the fact that the model does not account for differences in labor force participation by race or ethnicity, assuming instead that all race and ethnic groups demonstrate identical patterns of labor force attachment. (See appendix.) A comparison of 1990 labor force participation rates between older black adults and older adults of all races reveals only small differences when both sexes are considered together, but race differences are evident when rates for men and women are examined separately. Table 3 presents 1990 participation rates for all persons and black persons ages 55 and older. We focus on black persons because they constitute Wisconsin's largest minority group.

Among all Wisconsin men 55 and older in 1990, 38.4 percent were active in the labor force, compared with 33.7 percent of older black men. Older black women, on the other hand, had higher rates of labor force participation than their white counterparts (27.5 percent, black, versus 22.1 percent, all races), according to the full census sample. At the national level, the same general race-sex pattern prevailed at ages 55 and over.

Projected shifts in racial composition will increase the share of blacks in Wisconsin's population over the 30-year projection period. Blacks accounted for 5.0 percent of all Wisconsin residents in 1990, and this share is expected to grow to 6.6 percent in 2005 and 8.2 percent in 2020. The growth in black population share is similarly evident at ages 55 and older. The black share in the older population is expected to grow from 2.2 percent in 1990 to 3.0 percent in 2005 and 3.9 percent in 2020. Although black persons constitute a larger share of the U.S. population, the growth in their share is projected to be more moderate nationwide than that in Wisconsin. Projected changes in racial composition could have a substantial impact on the labor force projections in this study if differences in labor force participation rates by race become significantly wider than what was measured in 1990.

Other factors to consider

Insufficient attention has been given to the changing composition of the older adult population by level of education and the effect this might have on labor force participation. This article attempts to show that this compositional change in the labor force can be expected to lead to greater labor force participation among older adults which, when coupled with inevitable population growth in the 55-and-older age group, will result in sizable labor force gains. In addition to being larger in size, the older work force will be better educated and is likely to be more productive, individually and collectively, as well.

A number of other factors besides education will influence

Chart 5. Older labor force in Wisconsin, by age and educational attainment, 1990 and projected 2005, 2020

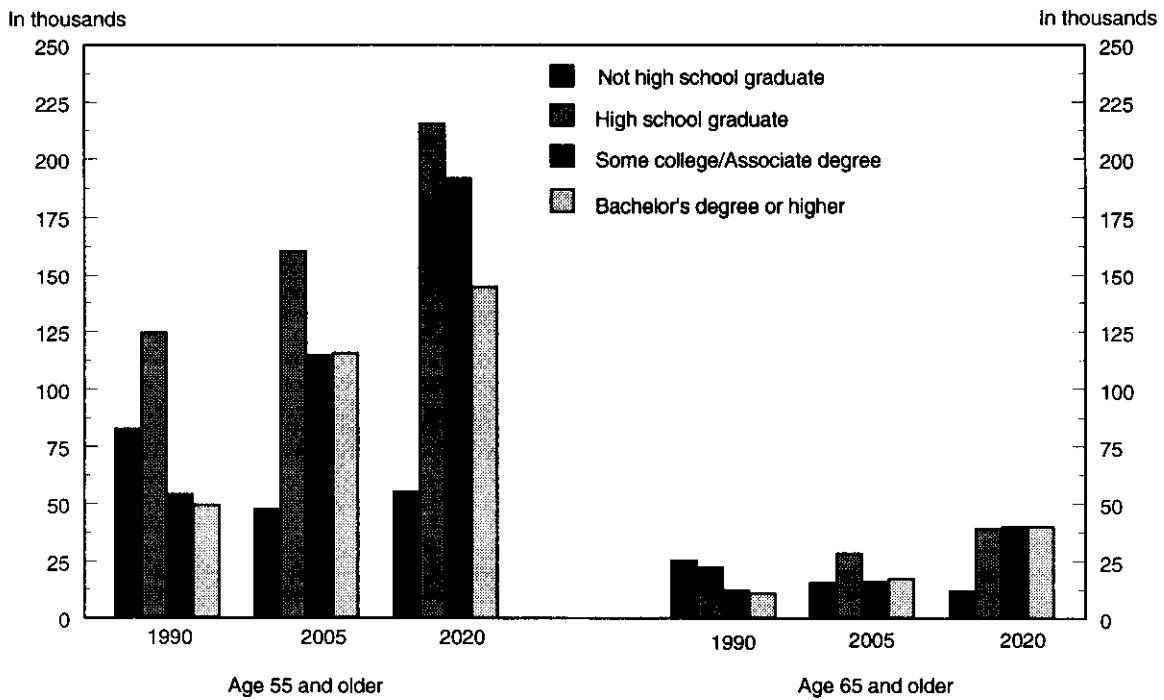


Chart 6. Percent distribution of older labor force in Wisconsin, by age and educational attainment, 1990 and projected 2005, 2020

