Estimating Work Capacity Among Near Elderly and Elderly Men

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As the population ages, labor force growth will fall, and demand for labor will increasingly have to be met by older workers. At the same time, pressures on Social Security and Medicare finances mean that older people may be required or incentivized to work to older ages – if they are able to do so. Both of these factors call for an understanding of the work capacity of the elderly and near-elderly populations.

Currently, labor force participation rates decline markedly with age. Seventy-three percent of men aged 55-59 are in the labor force, compared to 49 percent of men aged 60-64 and 23 percent of men aged 65 and 69. If this reflects declining work capacity, the possibility of future labor force increases is limited. But it may reflect desire and incentives as much as ability. Older men may be capable of working but have taste or incentive reasons to avoid doing so.

Work capacity is difficult to infer from existing data because many factors affect work capacity and those factors vary in different ways across the age spectrum. Chronic conditions and mobility limitations clearly inhibit the ability to work (Munnell and Sass, 2006), and both rise markedly with age. On the other hand, obesity and smoking are each related to reduced work capacity (Lakdawalla et al., 2004), and both of those decline with age. Thus, some elements of work capacity are rising at older ages. As a result, the net change in ability to work as people age is unknown.

The goal of this paper is to measure the work capacity of near elderly and elderly men. The analysis proceeds in two steps. First, I determine how various measures of health and health behaviors are related to capacity to work, using data on employment, self-reported

disability, and earnings aged 55 to 59. I then use that relation to simulate work capacity at older ages, in some cases as old as people aged 95.

I show that work capacity declines only slowly through the mid-70s, and then declines more rapidly thereafter. Relative to men in their late 50s, work capacity is about 90 percent as high at age 65, and 70 percent as high at age 75. The capacity for additional employment among near elderly and elderly men is thus very high.

The paper is structured as follows. The next section documents the data and methodology that I employ. The second section looks at trends in ability to work for the overall male population, and the third section considers racial and socioeconomic subgroups. The last section concludes.

I. Data and Methodology

I measure work capacity in two steps. The first step relates a measure of work capacity for 55-59 year old men to health and demographic factors:

$$\text{Work Capacity} = X\beta_1 + H\beta_2 + \varepsilon \qquad (1)$$

where X denotes demographic variables and H is health status variables. In the second step, I predict employment outcomes for men aged 55-94, using the estimated coefficients $\widehat{\beta_1}$ and $\widehat{\beta_2}$.

HRS Data

The analysis uses data from the Health and Retirement Study (HRS). The HRS surveys people aged 51 and older biannually beginning in 1992, with the most recent data from 2006. I use the Rand version of the HRS files, which have been adjusted for coding changes over time

(St. Clair et al., 2009). All men are in the analysis with the exception of the small number of men with missing demographic or health status information.

Data for equation (1) are taken from waves 2 through 8 of the survey, spanning the time period from 1994 through 2006. I omit the first wave because health questions changed greatly from wave 1 to wave 2. The standard errors in equation (1) are clustered to account for the multiple observations on each individual.

Work capacity is then estimated for men aged 60-94. I focus on the male population to avoid issues associated with women's decisions to be in or out of the labor force. The upper limit reflects the substantially diminished number of men alive at very advanced ages. All data are weighted to national totals using the sample weights.

Measures of Work Capacity

I use three measures of work capacity in estimating equation (1). The first is whether the person is employed. Since most men aged 55-59 are employed (73 percent in the 2006 HRS), lack of employment is a broad measure of inability to work. The second measure of work capacity is more specific to disability. I use a dummy variable for whether the person reports they are not at work because of a disability. Four percent of men aged 55-59 report they are not at work because of a disability.[1] The third measure of work capacity is earnings. People with particularly low earnings may be considered 'unable to work', even if technically they could hold a job. The average male aged 55-59 earned $70,000 in 2006.

[1] In addition to working or being disabled, 20 percent of men aged 55-59 report they are fully or partly, and 2 percent are unemployed.

Employment and self-reported disability are both dichotomous outcomes, which I model using logistic analysis. The logarithm of earnings is modeled using ordinary least squares. The predictions of this model are then exponentiated and averaged to form average predicted earnings.

Health Behaviors

The HRS asks consistently about smoking and BMI, which I use in the analysis. Smoking is measured with dummy variables for current, former, and never smokers, and BMI is measured with dummy variables for underweight, normal weight, overweight, obese, and missing BMI, based on self-reported height and weight. The upper part of table 1 shows how these risk factors vary by age. Current smoking rates decline markedly with age, from 21 percent of the population aged 55-64 to 2 percent of the population aged 85-94. Obesity rates, and to a lesser extent overweight, also decline greatly. One-third of the male population aged 55-64 is obese, compared to only 9 percent of the population aged 85-94.

Health Conditions

The second health variables are indicators for having had a health condition. Eight conditions are asked about in the HRS: high blood pressure, diabetes, arthritis, cancer, lung disease, heart disease, stroke, and psychological problems. In each case, I use indicators for whether the person ever had the condition. With very few exceptions (e.g., psychological problems), the prevalence of these conditions all increases with age.

