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Abstract

The labor force participation of men age 55-64 varies significantly among the various states of the Union. Little is known, however, about the reasons such variations exist. Using the *Current Population Survey* for the period 1977-2007, this paper demonstrates that the differences in the labor force participation of men age 55-64 are related to the labor market conditions, the nature of employment, and the employee characteristics in each state as well as a state pseudo replacement rate. These variables explain more than one-third of the total variation in labor force participation across states. Even controlling for state specific characteristics only cuts the explanatory power by half. To assess whether these relationships reflect different populations or unique aspects of the state economies, we turn to the *Health and Retirement Study* (HRS). We estimate equations for the probability of working and for the expected retirement for men in their late fifties and early sixties. We first estimate an equation predicting labor force participation using just the state-level variables taken from the CPS, then estimate an equation using both the CPS state-level variables and demographic and economic information for each individual taken from the HRS. The results show that while the state-level variables explain very little variation in an individual's probability of working or expected retirement age, most state-level variables have a statistically significant effect on such behavior both before and after the inclusion of the HRS information.

Introduction

With increasing pressure on the nation's retirement systems, questions about how long people stay in the labor force and why they decide to continue working or retire are of great importance. One avenue of investigation not previously explored is the variation in labor force activity among older workers across different states. In South Dakota, nearly 90 percent of those men aged 55-64 are in the labor force compared to only 40 percent in West Virginia (See Figure 1). The question is the extent to which this variation can be explained by differences in the people in these states and what can be explained by the state labor markets and other state characteristics.

This paper explores the relationship between labor force participation rates for older men and various state-level economic variables. Section I describes the enormous variation in labor force activity of men age 55-64 across states and documents the variation in pseudo replacement rates, labor market conditions, the nature of employment, and employee characteristics across states. Section II reports the results of equations relating the variation in labor force participation rates for older men across states to state-level economic variables, using the *Current Population Survey* for the period 1977-2007. The results show that these variables can explain more than one-third of the variation among states in the labor force activity of older men. The fact that a fixed-effects model reduces the explanatory power of these variables by only half suggests that these relationships are economically meaningful, and not driven just by unobserved differences across states in factors such as the attractiveness of a state as a retirement destination.[1]

The question remains, however, whether these relationships reflect different populations – a kind of sorting – or unique aspects of the state and its economy. To answer that question, Section III turns to the *Health and Retirement Study* (HRS). We estimate equations for the probability of working and for the expected retirement age for men in their late fifties and early sixties. In each case, the first equation includes just the state-level variables taken from the CPS, the second equation includes just individual characteristics taken from the HRS, and the third includes both the CPS state-level variables and the HRS demographic and economic information for each individual. The

[1] As we discuss below, the fixed effects estimator may obscure the effect of persistent differences across states in economic conditions, and the magnitude of the coefficient estimates from this specification should be regarded as a lower bound on the true effects.

results show that the state-level variables explain very little of the variation in an individual's probability of working or retirement age, whereas the HRS information does. Nevertheless, most of the state-level variables have a statistically significant effect on such behavior, both before and after the inclusion of the HRS information.

This analysis falls at the intersection of two strands of literature. One strand has focused on the retirement decision of older workers.[2] The other has analyzed local labor markets and the effect of local labor markets on the labor supply decision.[3] To date, only two papers have looked at the effect of local labor market conditions on the retirement decision of older workers.[4] Black and Liang (2005) exploit differences in industry composition across cities to analyze the effect of shocks to the steel industry, coal mining, and manufacturing on the labor supply decision of older workers. They find that older workers in locations with a high concentration of factories in declining industries are more likely to retire early. von Wachter (2007) finds that changes in state unemployment rates and the growth of Gross State Product and trends in total state employment affect the employment decisions of individuals nearing retirement. While these two papers analyze the relationship between retirement decisions and the local economy, neither differentiates between the importance of local economic conditions and the characteristics of the individuals in the localities. The following analysis attempts to fill that void.

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[2] For a variety of approaches, see Munnell et. al (2006), Friedberg and Webb (2003), Stevens and Chan (2001), Stock and Wise (1990), and Gustman and Steinmeier (1986). Gustman and Steinmeier (1986) construct a life-cycle retirement model to take into account the dynamic nature of retirement decision. Stock and Wise (1990) use an "option value" approach to analyze the effect of pension on retirement decision and find that structure of pension plan affects the timing of retirement. Stevens and Chan (2001) use a hazard model to analyze the effect of job loss on retirement decision of older workers and find that level of employment for reemployed displaced older workers is smaller than for non-displaced counterparts. A number of studies have analyzed the effect of the level of retirement benefits on retirement timing; Samwick (1998) provides a summary of that literature. Munnell et. al (2006), Friedberg and Webb (2003) explore how the shift from defined benefit to defined contribution plans affect the retirement decision.

[3] Studies have explored the impact of local labor markets on the whole population and women in particular (Odland and Ellis 1998, Feasel and Rodini 2002). Topel (1986) and Blanchard and Katz (1992) find that, due to migration to states with higher wages and lower unemployment rates, negative shocks to local employment permanently affect the level of employment in each particular state. Black et. al (2008) analyze find that women in cities with high unemployment rates are less likely to be in the labor force.

[4] A forthcoming study conducted by Friedberg, Owyang, and Webb (2008) examines the impact of local labor market conditions on the type of retirement process, such as voluntary versus non-voluntary, or gradual versus "cold-turkey" retirement.

I. Variations in Labor Force Participation and Economic Conditions across States

Economic conditions vary significantly across states: in 2007 the unemployment rate was 3 percent in Virginia, while neighboring Kentucky had unemployment of 5.7 percent (Bureau of Labor Statistics 2007); average wages were $29,500 in Maine versus $45,000 in Massachusetts (Bureau of Labor Statistics 2007); income taxes are 6 percent in Tennessee but Texas does not tax income (Tax Foundation 2007), etc. It is not surprising that different localities have different labor market outcomes (Odland and Ellis 1998). This section documents the existence and magnitude of the variation in the labor force participation of men age 55-64 and in the economic environment among states.

Labor force participation of men age 55-64

Figure 2 shows the distribution of labor force participation rates of men age 45-54 and 55-64 across states in 2007. For prime-age workers, the participation rates are clustered closely around 90 percent. For men age 55-64, the typical participation rate is about 70 percent. But the variation in the older age group is enormous. Three states (West Virginia, Kentucky, and Alabama) have participation rates below 60 percent, while South Dakota has a participation rate above 85 percent.[5]

The data are presented for 2007 – the most recent year for which Census data are available. But as shown in Figure 3, this type of variation has been the norm over the past thirty years. The standard deviation around the rate of participation for men age 55-54 has averaged about 7 percentage points, compared to about 4 percentage points for men 45-54. The question is why these labor force participation rates vary so dramatically.

"Replacement rates"

[5] Differences in labor force participation of women across metropolitan areas have been documented by Odland and Ellis (1998). The variability in labor force participation of men is consistent with the notion of large and persistent differences in employment growth rates across states (see Blanchard and Katz (1992)).