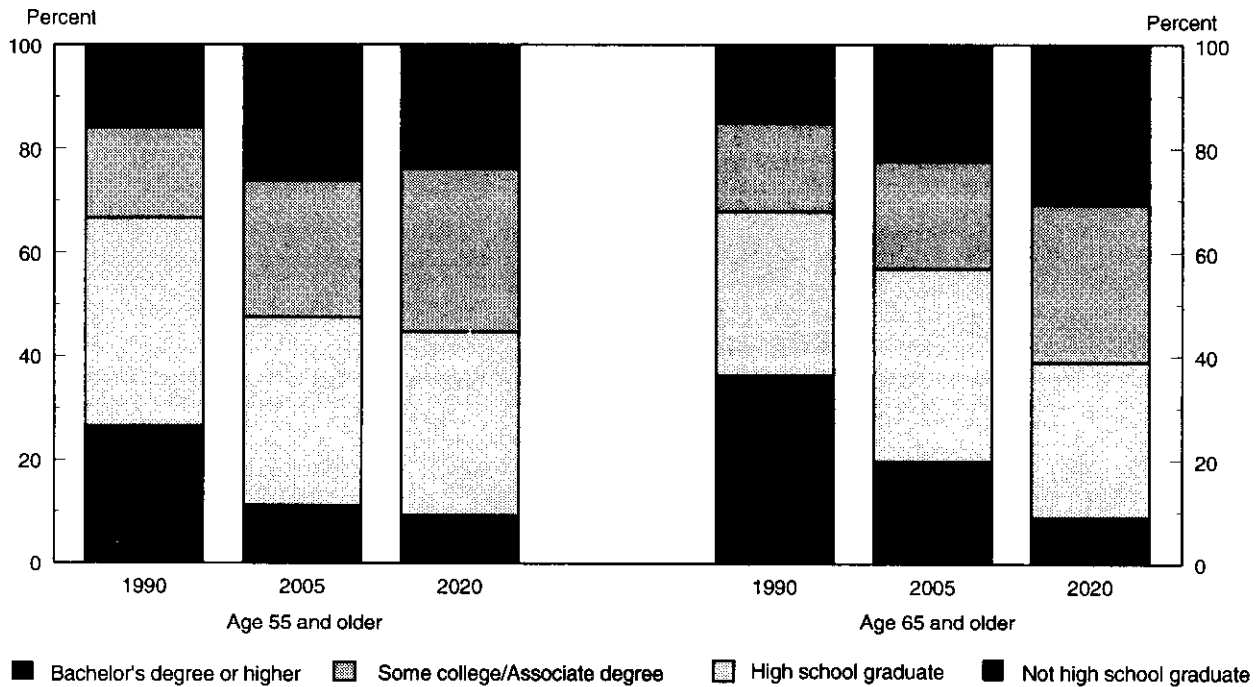


Table 3. Labor force participation rates for persons ages 55 and older, by sex and race, Wisconsin and United States, 1990

Area	Total		Men		Women	
	All races	Black	All races	Black	All races	Black
Wisconsin	29.2	30.1	38.4	33.7	22.1	27.5
United States . . .	29.7	29.8	39.5	35.7	22.4	25.8

SOURCE: U.S. Bureau of the Census, *Social and Economic Characteristics*, reports CP-2-1 and CP-2-51.

the decision older persons make when they consider leaving or remaining in the labor force. Regulations implemented over time will raise the normal retirement age for full Social Security benefits from 65 to 67. Furthermore, growth in Social Security benefits occurring over the past 30 years has made early retirement more affordable, but federal budget deficits might prohibit this growth from continuing. The tight budget environment will also affect medicare, the health insurance program for the elderly, which is projected to run out of funds before 2002, before the first baby boomers reach age 65.¹⁰ The anticipated reduction of these government benefits is likely to impose financial burdens which may compel older workers to delay retirement.