Heath Status

Finally, I include several measures of health status. I include dummy variables for self-reported general health status: excellent, very good, good, fair, or poor. I also include the number of limitations in activities of daily living (up to 5: bathing, dressing, eating, getting in and out of bed, and walking), the number of limitations in instrumental activities of daily living (up to 3: using the phone, managing money, and taking medications), the number of mobility impairments (up to 5: walking one block, walking several blocks, walking across a room, climbing one flight of stairs, and climbing several flights of stairs), and the number of impairments in large muscle functioning (up to 4: sitting for two hours, getting up from a chair, stooping/kneeling/crouching, pushing or pulling large objects).[2]

Demographic Controls

I include a number of demographic indicators as controls: whether the person is a veteran, race (white, black, other race), whether the person is Hispanic, marital status (married, widowed/single/divorced, never married), education (less than high school, GED, high school graduate, some college, college graduate), and dummies for wealth quartiles.

II. Overall Work Capacity Among Men

[2] I experimented with non-linear versions of the number of impairments, for example a dummy variable for any impairment in addition to the number conditional on having any, but these non-linear variables were not significantly related to work outcomes.

Table 2 shows the regression results predicting work capacity in men aged 55-59. There are 9,539 men with data on employment and self-reported disability. The earnings sample is smaller, since it only samples people with positive earnings.

The first column of Table 2 shows the regressions predicting employment. Most of the demographic coefficients are as expected (not reported). Blacks are less likely to be employed, as are less educated and lower wealth people.

Behavioral risk factors are in opposite directions. Former smokers are less likely to be at work than never smokers, but current smokers are not. Overweight and obese people are more likely to be at work than people of normal weight. The coefficients on these variables are influenced by the controls for health conditions and health status. Without health status and condition controls, overweight people are less likely to be employed than normal weight people. Thus, a good share of the impact of these risk factors is a result of their impact on otherwise measureable health status. Further, the results imply that the reduction in BMI as people age is not be associated with increased work capacity, holding conditions and health status constant.

Medical conditions, especially more severe ones, are associated with lower employment rates. Having heart problems, a stroke, or psychological problems lowers employment by 30 to 50 percent. Even chronic conditions such as arthritis are associated with worse outcomes. Measures of adverse health status have the biggest predictive power for employment. People in poor health are only 20 percent as likely to be employed as people in excellent health, for example. Each IADL impairment cuts the probability of employment in half, and mobility and large muscle impairments reduce work as well.

Since health status declines with age, and adverse health conditions increase with age, work capacity will be declining with age. Figure 1 shows the predicted measure of work capacity at different ages in 2006.[3] Work capacity declines only gradually as age increases. Relative to a predicted employment rate of 75 percent at age 55, predicted employment is 69 percent at age 65, 60 percent at age 75, and 54 percent at age 85. Even at age 94, one-third of men are in good enough health to be working.

The factors associated with the reduction in work capacity are shown in Table 3. Table 3 shows predicted employment at different ages using a number of prediction models. The first row includes only demographics in the prediction model. Work capacity declines only slightly from 55 to 75 in this model. The second row adds health behaviors – smoking and obesity – to the model. The impact of these is slight, and marginally favorable given the reduction in mean BMI at older ages. The third and fourth rows include health conditions and health status. Each of these variables explains a 10 to 15 percentage point reduction in work capacity up to age 75. At even older ages, reductions in health status dominate. As the last row shows, health conditions and health status are largely overlapping; the total decline in work capacity is similar to each one individually.

The share of men actually employed is also shown in Figure 1. There is an enormous decline in work between ages 59, when two-thirds of men are working, and age 66, when just over 20 percent of men are working. It is clear that the reduction in actual labor supply between ages 55 and 65 is not due in any significant part to reduction in work capacity.

[3] Throughout the paper, trend lines are based on a second order polynomial in age, with the exception of actual employment, which is based on a fifth order polynomial.

The middle columns of Table 2 show the predictors of self-assessed non-work because of disability. The results are generally similar to those for employment-based disability. Lower self-rated health status and activity impairments are highly related to self-assessed disability. Obese people are 60 percent more likely to self rate themselves as not working because of disability, although the standard errors on this are high.

Figure 2 shows disability-based work capacity by age. As with the work-based measure, disability remains low until about age 75, and then increases markedly. Between ages 75 and 94, disability-based inability to work approximately triples.

The final column of Table 2 shows the relation between earnings and the health measures, and figure 3 shows the predicted values.[4] Predicted earnings decline at a younger age than does expected employment. Relative to predicted earnings of people aged 55-59, predicted earnings at age 70 are about 5 percent lower. By age 75, predicted earnings are 10 percent lower. They decline even more rapidly as people age.

The rapid decline in earnings as people age may explain some of the reduction in employment. Figures 1 and 2 show the capacity of elderly men to work to later ages. But figure 3 shows that there would be an earnings reduction for doing so. Combined with Social Security and private pension incentives to retire earlier, the reduction in earnings capacity may push significantly more men into retirement.

Changes Over Time

[4] Predicted earnings in Figure 3 are below actual average earnings because of the non-linear model: exp(E[ln(earnings)]) ≠ E[earnings]. Because I am interested in the shape of the earnings profile more than the level, I do not make any adjustment for the non-linearity.