One hypothesis is that variation in the level of retirement security among states plays an important role. Those states where workers have ample retirement incomes from Social Security and employer pensions, relative to their preretirement incomes, are likely to have fewer older men in the labor force. The traditional measure of retirement security is the replacement rate – the ratio of income in retirement to income just prior to retiring. Given that this analysis uses state – not individual – data, it is necessary to construct a pseudo replacement rate. The measure reported in Figure 4 is the ratio of income for *retired* households age 65-74 to the income of *working* households age 55-64.[6] Again, the variation is substantial. Montana, Utah, and Wisconsin have replacement rates of 43 percent or less, while Ohio, Alaska, Arizona, and Tennessee have replacement rates of 70 percent or more.

Figure 5 plots the relationship between labor force participation rates and these pseudo replacement rates for the fifty states. The line is the result of a regression that measures the correlation between the two variables. As expected, it slopes downward – the higher the replacement rate, the lower the labor force participation rate.

Of course, factors other than replacement rates could affect the labor market outcomes for older men. For example, high replacement rates could reflect that people in some states have low incomes and are benefiting from the progressivity in the Social Security benefit formula. While this could be expected to encourage retirements, low incomes could be the result of difficult economic conditions and labor force participation could be low because the economy is weak and workers cannot find jobs. Thus, the weak economy is causing both the high replacement rate and the low labor force participation rate. Thus, it is necessary to consider measures of labor market conditions, the nature of employment, and employee characteristics.

Labor market conditions

The strength of the labor market varies across regions. High unemployment rates translate into poor job opportunities for older workers. Indeed, Figure 6 shows that there is a high variation in job opportunities measured by unemployment rate across states.

[6] The pseudo replacement rate is calculated for households headed by men and excludes single women. In 2007, the average pseudo replacement rate is 59 percent — i.e., the income of retired households age 65-74 is about 59 percent of the income of working households age 55-64.

The line is the result of a regression that measures the correlation between the two variables. As expected, it slopes downward – the lower the unemployment rate, the greater the labor force participation rate.

Another possibility is that the age structure of the population could affect the attractiveness of employment. Previous research finds that the age distribution of the population has an impact on wage structure and, thereby, employment.[7] The notion is that employers prefer to have a certain mix of old and young workers, since individuals with different labor market experience are imperfect substitutes in the production process. As a result, in states with a large share of the population 55-64, older workers would be expected to face depressed wages. And lower wages can have two opposing effects on labor force participation of older individuals. Individuals might prefer to work less and increase their leisure, since low wages also reduce the price of leisure – a substitution effect. Alternatively, the low wages might push individuals to work more to compensate for lost income – an income effect.

Unfortunately, a negative relationship between the age structure and labor force participation rates could emerge for another reason. Some states, such as Florida and Arizona, could be retirement magnets – a large number of older people go there once they stop working. Thus, those 55-64 would represent a large share of the population and the labor force participation rates of this group would be low. But no causal link would exist.

The nature of employment

Different states offer different employment opportunities for older workers. In the Midwest – which includes traditionally industrial states such as Michigan and Ohio – more than 20 percent of the employed men are in the manufacturing sector (see Figure 7). In other regions, manufacturing is much less important.

The importance of manufacturing in the state economy would be expected to affect labor force participation of older men. But the sign of this relationship is uncertain on theoretical grounds. On the one hand, manufacturing jobs are typically associated with traditional pensions and physically demanding work, both of which create incentives for early retirement. Thus, states with a high manufacturing concentration might be more

[7] See Sapozhnikov and Triest (2007).

likely to have low labor force participation rates among workers approaching retirement – a *negative* relationship. On the other hand, manufacturing jobs tend to be good jobs, particularly for low-skilled workers. These jobs tend to pay well and offer some degree of security (e.g. through union protection). So, low-skilled workers with manufacturing jobs may find it both more desirable and more feasible to work longer than those who are trying to piece together a living in the lower-paying, non-unionized service sector. In this case, states with a high manufacturing concentration might be more likely to have high labor force participation rates among workers approaching retirement – a *positive* relationship. A *positive* relationship might also emerge when looking at the relationship between trends in manufacturing and labor force participation if a negative shock, such as the decline in the steel industry, caused both to decline over time. In fact, the literature generally does find a positive association between manufacturing and labor force participation.[8]

Figure 7 also shows some variation, although less marked, in the share of self-employment across regions, with the South Atlantic and the West having the largest share – about 14 percent. Many workers nearing retirement would prefer flexible hours/partial retirement, which is not an option in most workplaces. Being one's own boss or working in a small business are possible solutions to these concerns. The hypothesis is that states with a higher share of self-employed individuals are more likely to have high labor force participation of workers approaching retirement.

Employee Characteristics

The characteristics of employees vary across regions as well (see Figure 8). The Northeast and the West have the most educated population, with nearly 40 percent of men 55-64 having a college degree. The South and the Midwest have the least, with less than 30 percent of the men 55-64 having graduated from college. College graduates tend to retire later due to delayed entry into the labor force and a less physically demanding

[8] See Edmiston (2006) and Feasel and Rodini (2002). An alternative explanation of the positive association between manufacturing and labor force participation of older workers is that it might be just a spurious relation: from the late '70s to the early '90s manufacturing and labor force participation of older men declined at the same time. The correlation between the national level of manufacturing and labor force participation of older men is positive and significantly different from zero for the period 1977-2007. The pooled regression reported below — which includes controls for year-specific effects — should eliminate most of this problem.

work environment.[9] Thus, the hypothesis is that states with a higher share of college graduates are more likely to have higher labor force participation rates for older men.

II. Empirical Results using the Current Population Survey

To explain the variation in labor force participation across states, we estimate an equation that includes the pseudo replacement rate described above as well as the variables to reflect differences in labor market conditions, the nature of employment, and employee characteristics, over the period 1977-2007. (The equation also includes indicator variable for each year.) The results are shown in Table 1. All the variables have statistically significant coefficients and predictable impacts.

The coefficients represent the change in labor force participation rates from a one-percentage point change in each of the explanatory variables. Thus, a 10-percentage point increase in the state replacement rate is associated with a reduction of 1.4 percentage points in the labor force participation rate.[10] Similarly, a one-percentage point increase in the unemployment rate implies a 1.4 percentage reduction. The percent of men age 55-65 relative to those 16-64 also is associated with lower labor force participation, a finding consistent with the hypothesis that a large number of workers in this age group depresses wages and reduces their work effort through the substitution effect. In contrast to the negative effects, a large percent self-employed, a high

[9] More generally, education is positively associated with labor force participation (see Krueger and Lindahl, 2001).

[10] This coefficient may be biased because the replacement rate variable is not exogenous. If labor force participation is low because low-income workers are leaving the labor force, benefits (the numerator of the replacement rate) will be lower and median wages of those remaining in the labor force (the denominator of the replacement rate) will be higher. A lower numerator and higher denominator imply a lower replacement rate. Thus, low participation and low replacement rates would be positively related, biasing the coefficient in a positive direction. And labor force participation would be determining the replacement rate rather than the replacement rate determining labor force participation as implied by the equation. Another problem emerges if low labor force participation is related to low state-level earnings. In these states, retirement income (the numerator of the replacement rate) will be relatively high because of the progressive nature of the Social Security benefit formula and median wages (the denominator of the replacement rate) will be low. A higher numerator and lower denominator imply a higher replacement rate. Thus, low participation and high replacement rates would be negatively related, but again the direction of causation is just the opposite of that implied by the regression. This problem biases the coefficient in a negative direction. On balance, the net impact of the two endogeneity problems could be offsetting.

proportion in manufacturing, and a greater percentage of the workforce with college degrees all are positively related to the labor force participation of older workers.

