

Trends in the ability to work among men and women in the older American population: 1997–2007

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Abstract Since the passage of United States (US) Social Security Amendments in 1983, the age for full Social Security benefits has been increasing from age 65 to 67 depending on one's year of birth. These increases introduce incremental savings in the long-term funding of the US public pension system, but they assume that American workers will be able to continue working past the age of 65. In this study, we examine self-reported work disability for men and women using the 1997 through 2007 National Health Interview Surveys. There are small but significant decreases in work disability and fairly significant increases in labor force activity among men and women in their 60s and for women in their 50s over the 11-year period, and relatively little difference between men's and women's trends. Changes in the educational composition of the population play a major explanatory role in the decrease of work disability. Without this compositional shift, work disability would have increased. Increased obesity over this period exerted an opposite effect; without this change, the decrease in work disability would have been greater.

Keywords Social security · Disability · Pensions · Retirement · Obesity

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Introduction

Since the passage of United States (US) Social Security Amendments in 1983, the age for full Social Security benefits has been increasing from age 65 to age 67 depending on one's year of birth. These increases were mandated to introduce incremental savings in the long-term funding of the US public pension system, but they assume that American workers will be able to continue working past the age of 65. In 1999, Crimmins and colleagues examined work disability between the ages of 50–69 with the aim of determining whether these increases in the normal retirement age were feasible. Findings at the time indicated that between 1982 and 1993 inability to work decreased so the percentage unable to work at age 67 in 1993 was lower than the percentage unable to work at age 65 in 1982. Findings also indicated that, although some subgroups of the population were disadvantaged in work ability, there had been improvements in work ability in the overall population of older workers (Crimmins et al. 1999).

The topic of disability in old age, usually defined as 65 and older, has been widely discussed over the past 30 years. In the 1970s, the US appeared to exhibit an increase in disability (Crimmins et al. 1989; Colvez and Blanchet 1981; Verbrugge 1984). There is general agreement, however, that the trend then reversed so that disability declined in the 1980s and 1990s (Crimmins and Saito 2001; Crimmins et al. 1997; Freedman et al. 2002, 2004; Manton et al. 1983, 1995, 1997; Schoeni et al. 2001).

However, when trends in the later middle ages or younger retirement ages are examined, it is not clear that there has been recent improvement. A number of authors have noted an increase in disability of various types in these age groups (Bhattacharya et al. 2008; Lakdawalla et al. 2004; Reynolds et al. 1998; Seeman et al. 2010).

While examinations of trends in ability to perform specific tasks such as walking, lifting, and carrying have also indicated improvements for older persons (Crimmins and Saito 2000; Freedman and Martin 2000), there are no such improvements for those in the 40–59 age range (Martin et al. 2009).

Explanations for improvements in disability among the older group include the reduction in disability connected with multiple conditions (Crimmins and Saito 2000; Cutler et al. 2008; Schoeni et al. 2008) and the increase in education level of the population (Freedman and Martin 1999; Schoeni et al. 2008). Some authors have attributed up to half the improvement observed to the increases in education. On the other hand, one explanation for the lack of improvement in ability or the deterioration in functioning among the younger group has been the rise in obesity in the American population (Alley and Chang 2007; Seeman et al. 2010).

Given these findings, our expectation is that we are unlikely to find that work ability has improved among the working age population. At the same time, the state of the US and world economies are such that calls for further increasing the retirement age, or perhaps even increasing the age for early retirement at reduced benefits (currently age 62), are already being heard (Turner 2007). Trends in labor force by gender have also changed the situation. In recent years, labor force participation rates have increased among older women so that larger proportions of women are working and larger proportions of the labor force are female now than in the past (Alley and Crimmins 2007). The higher rates of disabling conditions among women could lead to higher proportions of women with work limiting conditions (Verbrugge 1984). It makes sense, then, to revisit the issue of whether the US working age population has continued to experience improvement in work ability since the late 1990s.