For policy purposes, it is important to know if work capacity is increasing over time. If so, that would give strong reason to increase early and normal retirement ages from their current levels. Figure 4 shows predicted work capacity in 1996 and 2006, using the employment-based measure of work capacity.[5] Figure 4 shows little change in work capacity over this decade. At 'younger' ages, work capacity increased slightly. For example, predicted work capacity rose by 2 percentage points at age 60. At 'older' ages, there was a decline of approximately equal magnitude. The cross-over is about age 78. Still, the changes are so small as to be relatively unimportant. Over this decade, work capacity for near elderly and elderly men did not show a substantial trend.

III. Work Capacity by Demographic Group

Trends in overall work capacity may mask substantial heterogeneity by demographic group, which could be important for policy. If work capacity remains high for higher SES groups but not lower SES groups, for example, policies which encouraged working to later ages would significantly disadvantage lower SES cohorts.

I show work capacity for men along two dimensions: education (less than high school, high school or GED,[6] some college, and college graduate), and race. There are obvious selection issues with education. The meaning of a high school dropout differs for older relative to younger men. To some extent, the focus on men aged 55 and older limits this selection concern. Even still, the best way to interpret these results may be as the impact of policies

[5] For sampling reasons, the HRS does not have many men aged 65-72 in 1996. I thus omit the data in this interval.
[6] The regression model separates out high school graduate from GED recipient, but the two are shown together in Figure 5 because of small numbers. They look very similar.

implemented relatively quickly. Suppose that policy today incentivized older men to work more. What is the capacity of older men to return to the work force?

Figure 5 shows work capacity at different ages by education. I show the employment measure of work capacity; the results are similar using the other measures. Work capacity is very different, even at younger ages. At age 60, for example, about 60 percent of high school dropouts are capable of working, compared to 80 percent of men with a college degree. High school graduates/GED recipients and people with some college are in the middle, with work capacity of about 70 percent.

The lower level of work capacity among less educated men is largely a result of differences in health status. For example, 56 percent of men aged 55-59 without a high school degree report themselves in fair or poor health, compared to 9 percent of men who graduated college. Similarly, the average less educated man reports 1.3 mobility impairments, compared to 0.3 among college graduates.

As people age, work capacity declines relatively evenly among different SES groups. Through age 75, work capacity declines slightly more for those with a college degree, but the gap between the highest and lowest education groups remains about 15 percentage points. After age 75, work capacity among high school/GED graduates declines markedly.

Figure 6 shows work capacity by race. The difference between blacks and whites is similar to the difference between more and less educated individuals. Work capacity among black men is about 10 to 15 percentage points below work capacity among white men. That finding is true at young ages, and remains true as men age. Again, health status is the major difference between the groups. Thirty-six percent of black men aged 55-59 report themselves

in fair or poor health, compared to 21 percent of white men. Mobility and other impairments are correspondingly higher as well.

IV. Discussion

Society will almost certainly want to increase labor supply among the near elderly and elderly populations in the coming years. A central unknown about this possibility is whether people in those age groups have the capacity to work or not. Past evidence has been conflicting on whether work capacity is high in those ages, and how it is trending.

In this paper, I combine a variety of health indicators to measure work capacity of the near elderly and elderly population. I reach two central results. First, work capacity for the typical American male remains high through the mid-70s. Using the employment-based measure of work capacity, work capacity declines by only 8 percent between ages 55 and 65, and by only 20 percent up to age 75.

The relatively small decline in work capacity through the mid-70s implies that the observed decline in employment by age represents a large loss of productive potential. Considering men aged 55-64, the gap between predicted and actual employment is 11 million men. That is, roughly 11 million more people would be working if actual employment tracked changes in predicted work capacity by age. This amount is roughly 12 percent of the male population in that age group and 8 percent of total employment in the country. Extending the analysis to higher ages, the results predict that an additional 31 million men aged 55-74 have the capacity to work, about 25 percent of the men in that age group and 22 percent of total

employment. Thus, the United States could substantially meet a coming demand for workers with increased labor force participation among the 'young elderly.'

However, the possible increase is not the same across all demographic groups. Less educated workers have 10-20 percent lower labor force capacity than better educated workers, and blacks have 10-15 percent lower work capacity than whites. A uniform increase in labor force participation across all groups might thus adversely affect racial and economic minorities. It is possible that these differences would be reflected in differential take-up of disability insurance if increased labor force participation among the elderly and near elderly were desired. It may be that an increase in incentives to work later should be accompanied by an expansion of eligibility for disability insurance.

There are several advantages of the approach I employ. First, by measuring work capacity using employment, reported disability, and wages, I can examine severe outcomes such as inability to work as well as more graduated outcomes such as earnings. In addition, the use of regression analysis allows me to weight a variety of different health indicators into an overall measure of work capacity.

There are also some limitations of the analysis. All of the HRS data are self-reported, so measurement issues are a concern. Further, the regression sample is composed of men aged 55 to 59, some of whom have already retired. For those individuals, we do not know how health conditions affect their ability to work. However, there are fewer people at younger ages with adverse health conditions, making it difficult to determine the impact of health on work using men at any younger age.