We also estimate a fixed-effects equation, which controls for both state-specific characteristics and individual years, and these results are shown in Table 2. In essence, the equation explores the relationship between the explanatory variables and labor force participation within the state. The advantage of the fixed state effects approach is that we are able to isolate the effects of changing economic conditions on labor force participation from the largely structural influences that vary across states, such as some states being popular locations for retirement. However, a disadvantage of this specification is that the fixed effects will absorb economic conditions that are persistent within states. For example, the coefficient on the unemployment rate variable will reflect the effect of changes over time in the rate within states, but not persistent differences in unemployment rates between states. The within-state temporal variation is likely to be associated with business cycle fluctuations, while the between-state variation might reflect factors such as downward trending employment demand associated with deindustrialization. As such, the fixed effects specification coefficient estimates will tend to understate the effects of economic conditions on labor force participation.

Generally, the fixed-effect model reduces the size of the coefficient by half. This result seems reasonable given that the coefficients no longer pick up the relationship between labor force participation rates and the independent variables across states. Nevertheless, the direction of the effect of the independent variables remains the same and, with two exceptions, the coefficients are statistically significant. The persistence of the relationships as the analysis moves from the pooled regression to the fixed-effects model suggests that they are economically meaningful and not just the result of sorting. For example, the continued significance of the pseudo replacement rate suggests that it represents more than that those who have high replacement rates move to Arizona.

The two exceptions are worth a comment. First, the unemployment rate is not significant in the fixed-effects model. Our reading is that the year dummies pick up the national business cycles, and regional recessions have little additional impact. As discussed above, persistent differences in unemployment between states are not captured in the fixed effects estimator of the unemployment rate coefficient. Second, the percent

of men 55-64 as a percent of males 16-64 no longer has any effect. This tends to support the notion that some states are "retirement states." The reason that these states have a large number of older men and a low labor force participation rate is that men go to these states to retire. That phenomenon is what gives rise to the large statistically significant relationship in the pooled regression reported in Table 1. Once this interstate effect is eliminated in the fixed-effects regression, the relationship disappears.

Nevertheless, the message coming out of the analysis of the CPS data is that large variations exist among the states in the labor force participation rates of older men and this variation appears to be related systematically to the median pseudo replacement rate for the state, labor market conditions, the nature of employment, and the characteristics of the workers. The fact that these results remain even in the fixed-effects model suggests that the relationships are economically meaningful. The question is whether these results are due to differences in older workers' characteristics in the states or due to state specific characteristics.

III. Empirical Results from the Health and Retirement Study

In order to sort out the relative importance of the individual as opposed to state characteristics, we turn to the *Health and Retirement Study*. This nationally-representative data set began in 1992 with subsequent interviews every two years.[11] The original survey interviewed people age 51-61 (born 1931-1941) and their spouses. War Babies (1942-1947) were added in 1998, and Early Baby Boomers (1948-1953) were added in 2004, bringing the total sample to more than 22,000.[12] The HRS contains detailed information on education, job history, health, and many other demographic and economic factors that could affect men's decision to work.

The question under investigation is whether, say, Massachusetts has higher labor force participation of older men than, say, West Virginia because of something special

[11] The HRS is conducted by the Institute for Social Research (ISR) at the University of Michigan and is made possible by funding from the National Institute on Aging. More information is available at the ISR website: http://hrsonline.isr.umich.edu/. See Juster and Suzman (1995) for a detailed overview of the survey.

[12] In addition, the HRS includes data on Children of the Depression (1923-1930) and AHEAD (those born before 1923).

about Massachusetts or its economy or because highly educated people, who tend to work longer, make up a greater share of the Massachusetts population. The analysis involves a three-step approach. First, we assign each respondent in the HRS the state-level variables used in the CPS analysis and estimate an equation to determine the extent to which the state-level variables explain the probability of working or the expected retirement age for individuals in the HRS sample. Second, we estimate equations with respondents' characteristics as the only explanatory variables to determine the extent to which differences in individual characteristics alone can explain variation in the individual's probability of working or expected retirement age. Third, we combine the set of variables describing respondents' demographic and economic information from the HRS with the set of variables describing state characteristics to determine the explanatory power of each set of variables. The following reports the results for the probability of working and for respondents' expected retirement age.

Probability of Working

The first avenue of exploration is the probability of working for males aged 55-64 from all seven waves of the HRS. The dependent variable takes a value one if the respondent is working in a given wave and zero otherwise. Given the binary nature of the dependant variable, the model is estimated using a probit regression. The first equation includes only the state-level variables.[13] The results are shown in Table 3. The state level variables explain only a miniscule amount of the variation in labor force participation rates among older workers in the HRS. Interestingly, however, with the exception of manufacturing, all the coefficients are statistically significant and have the same signs as in the CPS state-level regression.[14] That is, HRS men in states with a high replacement rate and high unemployment rate have a lower probability of being in the

[13] An alternative specification assumes error terms are clustered at the state level. The results are qualitatively equivalent, but under this specification the variables that are marginally significant lose significance. This is not surprising because the clusters might pick up the state-specific shocks from some of the state-level variables

[14] The shift in the sign of the coefficient of the manufacturing variable may reflect the differing time periods in the two analyses. Over the 1977-2007, the *positive* relationship may reflect the downward trend in both manufacturing and labor force participation in those states hard hit by global competition. By the 1990s, much of the decline was over, and the *negative* relationship between manufacturing employment and the probability of working may reflect the early retirement incentives in defined benefit plans generally offered by manufacturing firms.

labor force. Those in states where a large percent of the jobs are self-employment and where a high percent of the population has a college degree are more likely to be employed. The association between the probability of working and the share of men age 55-64 is negative, probably picking up the effects of "cohort crowding" and the "retirement-state" phenomenon.[15]

The second equation introduces demographic information for each respondent as the only explanatory variables. This information falls into three categories: demographics (age, college, nonwhite, fair/poor health, and married), characteristics of the spouse (working, fair/poor health, and earnings), and respondent's wealth (owns a home and financial assets). The results are shown in Table 3. As expected, older individuals and individuals in fair/poor health are less likely to be working than their counterparts. Having greater financial wealth is associated with low probability of working. Having a college degree, having a working spouse or spouse in poor/fair health, and being a homeowner are associated with higher probability of being employed. Having a high earning spouse is associated with lower probability of working relative to having a low earning spouse. However, married men are more likely to be working regardless of the employment of their spouses.