Methods

The Data

Data for this analysis of persons aged 50–69 come from the US National Health Interview Surveys (NHIS) for the years from 1997 through 2007. The NHIS is an annual, ongoing, household survey designed to monitor the health and health care utilization of the non-institutionalized US population. Data are collected under the auspices of the National Center for Health Statistics (NCHS); the method of collection is well documented and will not be repeated here (NCHS 2009a). The annual sample size is about 17,000 adults in the 50–69 age range.

In 1997, the NHIS questionnaire underwent major revisions to the questions used to monitor population disability and health. Since 1997, the questionnaire has remained substantially the same, making analysis of trends since 1997 possible. Potentially important wording changes were also made to the questions on work disability between 1996 and 1997. Prior to 1997, all persons older than 17 and younger than 70 were asked about their activity limitation status in two questions (NCHS 2009b): “does any impairment or health problem NOW keep _____ from working at a job or business” and “is _____ limited in the kind OR amount of work _____ can do because of any impairment or health problem?” Beginning in 1997, the questions are asked of all respondents age 18 and older, and instead are worded (NCHS 2009a): “does a physical, mental, or emotional problem NOW keep _____ from working at a job or business?” and “is _____ limited in the kind OR amount of work _____ can do because of a physical, mental, or emotional problem?” These questions allow each respondent to be classified as “unable to work...,” “limited in amount or kind of work...,” or “not limited in ability to work” because of a physical, mental, or emotional problem. We examine trends in two variables: unable to work or not and limited in work ability which includes both unable and limited.

Covariates

In order to better understand time trends, we include controls for population compositional variables that could affect work ability. These include age, race/ethnicity, educational level, and obesity. Race/ethnicity is determined by the answers to two questions: “Do you consider yourself to be Hispanic or Latino?” A subsequent question asks: “What race or races do you consider yourself to be?” (NCHS 2009a). Because Hispanics can self-identify as Caucasian (white) or African American, they are normally classified in the US separately, while the others are specified as non-Hispanic whites or non-Hispanic African Americans.

We use educational attainment as a continuous variable, years of schooling completed. Obesity is defined as having a body mass index (BMI) of 30 or more, in accordance with accepted standards (WHO 2004). BMI is calculated from self-reported height and weight using the standard formula of weight in kilograms divided by squared height in centimeters.

Methods

In order to examine time change in ability to work, individual-level data are pooled over 11 years to examine the effect of being 1 year closer to 2007 while controlling for

compositional effects. This pooled data set has a total N of about 185,000. Our analysis is based on logistic regression equations. First, we control for age and gender. We then examine the effect of changing population composition in terms of race and ethnicity, education, and obesity status by adding these variables to the equation. The analysis takes the form:

$$\log(P/1 - P) = a + \beta_1 X_1 + \varepsilon_1,$$

where P is the probability of being unable to work (or limited in ability to work) and X_1 is a vector of independent variables including years since 1997 (time), age, sex, non-Hispanic African American, Hispanic, years of completed education, and obesity. Controlling for all of these characteristics standardizes for any changes in the composition of the population (in age, race, education, and obesity) that might have occurred over the 11 years and indicates the effect of change over time with a standard population. We also examine interaction terms to determine whether the time trend differs by gender, race/ethnicity, or education, and whether the effect of obesity varies with gender. We also examined interactions between obesity and time and found no significant trend.

Results

The characteristics of the pooled sample for this age group are presented in Table 1. Women make up 52% of the sample and are slightly older than the men (Table 1). While most of the differences between men and women are quite small, women are more likely to be non-Hispanic African American, or Hispanic than the men, and to have approximately 1/2 fewer years of education on average. Women are more likely to be obese, and to report both inability to work, and limitation in ability to work.