In summary, I find that work capacity remains high even through age 74, and thus there is potential for large increases in labor force participation among near elderly and elderly men, though the increase is particularly relevant for higher SES groups and racial majorities.

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Table 1: Characteristics of Male Population by Age Group, 2006

	Age Group			
Measure	55-64 (N=1,943)	65-74 (N=2,779)	75-84 (N=1,502)	85-94 (N=416)
Risk Factors				
Smoking status				
Current smoker	21%	13%	7%	2%
Former smoker	66%	70%	71%	72%
BMI				
Underweight (<18.5)	1%	1%	1%	2%
Normal weight (18.5-25)	19%	24%	32%	46%
Overweight (25-30)	47%	45%	46%	41%
Obese (>30)	33%	30%	20%	9%
Conditions				
High blood pressure	49%	61%	63%	61%
Diabetes	18%	24%	25%	20%
Arthritis	43%	60%	66%	68%
Cancer	8%	18%	26%	29%
Lung disease	6%	12%	15%	12%
Heart disease	18%	33%	46%	53%
Stroke	5%	9%	17%	20%
Psychological problem	16%	12%	10%	10%
Health Status				
Self-reported health status				
Excellent	15%	11%	8%	7%
Very good	33%	30%	26%	19%
Good	27%	32%	34%	34%
Fair	17%	20%	24%	27%
Poor	7%	7%	8%	13%
Number of ADL impairments	.19	.19	.38	.76
Number of IADL impairments	.07	.08	.21	.49
Number of mobility impairments	.69	.85	1.26	1.90
Number of large muscle impairments	.96	1.05	1.35	1.57

Note: Data are for men and are from the Health and Retirement Study. Means are weighted using sample weights.

Table 2: Models for Work Capacity, Men 55-59

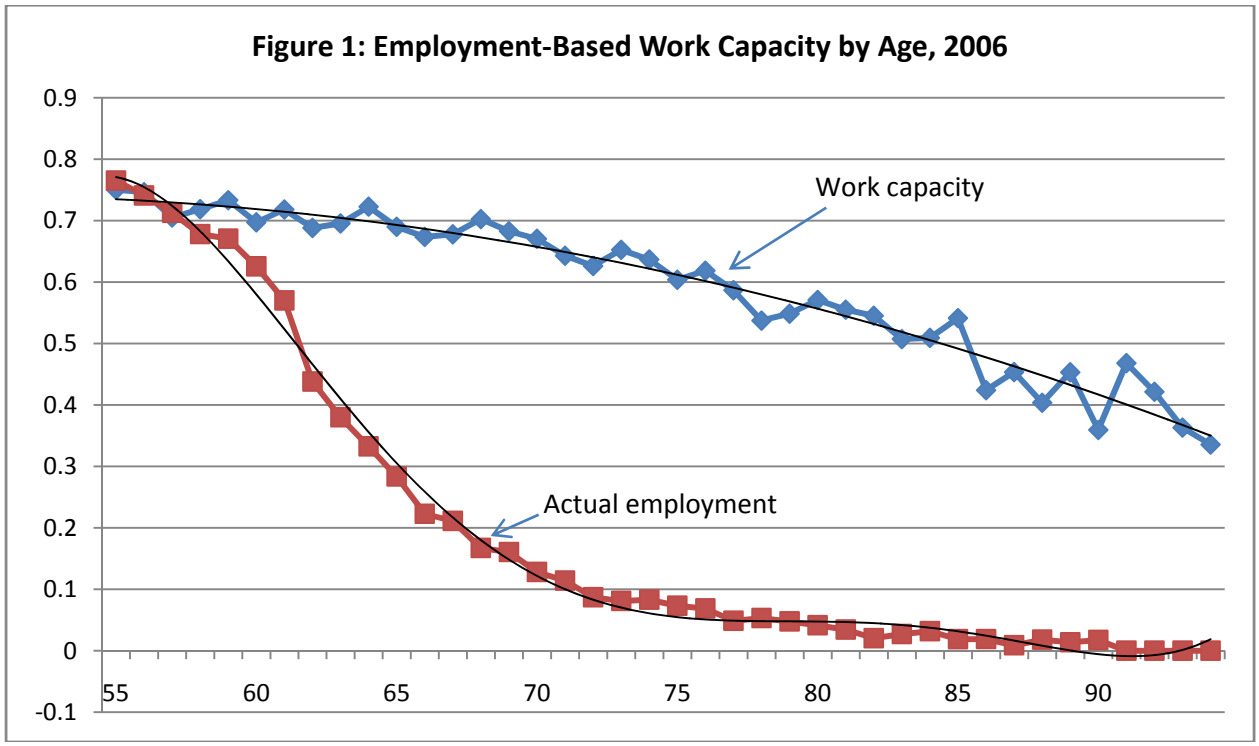
	Employment-Based		Disability-Based		Earnings-Based	
Independent Variable	Odds Ratio	Std Error	Odds Ratio	Std Error	Coef	Std Error
Risk Factors						
Smoking status						
Never smoker	1.00		1.00		.000	
Current smoker	1.02	(.10)	0.82	(.16)	-.021	(.044)
Former smoker	0.74**	(.07)	.99	(.21)	-.055	(.038)
BMI						
Normal weight	1.00		1.00		.000	
Underweight	0.78	(.40)	4.59**	(2.78)	-.051	(.337)
Overweight	1.21**	(.11)	0.73	(0.16)	.056	(.039)
Obese	1.25**	(.14)	1.60	(1.26)	.051	(.049)
Conditions						
High blood pressure	0.86*	(.07)	.71*	(.13)	-.050	(.036)
Diabetes	1.01	(.12)	.60**	(.12)	-.076	(.055)
Arthritis	0.86*	(.08)	.98	(.18)	-.023	(.038)
Cancer	0.81	(.15)	.95	(.29)	-.065	(.092)
Lung disease	1.17	(.21)	.91	(.24)	.010	(.085)
Heart disease	0.69**	(.08)	1.15	(.22)	.030	(.053)
Stroke	0.52**	(.11)	1.92**	(.51)	.099	(.114)
Psychological problem	0.63**	(.08)	2.06**	(.41)	-.142**	(.070)
Health Status						
Self-reported health status						
Excellent	1.00		1.00		.000	
Very good	0.83*	(.09)	1.24	(.58)	-.061	(.039)
Good	0.79*	(.10)	3.31**	(1.53)	-.050	(.046)
Fair	0.51**	(.07)	7.57**	(3.58)	-.107*	(.057)
Poor	0.21**	(.04)	13.12**	(6.95)	-.379**	(.129)
ADL impairments	0.90	(.07)	.83**	(.07)	-.062	(.057)
IADL impairments	0.43**	(.05)	1.92**	(.25)	-.275**	(.078)
Mobility impairments	0.73**	(.03)	1.48**	(.11)	-.035	(.027)
Large muscle impairments	0.84**	(.03)	1.25**	(.09)	-.025	(.018)
N	9,539		9,539		6,649	