The third equation adds to the state-level variables the economic and demographic information for each respondent. The effect of individual characteristics stays approximately the same. Interestingly, the state-level variables still matter even after controlling for individual characteristics. And the coefficients suggest an economically meaningful effect. An increase in the state's unemployment rate of one percentage point is associated with a drop in probability of being employed by 1.65 percentage points. The higher the state's median replacement rate the lower the probability of being employed; a 10-percentage-point difference is associated with 0.8 percentage points difference in the employment probabilities. Individuals in states with higher shares of self-employed have higher a probability of being employed. The coefficient of the

[15] An alternative specification uses instrumental variables to account for the endogeneity due to the "retirement state" phenomenon. We instrumented the share of men age 55-64 with the residuals from an equation of the share of men age 55-64 as a function three variables (the migration rate of 55-64 year old men, the percent of 55-64 year old men migrated for retirement reason, and the difference in temperature between December and February.) The instrumental variable estimation, however, only slightly reduces the magnitude of the relationship between the share of men age 55-64 and labor force participation.

education variable is no longer significant, suggesting the absence of any state-level effect, such as a peer effect, whereby all workers in states with high numbers of diligent college grads might be encouraged to mimic their highly educated brethren by working longer.

Expected Retirement Age

The second avenue of exploration is the expected retirement age, a question asked of respondents in each wave of the HRS. This is a shift of focus from what older men are actually doing – working or not working – to what they plan to do. Our sample consists of men 55-64 observed only once, at the first time they report their expected retirement age in any of the seven waves of the HRS.

Again, the first equation estimates the respondents' expected retirement age as a function of the state-level variables only (Table 4). As in the probability-of-working equation, the state-level variables explain only a tiny amount of the variation in the expected retirement age. Nevertheless, two state-level variables are statistically significant; percent self-employed and percent with a college degree both lead to later expected retirement age. These results suggest that flexibility is important when people are planning their retirement and peer effects matter. The coefficients of the unemployment rate and percent of men 55-64 are understandable. The unemployment rate is less relevant for these people who are already employed and planning their retirement. If anything the positive coefficient suggests that older men may opt for a later retirement age when the unemployment rate is high because if they change their mind they may be less likely to find another job. The insignificance of the coefficient for the percent of men 55-64 clearly suggests that the retirement plans of employed men in Arizona are no different than the plans of employed men in Massachusetts.

The second equation introduces respondents' characteristics as the only explanatory variables: demographics (age, college, nonwhite, fair/poor health, and married), characteristics of the spouse (working, fair/poor health, and earnings), and respondent's wealth (owns a home and financial assets). In addition, it is possible to include information about the respondent's job (wage, self-employed, physically demanding, and manufacturing) and whether the respondent expects employer-provided

retiree health insurance. The results are shown in Table 4. As before, the HRS variables generally enter the equation with the expected impact and are statistically significant. In terms of the variables that pertain to employment, higher wages, a physically demanding job, manufacturing employment, and the availability of retiree health insurance all lead to an earlier expected retirement age. Those who are self-employed plan to retire almost two years later.

The third equation adds to the state-level variables the economic and demographic information for each respondent. The effect of individual characteristics stays approximately the same. In terms of the state-level variables, the two that were significant in the first equation – percent self-employed and percent with a college degree – remain significant. In addition, the unemployment rate becomes marginally significant suggesting that high unemployment rates may make people nervous about retiring too early. In addition, the percent of jobs in manufacturing takes on a statistically significant positive effect, similar to that in the state-level CPS but the opposite sign of the probability-of-working equation. To make it even harder, the coefficient on the variable for the respondent having a job in manufacturing is negative. That is, if the respondent works in manufacturing, he will plan to retire earlier, but if he works in a state with a lot of manufacturing he will plan to retire later. The first is easy to interpret; manufacturing generally provides defined benefit pensions that contain incentives for early retirement. One way to interpret the state effect is that manufacturing jobs are good jobs and low skill workers who hold these jobs are likely to work longer than their counterparts outside the manufacturing cocoon.

Explanatory Power

The overall conclusion from the HRS analysis is that the state-level variables on their own, despite their statistical significance, explain very little of the variation in either an individual's probability of working or in an individual's expected retirement age. In contrast, the HRS information about the individuals' economic and demographic circumstances does provide a lot of explanatory power. But the really interesting result is that even after including the HRS information, the state-level variables remain important. It is as if the HRS information determines whether respondents have a strong taste or

weak taste for work, which allows for predicting whether the individual will be in the labor force or not and when he will retire. And once that prediction is made, the state-level variables indicate how both those with strong and weak tastes will responds to changes in, say, the unemployment rate.

Some might find puzzling that the state characteristics, which explain 34 percent of the variation in labor force participation rates across states in the CPS based state-level regression shown in Table 1, explain less than 1 percent of the variation in individual labor force participation in the HRS-based regression shown in Table 3. An explanation for this puzzle is provided in Table 5 and the accompanying discussion, which reconciles the predictive power of the individual-level and state-level regressions.

Table 5 shows the portion of the variation in *state* labor force participation rates explained (R^2) by equations based on individual HRS data that have been aggregated to the state level.[16] This aggregation is done for the *actual* HRS labor force participation rates and for *predicted* labor force participation rates derived from individual-level equations that incorporate: 1) state characteristics only; 2) individual characteristics only; and 3) state and individual characteristics.

An example might help. The 1996 HRS shows 200 men age 50-64 from the state of New York. Out of these 200, 120 reported working for pay. Therefore, the *actual* labor force participation rate, from the individual HRS data, for New York in 1996 was 50 percent. That is, the individual level data of New York (200 observations) are aggregated to the state level data (1 observation for New York).

The next step is to *predict* each individuals' probability of working from the HRS regressions in Table 3. In equation one, the *predicted* probability that an individual is working is estimated from the equation that uses state characteristics only. In this case, each individual in New York would be characterized by the same state variables and thus have the same probability of working – the predicted labor force participation rate for New York in 1996. In equation two the predicted probabilities would depend on

[16] Only states with at least 20 individual-level observations were used in these regressions. The following states did *not* meet this criterion for all of the years: Alaska, Delaware (DE), District of Columbia (DC), Hawaii (HI), Idaho (ID), Kentucky (KY), Maine (ME), Montana (MT), Nevada (NV), New Mexico (NM), Rhode Island (RI), South Dakota (SD), Utah (UT), Vermont (VT). Note that some of the remaining states were excluded in certain years when the number of observations was less than 20.

individual characteristics alone. In equation three, the predicted probabilities would depend on both individual and state-level characteristics. As equations two and three include individual level characteristics, men in New York in 1996 would end up with different probabilities of working. These probabilities are then averaged to produce *predicted* state labor force participation rates. Thus if half the men in New York, in 1996, in these regressions had a probability of working of 0.4 and half a probability of 0.8, the *predicted* labor force participation rate in New York would be 0.6. Table 5 shows the results of regressing these *predicted* aggregated rates on the *actual* state labor force participation rates.

Although the ability of state characteristics to predict individual labor force participation in the HRS is extremely low, these state variables explain 36 percent of the variance in average labor force participation rates across states in the HRS data – approximately the same R^2 as in the CPS regression in Table 1. The R^2 from the individual characteristics state-level regression is 0.39. This can be interpreted as implying that differences between states in the distribution of individual characteristics can explain 39 percent of the variance among states in labor force participation. The R^2 jumps to 0.50 when both individual and state characteristics are included in the state-level regression. The reason that the R^2 increases by less when the state characteristics are added to the individual characteristics, than when they enter on their own, is due to their correlation with the state means of the individual characteristics.

So, although the characteristics of the state in which someone lives are not very useful in predicting that person's labor force participation, the state characteristics are very useful in predicting average state-level labor force participation rates. A lot of their predictive power comes from their correlation with the means of individual characteristics. But even after controlling for individual characteristics, the state characteristics retain some independent predictive power.