Defined contribution plans, such as 401(k), have grown rapidly in recent years at the expense of traditional pension plans. Participation in 401(k) plans has been on the rise, but one-quarter of eligible employees did not participate in 1994. Many financial experts suggest that workers who participated in defined contribution plans and individual retirement accounts (IRAs) are too conservative in their investment choices, avoiding stocks in favor of fixed-income and money market accounts which may not keep pace with inflation. Workers assume the entire risk of poor investment performance in these self-directed retirement accounts; a conservative strategy may leave insufficient funds at the desired retirement age and end up postponing retirement for many older workers.

Rising divorce rates over the past three decades may reduce the availability of pension income to some older adults, particularly older women. Women who may have counted on sharing their husband's pension income will need to pro-

vide for themselves after divorce, and may be forced to continue working, perhaps well beyond age 65. In addition to the social and economic developments outlined earlier, legislation eliminating mandatory retirement and outlawing age discrimination has removed obstacles which in the past may have discouraged some older persons from remaining in the work force.¹¹ Finally, the evolution of desktop computer technology, including user-friendly software, should help reduce the physical demands of holding a job, lessening the importance of poor health as a reason older adults leave the labor force.

CONSIDERING THE SOCIAL AND ECONOMIC FACTORS outlined in this article, and accounting for the changing composition by level of education, we expect higher labor force participation rates among older adults in the next century. Labor force projections which assume that participation rates for persons aged 55 and older will remain at the current low levels may be overly pessimistic and may underestimate the future labor force. □

Footnotes

¹ Olivia S. Mitchell and Anna M. Rappaport, "Innovations and Trends in Pension Plan Coverage, Type, and Design," in Ray Schmitt, ed., *The Future of Pensions in the United States* (Philadelphia, PA, Pension Research Council and University of Pennsylvania Press, 1993) pp. 53-91.

² Murray Gendell, and Jacob S. Siegel, "Trends in retirement age by sex, 1950-2005," *Monthly Labor Review*, July 1992, pp. 22-29.

³ Phillip B. Levine and Olivia S. Mitchell, "Expected Changes in the Workforce and Implications for Labor Markets," in *Demography and Retirement: The Twenty-first Century*, Anna M. Rappaport and Sylvester J. Schieber, eds. (Westport, CT, Praeger, 1993), pp. 73-96. Also see, Ronald E. Kutscher, "New BLS projections: findings and implications," *Monthly Labor Review*, November 1991, pp. 3-12.

⁴ Howard N Fullerton, Jr., "Labor force projections: the baby boom moves on," *Monthly Labor Review*, November 1991, pp. 31-44.

⁵ Fullerton, "The baby boom," *Monthly Labor Review*.

⁶ Levine and Mitchell, "Expected Changes in the Workforce."

⁷ Kutscher, "New BLS projections," *Monthly Labor Review*.

⁸ Fullerton, "The baby boom," *Monthly Labor Review*.

⁹ Ibid.

¹⁰ Levine and Mitchell, "Expected Changes in the Workforce."

¹¹ Ibid.

Appendix: Data and methodology

Data sources

This analysis uses the Wisconsin 1990 Public Use Microdata Sample 5 percent file to calculate labor force participation rates and the distribution of Wisconsin's adult population by age, sex, and educational attainment. The study also incorporates age-by-sex population projections developed by the Demographic Services Center of

the Wisconsin Department of Administration, using a cohort component model. The model uses the 1990 modified age distribution, produced by the Census Bureau, as the base-year population. The model did not incorporate explicit economic assumptions concerning variables such as interest rates or employment by industry and occupation. Alternative scenarios for high, middle, and low series projections were not considered.

This article makes no distinction between full-time and part-time employment and makes no attempt to distinguish between a person's "career" job and another "postcareer" field of employment, which presumably would place fewer demands on the older worker.

Methodology

The study compares two alternative labor force projections for persons ages 55 and over. A preliminary projection is produced through a standard approach using age-sex-specific labor force participation rates. The revised projection attempts to account for the effects of education on labor force participation. The data indicate that persons with higher levels of educational attainment are more likely to remain in the labor force at older ages. The revised labor force projection quantifies the labor force gains that may result when younger cohorts with higher levels of educational attainment replace the current generation of older adults.

Preliminary labor force projection. A preliminary labor force projection, disregarding education characteristics, was produced by applying age-sex-specific labor force participation rates to 5-year age-sex cohorts (over the age of 55) projected for 2000, 2005, 2010, 2015, and 2020. Only the civilian population was considered in calculating rates of labor force participation. Rates were computed by dividing the civilian labor force at each age by the civilian population at the same age. The ratio can be multiplied by 100 to express the term as a percent.