Note: Regressions also include dummy variables for race, Hispanic, veteran status, marital status, education, wealth quintiles, and year of survey.

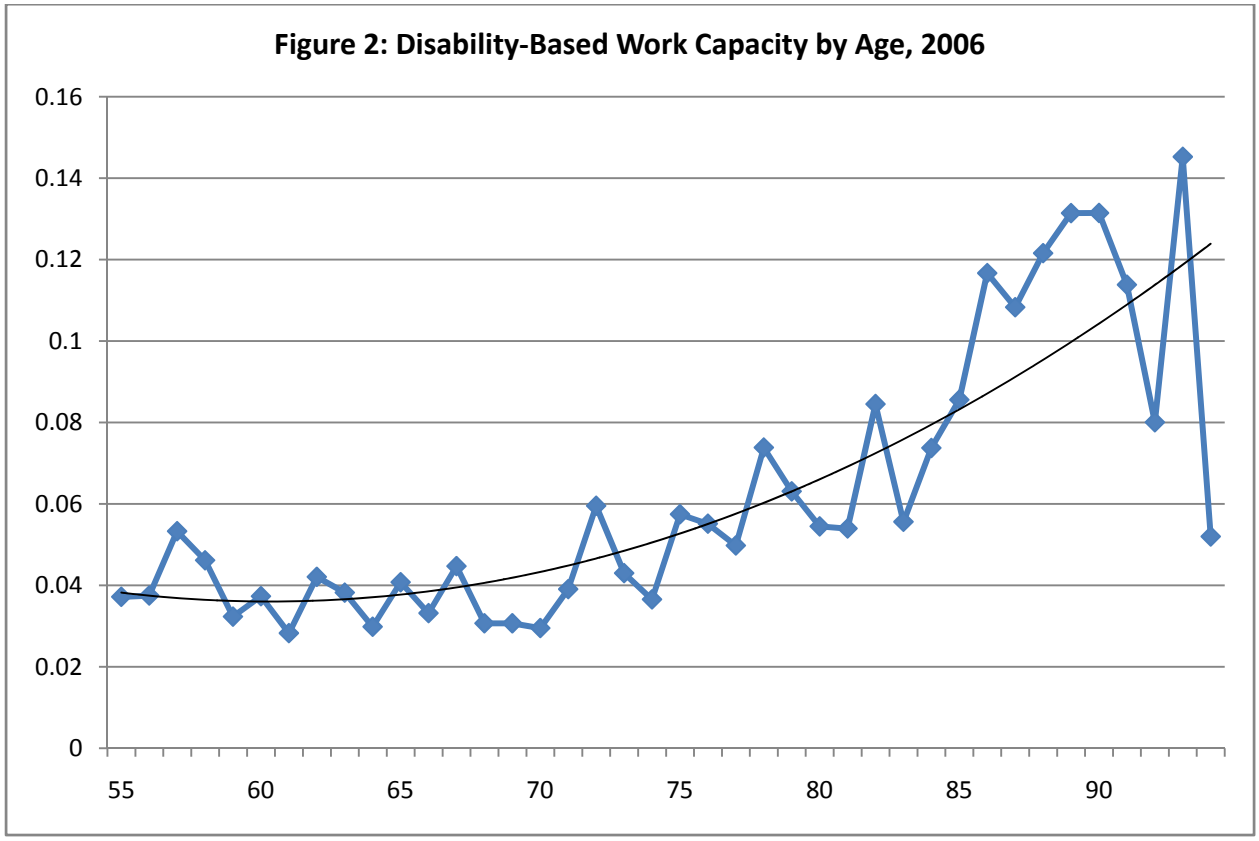
Table 3: Predicted Work Capacity at Different Ages,
Using Employment Model