IV. Conclusion

The difference in labor force participation rates of men age 55-64 across the United States is astounding. West Virginia, Kentucky, and Alabama have participation rates below 60, while South Dakota has a participation rate approaching 90 percent. This fact in itself has significant implications for the pressures that states will face as the baby boom starts to retire in the face of a contracting retirement income system, declining hosing prices and a lackluster stock market. In states where more than 40 percent are out of the labor force before age 65, a huge proportion of older men will have no access to health care except that provided by the state government.

A great deal of the variation in labor force participation can be explained by a pseudo replacement rate, the state of the economy, the nature of employment, and the employee characteristics in each state. These variables explain more than one-third of the total variation. Even moving to a fixed-effects model only cuts the explanatory power by half. Interestingly, the replacement rate continues to have an economically meaningful effect on the labor force activity of older men, and it is not due to sorting – that is, people with high replacement rates moving to Arizona. This relationship has implications for the future. It suggests that the upcoming contraction in the retirement system – resulting in a decline in replacement rates – may cause workers to continue to work at older ages.

As to the question whether the relationship between the labor force activity of older workers is due to different populations or unique aspects of the state, the answer from the two-step analysis with the *Health and Retirement Study* is that most of the variation in behavior – measured in terms of either the probability of working or the expected retirement age is attributable to the characteristics of the individuals. But the results also confirm the findings Black and Liang (2005) and von Wachter (2007) the state of the economy and the characteristics of employers affect the labor supply decisions of older workers.

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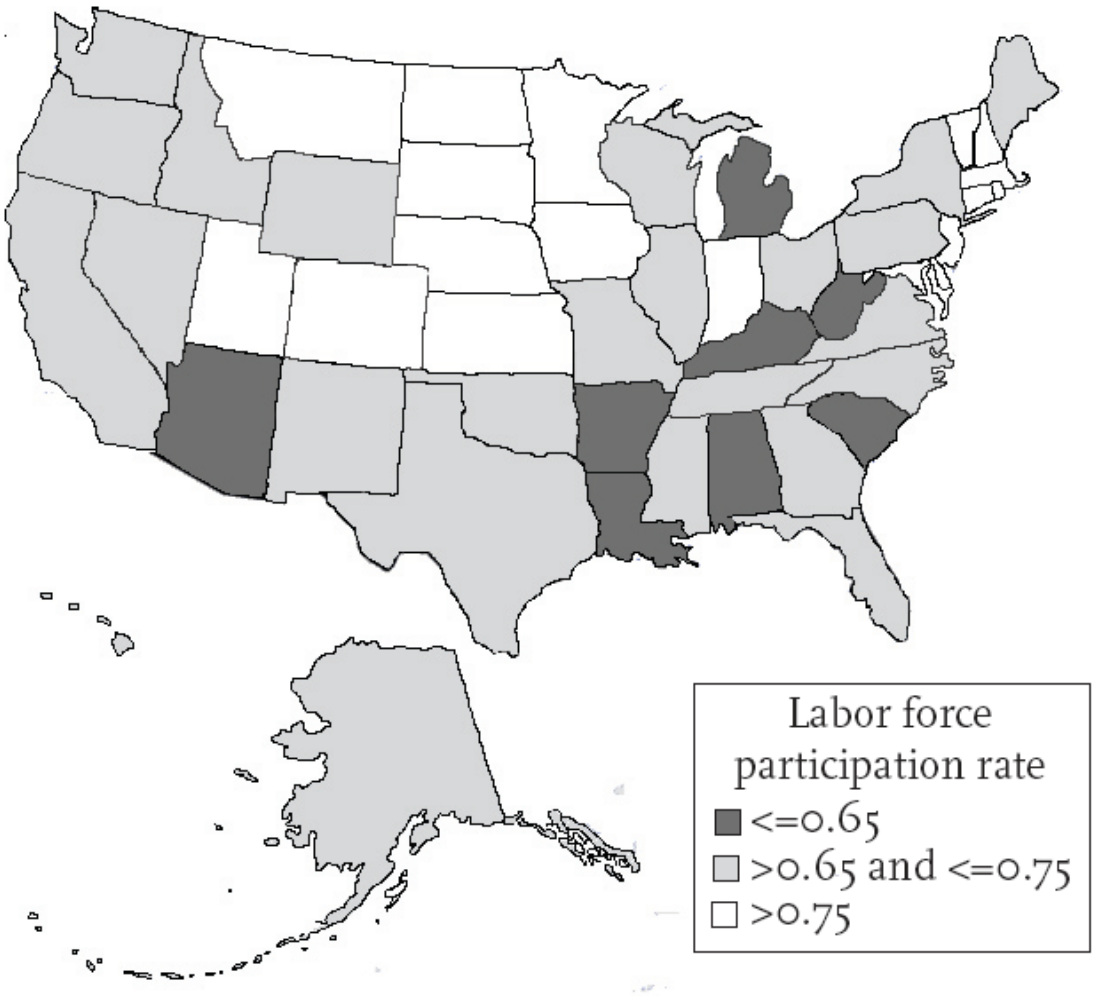
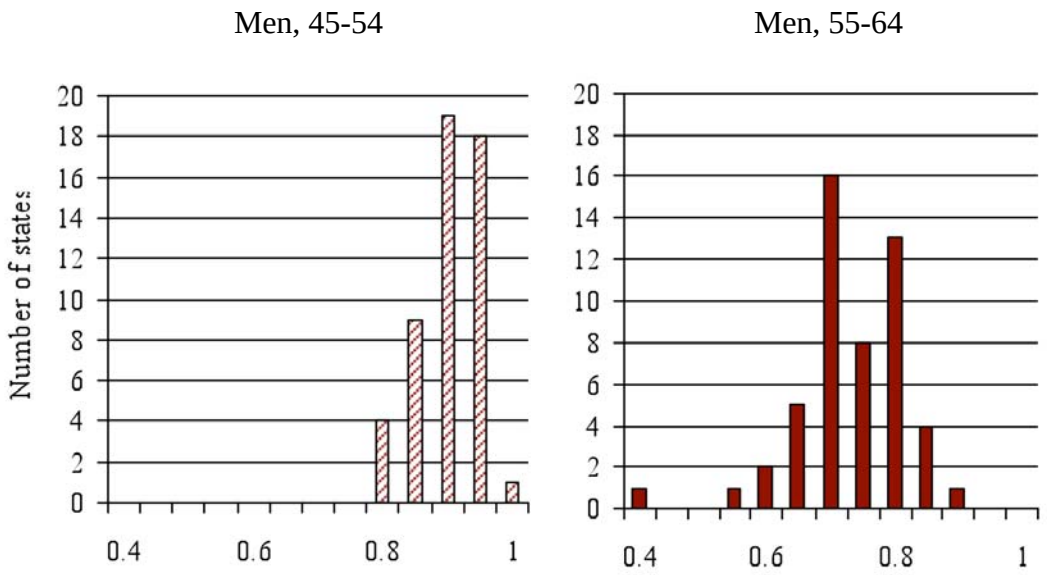
Figure 1. *Labor Force Participation Rates for Men Age 55-64 by State, 2007*



