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Does Schooling Improve Adult Health?

Jeremy Arkes

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DOES SCHOOLING IMPROVE ADULT HEALTH?

Jeremy Arkes
RAND
1700 Main St.
Santa Monica, CA 90407-2138

arkes@rand.org

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This analysis uses intra-state differences in unemployment rates during a person's teenage years as an instrumental variable to address potential selection bias problems in estimating the effects of schooling on adult health outcomes. A higher unemployment rate during a person's teenage years leads to greater educational attainment because lower wages and fewer jobs reduce the opportunity costs of attending school. From two-stage probit models, a year of school is estimated to reduce the probability of having a work-limiting health condition by 2.6 percentage points and to reduce the probability of requiring personal care by 0.67 percentage points. Both estimates are statistically significant and exceed the estimated beneficial effects of schooling from the corresponding standard probit models. For one other health measure, having a mobility limitation, the two-stage model shows no impact of schooling.

I. Introduction

Most economists doubt that health differences across educational levels are entirely causal effects. Education and health share common determinants that could explain part of their correlation. For instance, Victor Fuchs (1996), in his Presidential Address at the 1996 American Economic Association meetings, argues that differences in health between people of different educational levels are most likely explained by differences in time preference rather than by education improving health through some social or intellectual process. Yet, Berger and Leigh (1989), in the only attempt to use two-stage models to control for selection bias, find evidence that the correlation between education and health is primarily a causal relationship. However, their two-stage model estimates may be inconsistent because the instrumental variables they use (e.g., IQ and parents' education) may have had independent effects on adult health.

In this paper, I propose a new source of exogenous variation in educational attainment to estimate the health effects of schooling, namely within-state differences over time in state unemployment rates during a person's teenage years. For people who were teenagers in the late 1940s and the 1950s, I use the state unemployment rate as an instrumental variable in a two-stage model to estimate the effects of education on three measures of health: the probabilities of having a work-limiting disability or health condition, of having limited mobility, and of requiring personal care. This instrumental variable has also been used to estimate the monetary returns to schooling (Arkes, 2000).

State unemployment rates can affect school enrollment and educational attainment through two forces. First, there is an income effect, or "additional worker" effect. With a higher unemployment rate, income will be lower so families may need

their teenage children to quit school and work to help support them. As labor market conditions improve and as unemployment rates come down, more families can afford to let their teenagers attend school. Thus, under the income effect, higher unemployment rates would be associated with lower enrollment rates and less educational attainment. Conversely, the substitution effect, or the "discouraged worker" effect, would entail higher enrollment rates with higher unemployment rates. In periods of high unemployment, wages would be lower and jobs would be scarcer. Thus, the opportunity cost of attending school would be lower. The evidence from this study as well as from past research indicates that the substitution effect outweighs the income effect so that higher unemployment rates during a person's teenage years lead to higher educational attainment (Duncan, 1965; Gustman and Steinmeier, 1981; Rees and Mocan, 1997).

The estimated health effects of schooling are greater in the two-stage probit models than in the corresponding standard probit models for two of the three health measures. The two-stage probit models indicate that a year of schooling reduces the probability of having a work-limiting health condition by 2.6 percentage points and reduces the probability of requiring personal care by 0.5 percentage points. Both estimates are statistically significant at the one percent level. The estimated effect of schooling on the probability of having a mobility limitation becomes statistically insignificant in the two-stage probit model and decreases from the standard probit model.

II. Previous Research on the Relationship Between Education and Health

Education can affect a person's health in several ways. First, schooling can improve one's allocative efficiency in producing health by helping people better

understand the effect certain behaviors have on health (Grossman, 1975; Kenkel, 1991). Education could also improve a person's ability to process information about health and to apply these lessons to other health topics (Grossman, 1975). Students may also learn about health from interactions with other students, which could include beneficial effects (such as exercise) and harmful effects (e.g., smoking). In addition, more schooling could improve a person's ability to practice self-control (Thaler and Shefrin, 1981). Finally, more schooling tends to increase income, which allows individuals to make more investments in their health and to buy better health care.

While these are all credible mechanisms through which education can affect health, Fuchs (1982 and 1996) proposes an alternative explanation for the positive correlation between schooling and good health. He argues that individuals with a low rate of time discount--i.e., a strong preference for the future relative to the present--are more likely to invest in further schooling and are also more likely to engage in healthier activities and habits.

There are other explanations for the positive relationship between schooling and good health. If people who have a greater ability to process information select into higher levels of education, then more-educated individuals may enjoy better health because they better processed the health information they were exposed to outside of school. Furthermore, more-intelligent people may be more likely to read various printed and web-based materials, from which they can learn information on health.

Reverse causality may also help produce a positive relationship between education and health. It is likely that a health- and safety-conscious person may acquire more schooling to avoid having to take a hazardous job. Finally, healthier youth may be

more able and more likely to pursue further schooling, and health as a youth is highly correlated with adult health (Perri, 1984; and Wolfe, 1985).

The presence of “third variables” and any reverse causality would cause the estimated health differences across educational levels to overstate the causal effects of schooling. Another potential source of bias is measurement error in the schooling variable, which could cause either an upward or downward bias in the estimated causal effects of schooling. The general consensus is that the combined biases cause standard regressions to overstate the causal effect of schooling.