Table 2 Trends in years of educational attainment and percent obese as measured by body mass index, by gender: 1997–2007, 1997–2002, and 2003–2007

	1997–2002 Mean (SD)	2003–2007 Mean (SD)	1997–2007 Mean (SD)
Men			
No. years of education***	14.37 (3.88)	14.95 (3.61)	14.62 (3.77)
Percent obese***	25.10	28.77	26.58
Women			
No. years of education***	13.92 (3.50)	14.64 (3.37)	14.23 (3.46)
Percent obese***	26.40	29.72	27.72

*** $p < 0.001$; p values indicate significant differences between the periods

Persons in this age range have changed in composition even over this short period of time. For example, racial/ethnic composition between 1997 and 2007 showed a 7.8% decrease in whites who are not Hispanic; virtually no change in African Americans, a 26.3% increase in Hispanics, and a 16.7% decrease in those from “other” race groups (data not shown). In addition, men’s average years of school completed rose from 14.4 during the first half of the period to nearly 15 years in the second half; at the same time, women’s average years of school completed rose from just under 14 years during the first half of the period to 14.6 in the second half (Table 2). Women were more likely to be obese in both halves of the period, and both men and women’s rates of obesity increased by ~3% points between the first and second half.

Labor force participation also changed but the change was differential by sex. Men reported slightly less participation in 2007 than in 1997 (e.g., 79.6 vs. 82.2% for those age 50–54) but more participation for those age 60–64 (58.2 vs. 50.1%). The percent of women in the labor force increased from 65.0 to 67.8% for those in the 50–54-year

Table 1 Characteristics of the sample: percents (Means/SD) from National Health Interview Surveys, 1997–2007, total sample, and by gender

	Total ($n = 185,115$)	Men ($n = 87,840$)	Women ($n = 97,275$)
Age***	(58.08/5.70)	(57.99/5.71)	(58.16/5.69)
Female	52.05	–	–
Non-Hispanic African Americans***	9.83	9.03	10.56
Hispanic*	7.93	7.79	8.05
Education***	(14.41/3.62)	(14.62/3.77)	(14.23/3.46)
Obese ^a , ***	27.19	26.58	27.72
Unable to work*	10.43	10.24	10.60
Limited in ability to work***	16.28	15.84	16.69

^a $N = 78,415$; the sample who responded to questions on body mass index came from a subsample of the person file

* $p < 0.05$, *** $p < 0.001$; p values indicate significant gender differences

Table 3 Trends in labor force status by gender and for men and women 50–69 in 5-year age groups: NHIS 1997–2007

	50–54		55–59		60–64		65–69	
	1997	2007	1997	2007	1997	2007	1997	2007
Men								
Working	82.2	79.6	71.1	72.2	50.1	58.2	26.6	32.7
Unemployed	5.1	5.2	4.9	5.7	3.5	4.3	1.3	2.5
Keeping house	0.2	0.4	0.2	0.8	0.4	0.7	0.4	0.1
Retired	2.1	2.1	9.6	6.9	31.1	24.1	64.5	54.4
OutLF—Health	7.9	7.9	11.5	11.2	12.9	8.9	6.3	5.9
OutLF—Other	2.6	4.8	2.7	3.3	2.0	3.7	1.0	4.6
Women								
Working	65.0	67.8	51.8	62.2	35.4	40.9	16.6	18.4
Unemployed	5.5	5.6	4.5	5.0	2.6	3.3	1.4	2.0
Keeping house	14.3	12.0	19.9	12.6	18.6	12.0	20.4	11.6
Retired	2.4	1.8	9.5	7.6	27.9	27.0	51.7	55.8
OutLF—Health	9.1	7.7	10.4	7.6	12.4	10.8	8.3	7.8
OutLF—Other	3.6	5.1	4.1	4.9	3.1	6.1	1.7	4.4

Percents may not add to 100 due to rounding

OutLF out of the labor force

age group and from 35.4 to 40.9% for those between 60 and 64 (Table 3).

The results of the regression of being unable to work on reporting in a more recent year for the 50–69-year-old sample are shown in Table 4. When age and sex are controlled, we find a significant effect of years since 1997 such that the relative likelihood of being unable to work is somewhat lower in more recent years (Table 4, Model 1). We show the analogous regression results for the measure of work limitation, being limited in ability to work in Table 5 (Model 1). There is also significantly less work limitation in later years. The effect is small, with a decrease in the relative likelihood of about 1 to 1½% per year, so with age and gender composition of the population constant, both indicators of work ability would have improved over time.