A constant 1990 age-sex-specific labor force participation rate is applied to the projected population in each age-sex cell in each projection year. Holding the labor force participation rate constant appears to be a reasonable assumption in view of the data presented in the text which suggest that participation rates have stabilized in recent years. It may be a conservative assumption in light of BLS projections which expect higher participation rates at age 55 and older in the future.

Revised projections. The revised labor force projection incorporates a number of key assumptions, the first of which involves the distribution of each 5-year age-sex cohort by educational attainment. The four education levels considered in this study are: (1) not a high school graduate, (2) high school graduate, (3) some college or Associate degree, and (4) Bachelor's degree or higher.

Members of each cohort are assumed to have completed their education by age 25. In other words, the education distribution of each cohort is assumed to remain fixed over the 30-year projection period. This assumption means that persons do not improve their educational status once they have passed their 25th birthday, effectively discounting the possibility that they may later enroll in or complete the next level of education attainment. For example, 19.5 percent of Wisconsin men in the age group 25–29 in 1990 had completed college; 30 years later in 2020, we assume an identical share of men ages 55–59 to be college graduates. This assumption particularly limits the share of college completers in the younger cohorts (ages 25–29 and 30–34 in 1990 who will be ages 55–64 in 2020). The share of college graduates in the 55–64 age group in 2020 is thus held artificially low by this conservative assumption (See table A.) Highlighting the conservative nature of our assumption, Census data demonstrate that school enrollment among young adults has risen in recent decades. In Wisconsin in 1990, 10.7 percent of adults in the age group 25 to 34 were enrolled in school, an increase from 7.4 percent in 1980. At the national level in 1990, an even higher share of young adults—11.7 percent of the 25–34 age

group—were enrolled in school. Clearly, a sizable minority of young adults are continuing their education beyond age 25, a trend that is not considered in the model adopted in this article. The procedure described in the following sections understates the educational level of the future population and its impact on the projected labor force.

The proportional distribution of each age-sex cohort among the four education levels is applied to the projected population to yield a distribution of persons by educational attainment in each projection year, updating age. For example, the projected male population ages 55 to 59 in 2020 is disaggregated into educational attainment segments by applying the 1990 education proportions for men ages 25 to 29 in 1990. Mortality risks are assumed to remain the same for all persons irrespective of their educational attainment. This is yet another conservative assumption, considering the inverse association between mortality and education.¹

The next step required detailed labor force participation rates by age, sex, and education. These rates were based on cross-tabulations retrieved from the 1990 Public Use Microdata Sample file. Another assumption comes into play here. The labor force participation rates by age, sex, and education for persons age 55 and older in 1990 are assumed to hold good for each projection year. Forty separate participation rates (five age groups by two sexes by four levels of education) are applied to the 40 population cells projected by age, sex, and education for each projection year. The revised labor force projection is the sum of cells across the four levels of education within each age-sex cohort.

Limitations of the model

The labor force projections presented in this article were derived from population projections developed by age and sex from a cohort component model. Age-sex-specific labor force participation rates were applied to the projected population in each age-sex cell to produce a preliminary labor force projection. To account for the inevitable improvement in educational attainment among older adults in the next century, a revised labor force projection was prepared using age-, sex-, and education-specific labor force participation rates.

Our labor force projection model rests on three major assumptions discussed in the previous section. Each assumption represents a conservative approach that will tend to understate labor force participation among older persons, if recent trends continue. First, labor force participation rates for the older population are assumed to remain at their 1990 levels, despite recent evidence that these rates are moving upward, in particular for the growing segment of older persons who have graduated from college. Secondly, despite evidence to the contrary, we assume that survival probabilities are equal within each age-sex group, regardless of educational attainment. This assumption effectively understates the share of persons with postsecondary education—those with the highest rate of labor force participation. Thirdly, the model incorporates the assumption that persons who were ages 25 and older in 1990 have completed their education. This assumption especially limits the share of college graduates in the cohort which will be ages 55–64 in 2020.

Future changes in racial and ethnic composition constitute another limitation of the model, a factor which may counteract our conservative assumptions. Labor force participation rates in this study were calculated for all races together. The model assumes that all race and ethnic groups demonstrate identical patterns of labor force attachment after age 55.