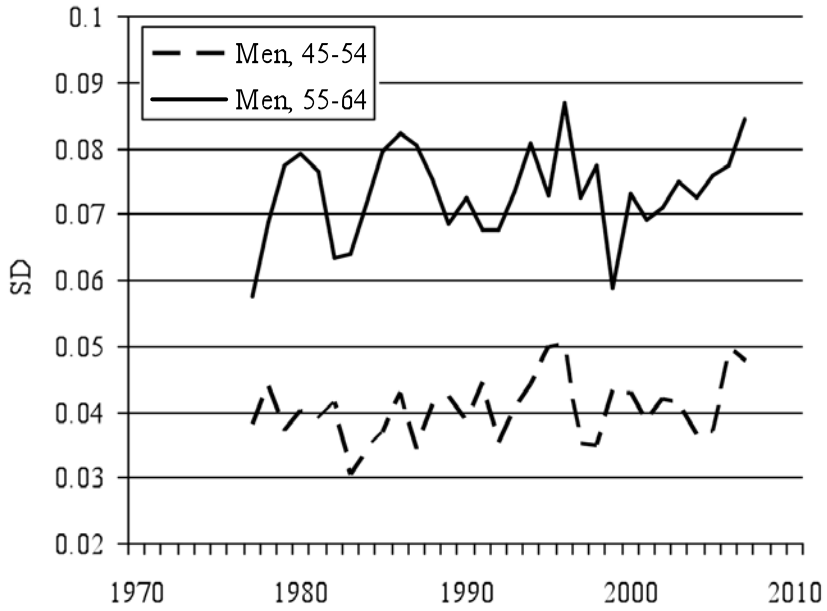
Source: Authors' calculations from the U.S. Census Bureau, *Current Population Survey* (CPS), 2007.

Figure 2. *Distribution of State Labor Force Participation Rates of Men Age 55-64 versus Men Age 45-54, 2007*



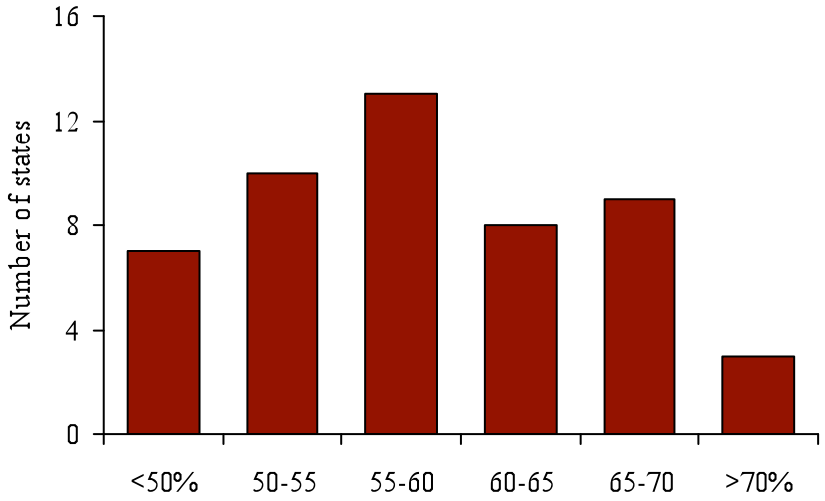
Source: Authors' calculations from the 1977-2007 CPS.

Figure 3. *Variation in State Labor Force Participation Rate of Men Age 55-64 and Men 45-54 as Measured by the Standard Deviation, 1977-2007*



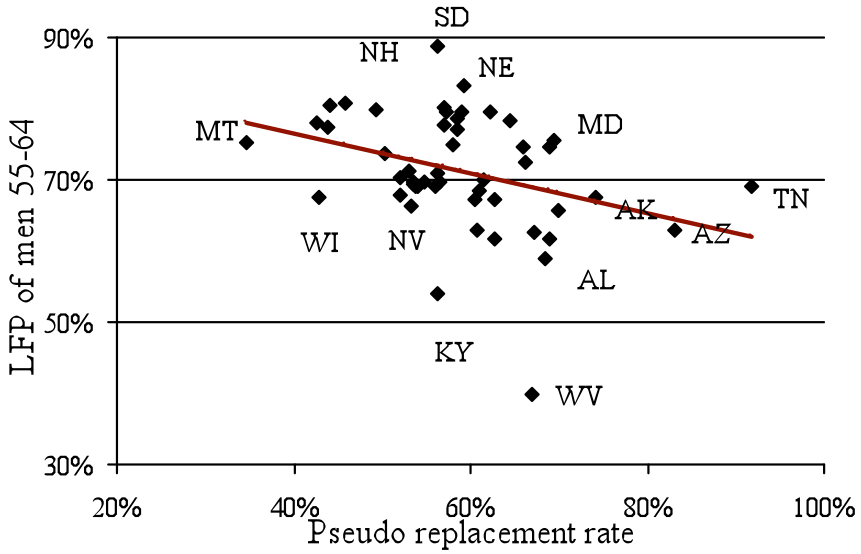
Source: Authors' calculations from the 1977-2007 CPS.

Figure 4. *Distribution by State of Pseudo Replacement Rates, 2007*



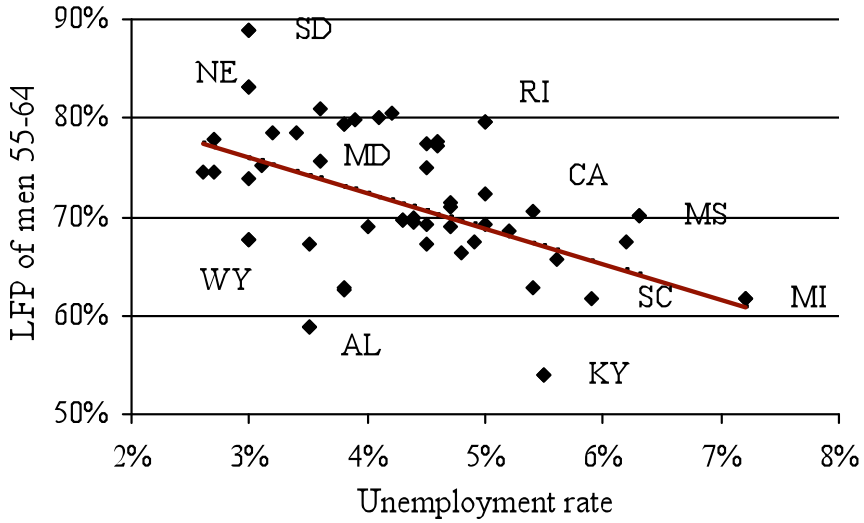
Source: Authors' calculations from the 2007 CPS.