Older persons are more likely to report that they are unable or limited in work ability. Each year of age increases by almost 3% the relative likelihood that one will be unable to work and by nearly 4% the relative likelihood that one will be limited in work ability. Women are somewhat more likely to report inability to work. We find that being female increases the relative likelihood of being unable to work by about 3% (Table 4, Model 1) and increases the relative likelihood of being limited in work ability by almost 6% (Table 5, Model 1). There was no significant interaction between gender and time indicating a similar trend for men and women.

When we control for race and ethnicity, we find that both Blacks and Hispanics are more likely to report an

Table 4 Hierarchical logistic regression on the probability of being unable to work: NHIS 1997–2007, *n* = 185,115

	Model 1 Parameter estimates [odds ratios]	Model 2: Model 1 + Race/Ethnicity Parameter estimates [odds ratios]	Model 3: Model 2 + Education Parameter estimates [odds ratios]	Model 4: Model 3 + Education × Time Parameter estimates [odds ratios]	Model 5: Model 4 + Obese Parameter estimates [odds ratios]	Model 6: Model 5 + Obese × Female Parameter estimates [odds ratios]
Years since 1997	−0.0103*** [0.990]	−0.0113*** [0.989]	0.0112*** [1.011]	−0.0081 [0.992]	0.0030 [1.003]	0.0026 [1.003]
Age	0.0270*** [1.027]	0.0279*** [1.028]	0.0124*** [1.012]	0.0123*** [1.012]	0.0023 [1.002]	0.0022 [1.002]
Female	0.0329* [1.033]	0.0195 [1.020]	−0.0064 [0.994]	−0.0063 [0.994]	−0.0253 [0.975]	−0.1747*** [0.840]
Non-Hispanic Black		0.7002*** [2.014]	0.4957*** [1.642]	0.4951*** [1.641]	0.4706*** [1.601]	0.4499*** [1.568]
Hispanic		0.1939*** [1.214]	−0.5935*** [0.552]	−0.5903*** [0.554]	−0.4841*** [0.616]	−0.4932*** [0.611]
Education			−0.1573*** [0.854]	−0.1642*** [0.849]	−0.1660*** [0.847]	−0.1658*** [0.847]
Education × Time				0.0015* [1.001]	0.0012*** [1.001]	0.0012 [1.001]
Obese					0.5038*** [1.655]	0.2677*** [1.307]
Obese × Female						0.4208*** [1.523]
Adj. <i>R</i> ²	0.0049	0.0155	0.0748	0.0749	0.0932	0.0950
−2 Log Likelihood	122,992.79	122,031.71	112,961.70	112,956.43	55,659.001	55,577.967

The introduction of obesity reduces the number of respondents in Models 5 and 6 to 78,415

* *p* < 0.05, *** *p* < 0.001

Table 5 Hierarchical logistic regression on the probability of being limited in ability to work (including Unable): NHIS 1997–2007, $n = 185,115$

	Model 1	Model 2: Model 1 + Race/Ethnicity	Model 3: Model 2 + Education	Model 4: Model 3 + Obese	Model 5: Model 4 + Obese \times Female
	Parameter estimates [odds ratios]	Parameter estimates [odds ratios]	Parameter estimates [odds ratios]	Parameter estimates [odds ratios]	Parameter estimates [odds ratios]
Years since 1997	−0.0161*** [0.984]	−0.0166*** [0.984]	0.0024 [1.002]	0.0086** [1.009]	0.0087** [1.009]
Age	0.0367*** [1.037]	0.0373*** [1.038]	0.0250*** [1.025]	0.0168*** [1.017]	0.0167*** [1.017]
Female	0.0557*** [1.057]	0.0470*** [1.048]	0.0212 [1.021]	0.0151 [1.015]	−0.1037*** [0.902]
Non-Hispanic Black		0.5079*** [1.662]	0.3250*** [1.384]	0.2875*** [1.333]	0.2702*** [1.310]
Hispanic		0.0408 [1.042]	−0.6141*** [0.541]	−0.5230*** [0.593]	−0.5305*** [0.588]
Education			−0.1368*** [0.872]	−0.1388*** [0.870]	−0.1385*** [0.871]
Obese				0.5637*** [1.757]	0.3684*** [1.445]
Obese \times Female					0.3488*** [1.417]
Adj. R^2	0.0112	0.0172	0.0682	0.0877	0.0892
−2 Log Likelihood	162,773.64	162,112.40	151,730.42	73,102.244	73,024.511