Regression	55	65	75	85	94
Demographics only	72%	73%	69%	68%	68%
Demographics and behaviors	72%	72%	70%	68%	68%
Demographics and conditions	75%	67%	61%	58%	54%
Demographics and health status	74%	71%	64%	59%	39%
All Factors	75%	69%	60%	54%	34%

Note: The table shows predicted employment based on the employment measure of ability to work. Each row shows the results with a different set of controls.



Note: Data are from the Health and Retirement Study. Work capacity is measured by employment status among men aged 55-59.



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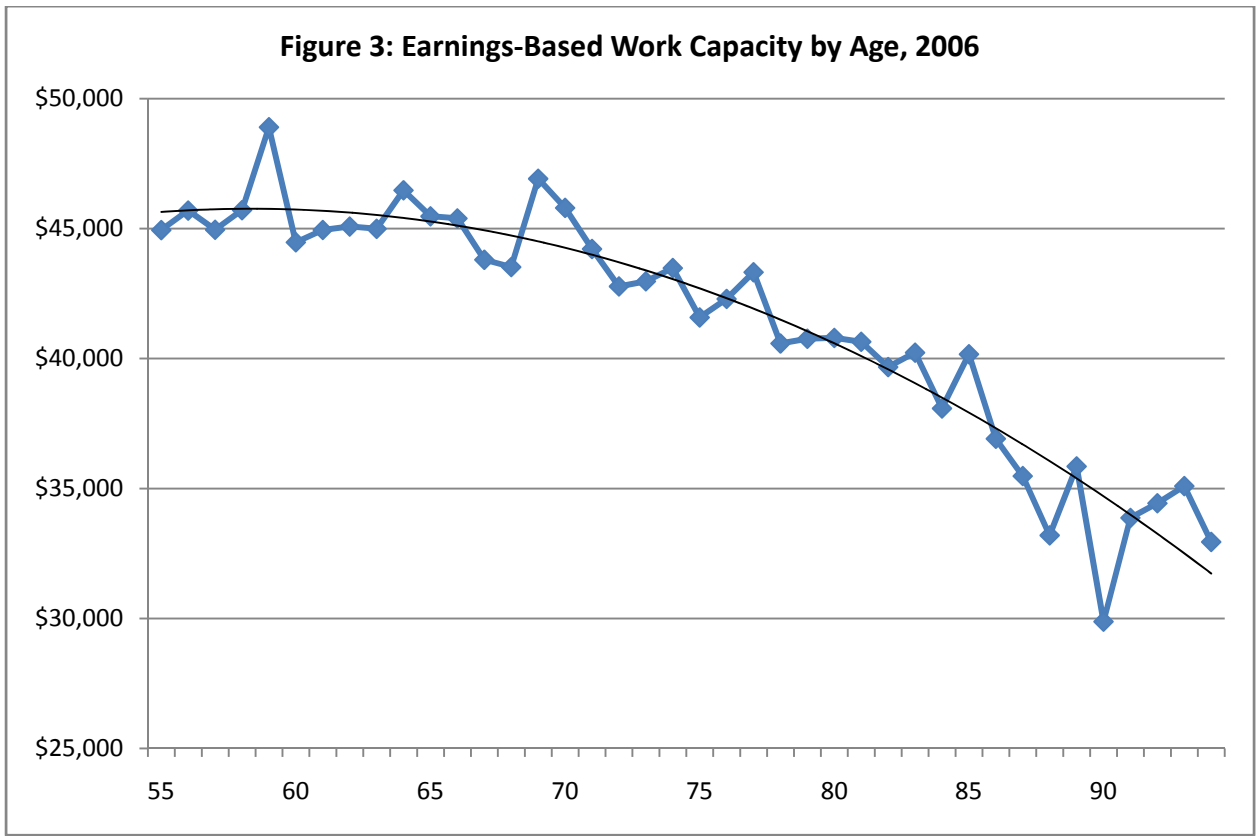
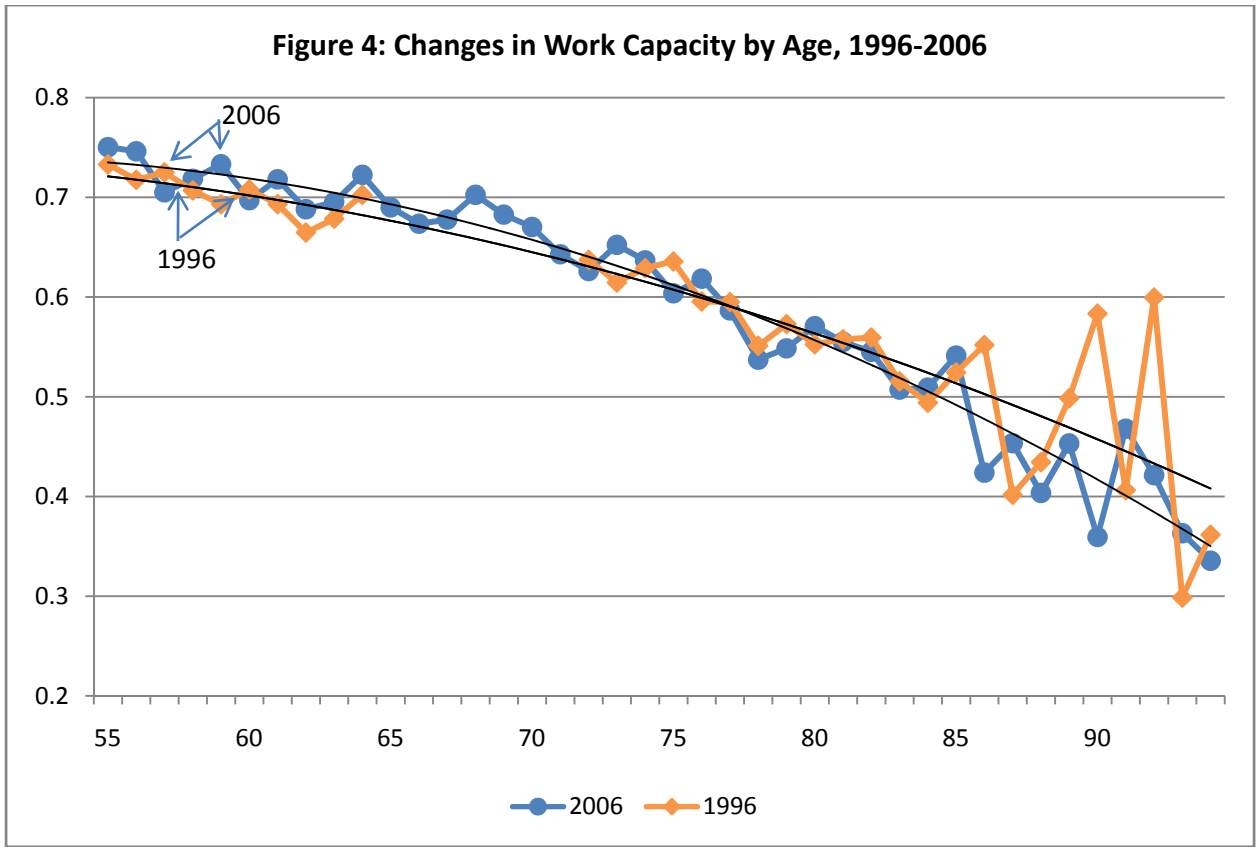
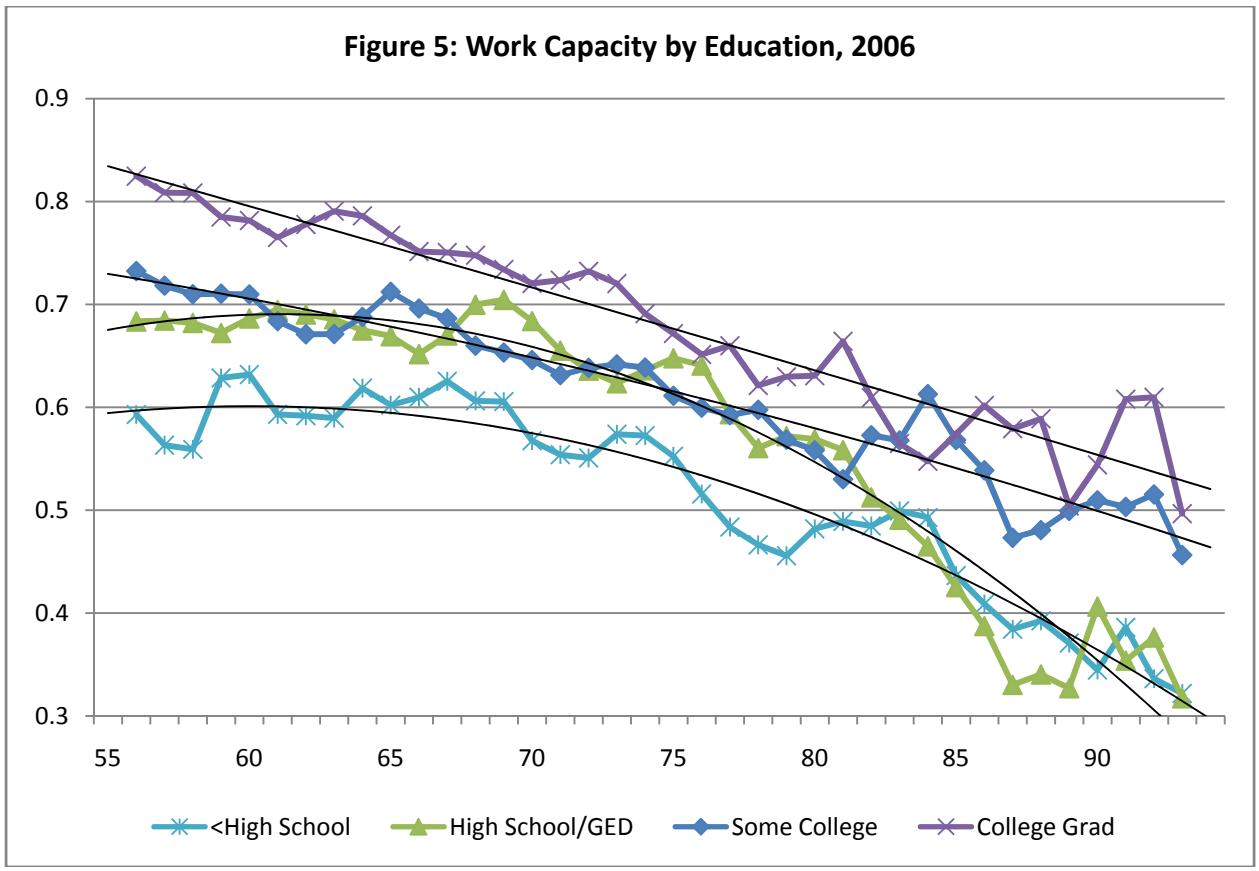