Figure 5. *Pseudo Replacement Rate and Labor Force Participation Rate of Men Age 55-64, by State, 2007*



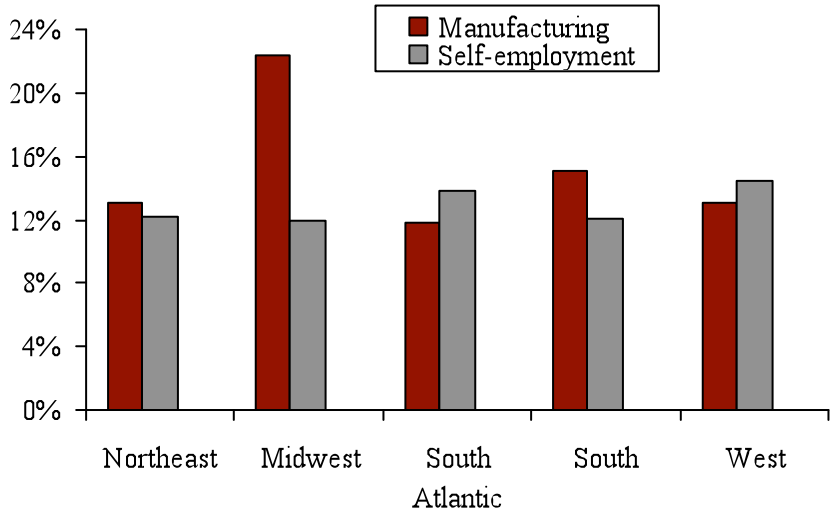
Source: Authors' calculations from the 2007 CPS.

Figure 6. *Labor Force Participation Rate of Men Age 55-64 and Unemployment Rate, by State, 2007*



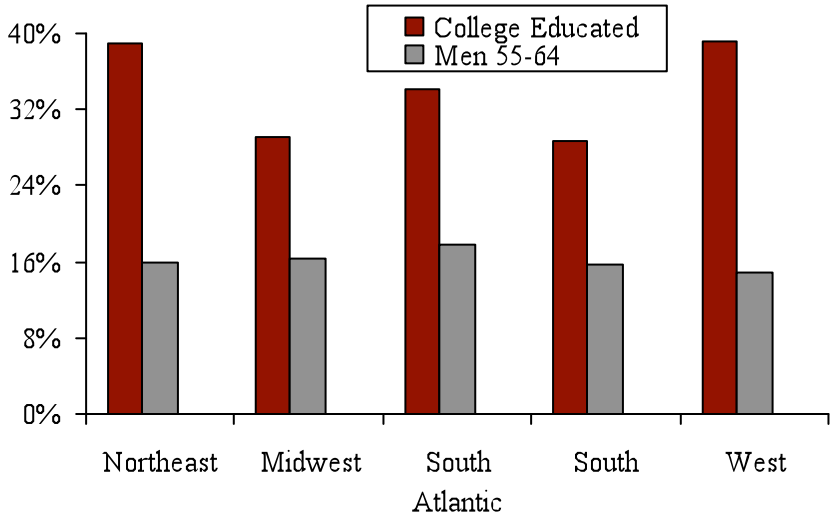
Source: Authors' calculations from the 2007 CPS.

Figure 7. *Percent of the Workforce in Manufacturing and Self-employment, by Region, 2007*



Source: Authors' calculations from the 2007 CPS.

Figure 8. *Percent of Men Age 55-64 with a College Degree and Men 55-64 as Percent of Men 16-64, by Region, 2007*



Source: Authors' calculations from the 2007 CPS.

Table 1. *Factors that Affect the Labor Force Participation of Men Age 55-64, Pooled Regression, 1977-2007*

Variables	Coefficient	t	Mean	SD
Pseudo replacement rate	-0.140	-9.17	0.587	0.116
Unemployment rate	-1.355	-12.65	0.058	0.020
Percent of jobs in self employment	0.457	9.68	0.129	0.043
Percent of jobs in manufacturing	0.073	3.17	0.200	0.082
Percent of men 55-64 with college degree	0.276	10.72	0.220	0.093
Percent of men 55-64	-0.272	-2.59	0.123	0.018
Constant	0.701	3.62	-	-
Year Dummies	yes			
State Dummies	no			
R-squared	0.343			
Number of observations	1,550			

Source: Authors' calculations using the 1977-2007 CPS.

Table 2. *Factors that Affect the Labor Force Participation of Men Aged 55-64, Fixed Effect Model, 1977-2007*

Variables	Coefficient	t
Pseudo replacement rate	-0.077	-5.78
Unemployment rate	0.001	0.70
Percent of jobs in self employment	0.247	3.46
Percent of jobs in manufacturing	0.210	4.14
Percent of men 55-64 with college degree	0.163	5.72
Percent of men 55-64	0.037	0.37
Constant	0.606	25.27
Year Dummies	yes	
State Dummies	yes	
R-squared	0.177	
Number of observations	1,550	

Source: Authors' calculations using the 1977-2007 CPS.

Table 3. *Factors that Affect the Probability of Working of Men Aged 55-64, HRS, 1992-2004*

	State Characteristics		Individual Characteristics		State and Individual Characteristics	
	dF/dx	*Z*	dF/dx	*z*	dF/dx	*z*
State Characteristics						
Pseudo replacement rate	-0.072	-1.83	-	-	-0.080	-1.96
Unemployment rate	-1.912	-6.14	-	-	-1.650	-5.05
Percent of jobs in self employment	0.583	3.66	-	-	0.383	2.30
Percent of jobs in manufacturing	-0.065	-1.07	-	-	-0.134	-2.07
Percent of men 55-64 with college degree	0.206	3.44	-	-	0.051	0.82
Percent of men 55-64	-0.832	-3.20	-	-	-1.011	-4.10
Individual characteristics						
Age	-	-	-0.038	-31.15	-0.039	-30.16
College education	-	-	0.071	8.26	0.068	7.81
Nonwhite	-	-	-0.029	-3.15	-0.029	-3.16
Poor/fair health	-	-	-0.330	-38.91	-0.330	-38.33
Married	-	-	0.035	3.21	0.036	3.31
Spouse working	-	-	0.130	15.11	0.127	14.93
Spouse has poor/fair health	-	-	0.019	1.91	0.018	1.83
Spouse's earnings ($10,000)	-	-	-0.006	-2.55	-0.006	-2.54
Homeowner	-	-	0.080	6.08	0.081	6.23
Financial wealth ($10,000)	-	-	-0.001	-6.36	-0.001	-6.60
Financial wealth squared ($10^4)	-	-	0.030	4.26	0.031	4.69
Year dummies	yes					
Number of observations	20,681					
Pseudo R-squared / R-squared	0.005		0.140		0.143	

Note: Sample for the work equation includes men in their 55-64 observed in Waves 1-7.
Source: Authors' calculations using the 1992-2004 HRS.