The introduction of obesity reduces the number of respondents in Models 4 and 5 to 78,415

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

inability to work and work limitation (Tables 4, 5, Model 2), although the Hispanic effect is not significant for work limitations. Controlling for race/ethnicity has little effect on the coefficient indicating the time trend meaning that changes in ethnic composition are not a factor in explaining the trend. However, these controls eliminate the significance of the effect of gender on reported inability to work (Table 4), indicating that the gender effect was due to race/ethnic differences. This is not the case for work limitation (Table 5).

When the composition of the population in terms of education is controlled (Model 3), however, the initial effect of time reverses, suggesting that the relative likelihood of being unable to work would have increased in the more recent years without changes in education. When educational composition is controlled, the relative likelihood of being limited in ability to work does not change significantly with time. Educational compositional change, then, is potentially responsible for the reduction in inability to work and work limitation over this period. Without these changes in educational composition in the population, there would have been an increase in work inability and not a decrease. For reported inability to work, there is a positive interactive effect between education and time, suggesting that the education effect increases over the period. This interaction is not significantly related to work limitations.

In order to examine the effect of increasing obesity on the population's ability to work, we also control for obesity status and include an interactive effect between obesity and being female. In order to control for obesity, we were limited to responses for the years between 1997 and 2006,

for this reason the number of cases is smaller in this equation and also because height and weight were not reported by some survey respondents (Table 4, Models 5 and 6; Table 5, Models 4 and 5). The introduction of obesity again reverses the direction of the effect of time and implies a trend toward increased work inability although the effect is no longer significant (Table 4, Models 5 and 6). In the case of work limitations, the introduction of controls for increased obesity strengthens the trend toward increased work limitations in the population (Table 5, Models 4 and 5). The significant interaction of being female and obesity indicates that work ability and limitation of activity are more common among obese females than obese males. The introduction of the interaction between gender and obesity has little impact on the time trend (Table 4, Model 6; Table 5, Model 5).

In order to better interpret the meaning of the statistical results on the effects of time change in ability to work and limitation in work as well as the size of the differentials across age and sex subgroups, we estimate the probability that a person with specified characteristics would be unable to work or be limited in work ability in 1997 and 2007 using the results of the logistic regression models in Tables 3 and 4. Using coefficients from the models for age, sex, and years since 1997, we estimate the probability that a man and woman would be unable to work because of health at ages 62, 65, 67, and 69 in 1997 and 2007 (Table 6). The decrease in the estimated probability of inability to work over 10 years is 1–2.5% points—proportionately even this small decline is relatively large. This amount of change indicates that work ability levels for

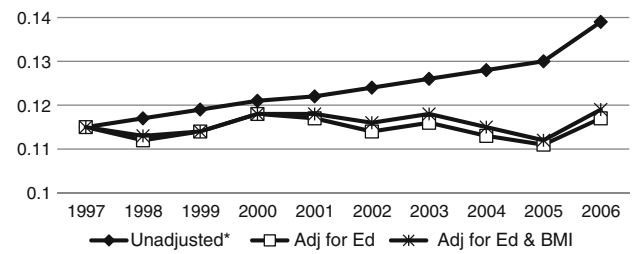
Table 6 Estimated probability of being unable to work or limited in ability to work at specified ages

	1997	2007
Unable to work		
Men		
Age 62	0.117	0.107
Age 65	0.126	0.115
Age 67	0.132	0.120
Age 69	0.138	0.126
Women		
Age 62	0.121	0.110
Age 65	0.129	0.118
Age 67	0.136	0.124
Age 69	0.142	0.130
Limited in ability to work (including Unable)		
Men		
Age 62	0.188	0.165
Age 65	0.206	0.181
Age 67	0.218	0.192
Age 69	0.231	0.204
Women		
Age 62	0.197	0.173
Age 65	0.215	0.189
Age 67	0.228	0.201
Age 69	0.241	0.213