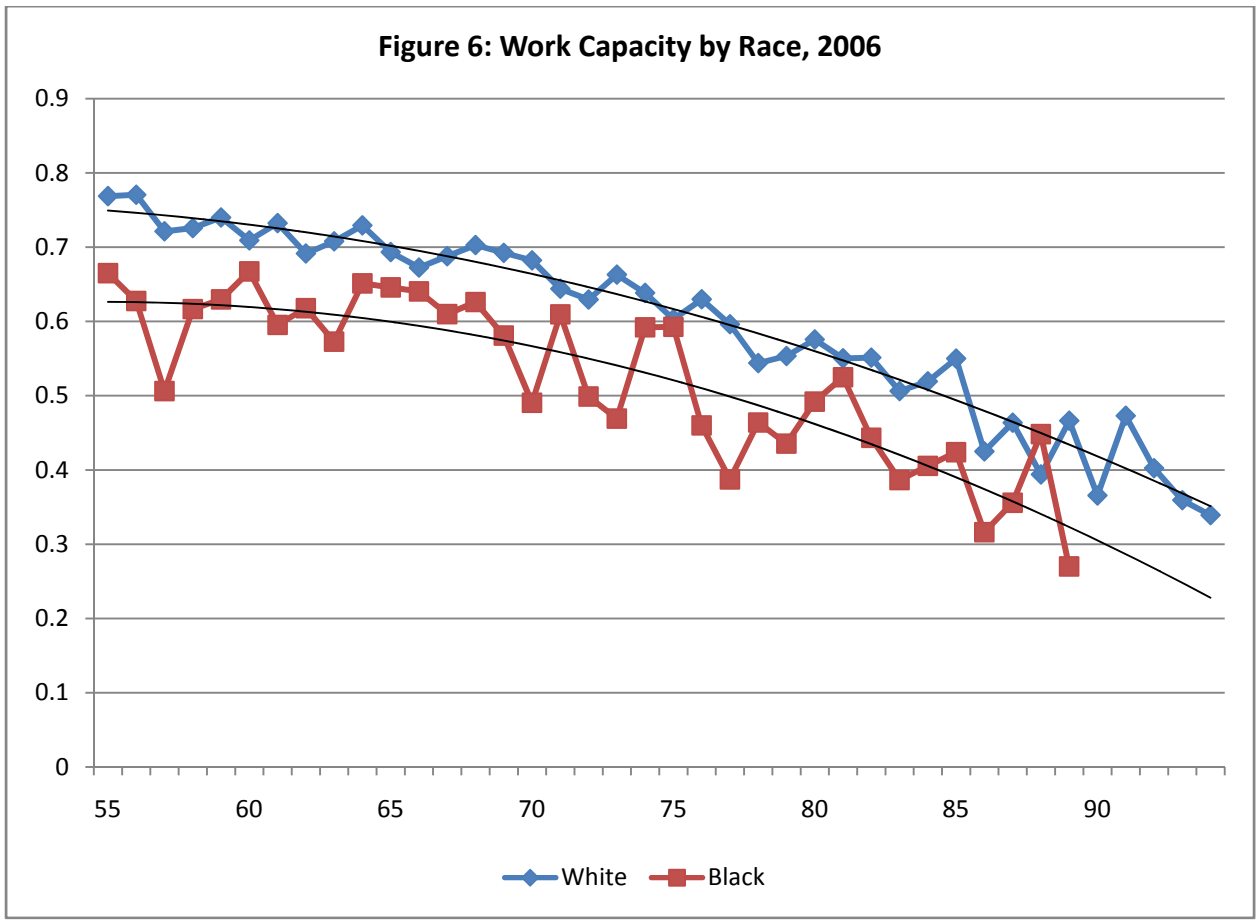
Note: Data are from the Health and Retirement Study. Work capacity is measured by annual earnings for men aged 55-59.



Note: Work capacity is measured by employment status among men aged 55-59. Because of sampling issues, there are not enough people aged 65-72 for meaningful estimates in 1996.



Note: Work capacity is measured by employment status among men aged 55-59. Because of small sample sizes at each age, data are shown as three year moving averages.



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