Table 4. *Factors that Affect the Expected Retirement Age of Men Aged 55-64, HRS, 1992-2004*

	State Characteristics		Individual Characteristics		State and Individual Characteristics	
	dF/dx	*z*	dF/dx	*z*	dF/dx	*z*
State Characteristics						
Pseudo replacement rate	0.141	0.17	-	-	0.009	0.01
Unemployment rate	6.950	1.20	-	-	8.534	1.55
Percent of jobs in self employment	13.296	3.97	-	-	11.540	3.59
Percent of jobs in manufacturing	1.460	1.04	-	-	3.092	2.30
Percent of men 55-64 with college degree	2.712	1.94	-	-	2.438	1.82
Percent of men 55-64	2.715	0.42	-	-	7.138	1.17
Individual characteristics						
Age	-	-	0.368	13.45	0.368	13.42
College education	-	-	0.841	4.30	0.850	4.36
Nonwhite	-	-	-0.030	-0.15	-0.006	-0.03
Poor/fair health	-	-	-0.257	-1.20	-0.253	-1.18
Married	-	-	0.237	0.98	0.216	0.90
Spouse working	-	-	0.227	1.24	0.219	1.20
Spouse has poor/fair health	-	-	-0.034	-0.16	-0.029	-0.14
Spouse's earnings ($10,000)	-	-	-0.037	-0.69	-0.032	-0.60
Homeowner	-	-	-0.529	-1.63	-0.495	-1.52
Financial wealth ($10,000)	-	-	-0.017	-3.16	-0.017	-3.30
Financial wealth squared ($10^4)	-	-	0.215	2.09	0.220	2.20
Household has defined benefit plan	-	-	-0.831	-5.18	-0.838	-5.23
Health insurance in retirement	-	-	-0.554	-3.71	-0.534	-3.59
Wage ($10,000)	-	-	-0.037	-1.47	-0.040	-1.59
Self-employed	-	-	1.929	7.49	1.915	7.43
Physically demanding job	-	-	-0.493	-3.31	-0.476	-3.21
Manufacturing sector	-	-	-0.211	-1.44	-0.231	-1.56
Year dummies	yes					
Number of observations	3,192					
Pseudo R-squared / R-squared	0.035		0.157		0.162	

Note: Expected retirement age equation has a sample of men in their 55-64 observed and reported expected retirement age for the first time in Waves 1-7.
Source: Authors' calculations using the 1992-2004 HRS.

Table 5. Explanatory Power of Predicted State-Level Labor Force Participation Rates on Actual Rates, HRS, 1992-2004

Equation	R-squared
State characteristics	0.3565
Individual characteristics	0.3896
State and individual characteristics	0.4977

Note: State level equations are estimated using predicted labor force participation from the individual level equations aggregated over states. Only states with at least 20 individual-level observations were used in these regressions. The following states did *not* meet this criterion for all of the years: Alaska, Delaware (DE), District of Columbia (DC), Hawaii (HI), Idaho (ID), Kentucky (KY), Maine (ME), Montana (MT), Nevada (NV), New Mexico (NM), Rhode Island (RI), South Dakota (SD), Utah (UT), Vermont (VT). Note that some of the remaining states were excluded in certain years when the number of observations was less than 20.

Source: Authors' calculations using the 1992-2004 HRS.

Appendix 1

Data and Methodology for the Regression Analysis using the Current Population Survey

The regression analysis uses data from the 1977-2007 *Current Population Survey* (CPS). to create state-level variables for labor market conditions, the nature of employment, and employee characteristics. The following variables were included in the equation.

- The labor force participation rate of men 55-64 is the ratio of the number of men age 55-64 who report being in the labor force to the number of men age 55-64 in the population.
- The pseudo replacement rate is the ratio of the median income for *retired* households age 65-74 to the median income of *working* households age 55-64. The pseudo replacement rate is calculated for households headed by men and excludes single women.
- Unemployment rate by state is downloaded from the website of the Bureau of labor Statistics.
- The percent of men in self-employment jobs is the ratio of all men age 16-64 who report being self-employed during the last week — as opposed to employed by the government, a private company, or a non-profit organization — to the total number of men age 16-64 who were employed during the week prior to the interview.
- The percent of manufacturing jobs is the ratio of employed men age 16-64 who report working for the manufacturing industry to total state employment.
- The percent of men age 55-64 with a college degree is the ratio of men age 55-64 who report having a college degree to the total number of men age 55-64 in the population.
- The percent of the men age 55-64 is the ratio of men age 55-64 to the total population of men age 16-64.

Appendix 2

Data and Methodology for the Regression Analysis using the Health and Retirement Study

The regression analysis using the Health and Retirement Study is based on a sample of older male individuals in their 55-64. Variables describing local labor market conditions are constructed using the Current Population Survey (see description of the variable in Appendix 1). Variables describing demographic, financial, and work characteristics are defined the following way:

- Age – age at the time of the interview
- College – 1 if a respondent has a college degree or higher and 0 otherwise
- Nonwhite – 1 if a respondent respond reports being non-white and 0 otherwise
- Poor/fair health – 1 if a respondent report having poor/fair health and 0 otherwise
- Married – 1 if a respondent reports being married and 0 otherwise
- Spouse working – 1 if a spouse works and 0 if spouse does not work or a respondent is single
- Spouse has poor/fair health – 1 if spouse reports having poor/fair health and 0 otherwise or a respondent is single
- Spouse's earnings – earnings measured in $10,000 in 1992 dollars reported by a spouse in income section of the survey and 0 if spouse is not working or a respondent is single
- Homeowner – a respondents reports having a house
- Financial wealth – measured in $10,000 in 1992 dollars, includes IRA balances
- Household has a defined benefit plan – 1 if a respondents or a spouse have or had in the past defined benefit plan
- Health insurance in retirement – 1 if a respondent has insurance in retirement from own or spouse's employer and 0 otherwise
- Wage – earnings reported by a respondent in income section and measured in $10,000 in 1992 dollars
- Self-employed – 1 if a respondents reports being self-employed and 0 otherwise
- Physically demanding job – 1 if a current job requires physical efforts all/almost all the time or most of the time and 0 otherwise
- Manufacturing sector – 1 if a respondent reports working in manufacturing and 0 otherwise

Appendix 3

Table A1. Summary Statistics for Work Equation and Expected Retirement Age Equation for Men Aged 55-64, HRS, 1992-2004

Variables	Work Equation		Expected Retirement Age	
	Mean	SD	Mean	SD
Individuals' characteristics				
Age	59.51	2.82	57.79	2.47
College education	0.23	0.42	0.27	0.44
Nonwhite	0.18	0.38	0.16	0.37
Poor/fair health	0.24	0.43	0.13	0.33
Married	0.84	0.37	0.86	0.34
Spouse working	0.49	0.50	0.57	0.50
Spouse has poor/fair health	0.16	0.37	0.14	0.34
Spouse's earnings ($10,000) – median for non-zero earnings	1.68	1.96	1.80	1.73
Homeowner	0.92	0.28	0.93	0.25
Financial wealth ($10,000) - median	2.11	52.85	2.28	25.98
Financial wealth squared ($10^4)	0.29	17.67	0.08	1.07
Household has defined benefit plan	-	-	0.61	0.49
Health insurance in retirement	-	-	0.52	0.50
Wage ($10,000)	-	-	3.09	3.39
Self-employed	-	-	0.17	0.37
Physically demanding job	-	-	0.39	0.49
Manufacturing sector	-	-	0.25	0.43
States' characteristics				
Pseudo replacement rate	0.59	0.10		
Unemployment rate	0.06	0.02	0.06	0.02
Percent of jobs in self employment	0.13	0.02	0.13	0.03
Percent of jobs in manufacturing	0.20	0.07	0.20	0.07
Percent of men 55-64 with college degree	0.26	0.07	0.25	0.07
Percent of men 55-64	0.12	0.01	0.12	0.01
Number of observation	20681		3192	

Note: Sample for the work equation includes men in their 55-64 observed in Waves 1-7. Expected retirement age equation has a sample of men in their 55-64 observed and reported expected retirement age for the first time in Waves 1-7.

Source: Authors' calculations using the 1992-2004 HRS.

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