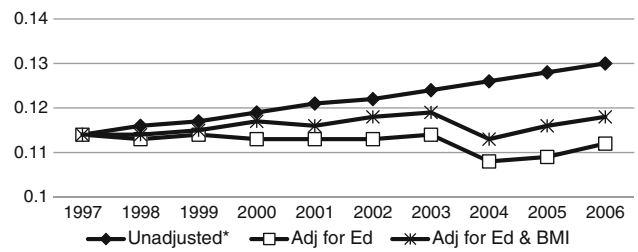
those in their late 60s in the mid-to-late 2000s are at similar levels as those in their middle 60s in the late 1990s. For example, a man aged 69 in 2007 has a similar probability of being unable to work as a man aged 65 in 1997. Estimated probabilities of inability to work are quite similar for men and women at the same age. For example, the estimated proportion unable to work at age 65 in 1997 was 12.6% for men and 12.9% for women. These dropped to 11.5% and 11.8% in 2007.

The results for work limitations are similar; a 69-year-old man in 2007 had the same probability of being limited in work ability as a 65-year-old man in 1997. Gender differences in inability to work are very small. For example, a 67-year-old woman in 2007 has a 20.1% probability of work limitation compared to 19.2% in a 67-year-old man. However, the changes over time are larger in work limitation than those for work inability, with decreases between 4 and 6% points.

In order to illustrate the relative effect of education and obesity on work inability, as an example, we estimate inability to work for males (Fig. 1) and females (Fig. 2), first adjusted only for age, sex, and race/ethnicity. We then adjust for educational attainment and, subsequently, for both education and obesity. Figure 1 shows that without adjustment for education or obesity, the probability of men



* Adjusted only for gender, race/ethnicity

Fig. 1 Relative effect of education and BMI on being unable to work: males

* Adjusted only for gender, race/ethnicity

Fig. 2 Relative effect of education and BMI on being unable to work: females

being unable to work would have increased fairly steadily during the period. By adjusting for education, the probability of being unable to work decreases and remains fairly stable. When we include the adjustment for obesity, the likelihood of a man being unable to work increases slightly. Figure 2 shows a similar increase in the unadjusted effect of time on the inability to work. When controls for education are introduced, the probability of being unable to work decreases similar to that of the men; however, additional controls for obesity (including the obese-female interactive term) make it clear that obesity has a more negative effect on women's report inability to work (Fig. 2).

Conclusions

We began this study assuming that there would be little evidence of major improvements in work disability. Instead, we find evidence of modest improvements in work ability and limitation. These improvements are enough to make persons of age 67 have work disability and limitation levels that were experienced at ages 3 years younger a decade earlier. The improvement in work ability is largely explained by increases in the average educational attainment of the population.

At the same time, the other major phenomenon is the steady increase in obesity, which had a clearly negative

effect on work disability, measured either by inability to work or by work limitations. Absent the increase in obesity in the US population over this period, the improvement in work disability in this age group would almost certainly have been greater.

Both of these findings may have interesting implications for the future. While the increase of educational attainment is important for the maintenance of a productive workforce, the undiminished increase in obesity in the US population and its potential effect on disability does not bode well (Jenkins 2004; Reynolds et al. 2005), suggesting that prospects for further improvements in the ability of the older population to work may be uncertain.

There are limitations to this study, including the reliance on self-reported estimates of work disability and limitation. In addition, the desire to control for increasing prevalence of obesity required us to use a smaller subsample, although the trend in obesity is significant enough to warrant doing so. What we do not find is overly strong differences between men and women, at least in terms of the time trends. Although when pooled together, men and women have differing rates of reported work inability and limitation (Table 1), these differences are positively affected by increased education level in the women over time, but negatively affected by increases in obesity in the women (Table 2), and also their increase in labor force participation relative to men, particularly in their 50s. Increasing educational attainment and decreasing obesity will help the US government to ensure an increasingly healthy and productive workforce.

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