A final limitation of the model involves the migration component of population change. The model assumes that migrants, either

Table A. Population and civilian labor force at age 55 and older, by age, sex, and educational attainment, Wisconsin, 1990 and projections for 2005 and 2020

Characteristic	Population				Civilian labor force			
	Not a high school graduate	High school graduate	Some college or Associate degree	Bachelor's degree or higher	Not a High school graduate	High school graduate	Some college or Associate degree	Bachelor's degree or higher
All persons								
55 and older								
1990	432,064	368,517	151,895	111,957	82,391	124,481	54,167	49,483
2005	296,204	495,390	263,225	226,402	47,575	160,309	114,870	115,665
2020	267,812	660,568	486,125	350,044	55,215	215,624	191,528	144,503
55 to 64								
1990	116,960	175,463	66,023	55,049	56,899	102,192	42,075	38,887
2005	65,346	221,792	149,762	137,677	32,370	131,774	99,082	98,533
2020	85,320	297,817	241,609	154,258	43,509	176,300	151,395	104,289
65 and older								
1990	315,104	193,054	85,872	56,908	25,492	22,289	12,092	10,596
2005	230,858	273,598	113,463	88,725	15,205	28,535	15,788	17,132
2020	182,292	362,751	244,516	195,786	11,706	39,324	40,133	40,214
Men								
55 and older								
1990	196,631	142,857	66,699	59,278	52,311	62,565	29,938	33,115
2005	129,549	199,292	121,662	121,198	29,479	85,422	64,681	73,280
2020	121,443	293,231	220,625	171,629	34,711	125,871	102,311	86,407
55 to 64								
1990	63,595	72,552	32,493	32,362	35,850	51,298	23,559	25,462
2005	33,616	99,100	73,871	76,150	19,626	70,412	55,865	60,780
2020	45,795	148,980	112,009	75,520	27,114	103,770	80,473	58,545
65 and older								
1990	133,036	70,305	34,206	26,916	16,461	11,267	6,379	7,653
2005	95,933	100,192	47,791	45,048	9,853	15,010	8,816	12,500
2020	75,648	144,251	108,616	96,109	7,597	22,101	21,838	27,862
Women								
55 and older								
1990	235,433	225,660	85,196	52,679	30,080	61,916	24,229	16,368
2005	166,655	296,098	141,563	105,204	18,096	74,887	50,189	42,385
2020	146,169	367,337	265,500	178,415	20,504	89,753	89,217	58,096
55 to 64								
1990	53,365	102,911	33,530	22,687	21,049	50,894	18,516	13,425
2005	31,730	122,692	75,891	61,527	12,744	61,362	43,217	37,753
2020	39,525	148,837	129,600	78,738	16,395	72,530	70,922	45,744
65 and older								
1990	182,068	122,749	51,666	29,992	9,031	11,022	5,713	2,943
2005	134,925	173,406	65,672	43,677	5,352	13,525	6,972	4,632
2020	106,644	218,500	135,900	99,677	4,109	17,223	18,295	12,352

SOURCE: Age group totals in 1990 are taken from the modified age, race, sex distribution produced by the Bureau of the Census. Population totals projected by age and sex for 2005 and 2020 were produced by the Wisconsin Department of Administration and published in *Official Population Projections: 1990-2020*,

Issued June 1993. The population in each year was disaggregated by level of education following procedures outlined in the appendix. Labor force data were derived from this population distribution, following procedures described in the appendix; projections for 2005 and 2020 represent the revised series.

interstate or international, have a similar distribution, by level of education, to the 1990 resident population, within age-sex cohorts. A detailed study of 1985-90 migration data found Wisconsin to be a net exporter of college graduates over the 5-year period, but gross migration flows into and out of Wisconsin are small and likely to have no appreciable effect on the education distribution within any age-sex cohort.² At the national level, immigration from abroad can be expected to have a noticeable impact on the educational distribution of the future population and labor force, but the age composition of immigrants would appear to mitigate this impact. The median age of foreign-born persons who entered the United States between 1987 and 1990 was 25.1, according to 1990 census tabulations. Only half of

these recent immigrants would factor into our study, because persons under age 25 in 1990 do not reach age 55 in the projection period.

Footnotes to the appendix

¹ Evelyn M. Kitagawa, and Philip M. Hauser *Differential Mortality in the United States: A Study in Socioeconomic Epidemiology* (Cambridge, MA, Harvard University Press, 1973).

² William H. Frey, *Interstate Migration and Immigration for Whites and Minorities, 1985-90: The Emergence of Multi-ethnic States*, Report No. 93-297 (Ann Arbor, MI, University of Michigan, Population Studies Center Research, October, 1993).