Farrell and Fuchs (1982) are the first researchers to empirically address the selection problem in the relationship between education and health. Analyzing smoking status for individuals at ages 17 and 24, they find that the differences in smoking status across eventual educational levels (at age 24) were just as large as they were at age 17. However, education before age 17 may have still affected smoking status. Furthermore, smoking is merely a predictor of health rather than a measure of health.

In consideration of the potential biases in estimating the relationship between schooling and health, Berger and Leigh (1989) estimate two-stage models to examine the effects of education on blood pressure and on the probabilities of having functional limitations and disabilities that prevent or limit work. They find that the estimates from the two-stage models are very close to the estimates from conventional one-stage models that assume random selection into educational levels. Since selection bias does not explain the relationship between schooling and health, Berger and Leigh (1989) conclude that associations between education and measures of health represent causal effects.

Their results, however, could be driven by inconsistency in the estimates due to the instrumental variables they use for years of schooling (parents' education, IQ, and state school expenditures) having independent effects on health. In regards to parents' education, if schooling has a positive impact on health, then more-educated parents will practice better health habits, which then could be passed along to their children. Given this potential shortcoming, it would be worthwhile to estimate the health effects of schooling with alternative instruments.

III. Data

The data for this analysis come from the 1990 Census of Population and Housing Five Percent Public Use Microdata Sample. The basic sample includes white males who were aged 47 to 56 in April 1990, were born in the United States, Alaska, or Hawaii, and did not have any allocated values for any variable (other than the health variables) used in the analysis. Only whites are considered because, according to the data I use, the educational attainment of other racial groups is less responsive to changes in the unemployment rate, perhaps because the income and substitution effects cancel each other out. I use the age group of 47 to 56 year olds in order to analyze people at ages when health problems are more likely to arise. I cannot consider people older than 56 (those born prior to 1933) since state unemployment rates are not available before 1948, the year in which those born in 1933 were 15 years old. I create three samples for the three health measures. In each sample, I exclude those with an allocated (missing and filled in) response to the relevant health question. The sample sizes are all over 420,000.

The Census indicates a respondent's state of birth. These states of birth are matched with the average state unemployment rates over the three years in which the respondent was 15, 16, and 17 years old.¹ I do not consider the unemployment rates during the period in which a person was of college age. Once people turn 18 they may be more likely to move away from home, perhaps to a different state, so that the unemployment rate from a person's state of birth would be less indicative of the labor market conditions a person faced.² Furthermore, the ones who move to different states may more often be those who are searching for better labor markets. A more localized unemployment rate would be preferable because employment opportunities could vary widely within a state. Unfortunately, the unemployment rate is only available on a state-wide level for the late 1940s and the 1950s. And, the state unemployment rates available are just for workers who were covered by unemployment insurance. This actually turns out to be a good unemployment rate to use because teenagers were unlikely at the time to be covered by unemployment insurance.

One shortcoming of the 1990 Census is that one can only determine respondents' ages as of April 1, 1990 (the start of interviewing) and not the year of birth since the 1990 Census reported neither the quarter of birth nor the year of birth, unlike previous Census'. Thus, the actual year in which a person turned 15 cannot be precisely identified, so the unemployment rates during a person's teenage years are determined by age rather than birth year. It is assumed that respondents turned their current age in 1989, which is true

¹ From the 1950 and 1960 Census, I calculated the proportion of white 15, 16, and 17 year olds who lived in the same state in which they were born. 84.3 percent of the teenagers from the 1950 Census and 77.5 percent from the 1960 Census lived in the same state.

² Of whites aged 19 to 22 in 1950 and in 1960, 77.1 and 69.2 percent lived in the same state in which they were born.

for three-quarters of the sample since the interview date is April 1, 1990. So, for example, if a person is currently 47 years old, I use the average state unemployment rates for 32, 31, and 30 years before 1989, or 1957, 1958, and 1959—when the person was 15 to 17 years old. For those aged 56 at the time of the survey, I use the average home state unemployment rate from 41, 40, and 39 years before 1989, or 1948, 1949, and 1950.

Table 1 shows the mean and the standard deviation of the unemployment rates within each state over the 12 years that unemployment rates are used (1948 to 1959). The average standard deviation of unemployment rates within states was 1.36. The highest standard deviations occurred in Alaska and West Virginia with 3.49 and 2.83 percentage points, while Iowa and Washington, DC had the lowest standard deviation (0.51 percentage points). With the three-year moving average unemployment rate, the average standard deviation is 0.75.

Another shortcoming of the 1990 Census is that the educational variable became categorized for certain years: grades one to four, grades five to eight, and some postsecondary educational attainment. For people with one to four years and five to eight years of schooling, I assign the mean level of years completed based on their white male counterparts of the same age from the 1980 Census. For a college education, people who reported having some college or an associate's degree are assumed to have 14 years of schooling. People with a bachelor's, master's, or professional degree are coded as having 16, 18, or 20 years of schooling, respectively.

The 1990 Census asked several questions relating to health. The three measures used are: whether a health condition or disability lasting for at least six months limits the work that the person can do, whether the person's mobility is limited, and whether the

person requires personal care.³ Table 2 shows the summary statistics for the sample, including the three measures of health. 12.5 percent of the sample have a work-limiting health condition, 2.6 percent have a mobility limitation, and 3.2 percent require personal care.

The first health indicator—whether the person has a work-limiting health condition—has a few shortcomings. One may argue that certain illnesses could affect people with different jobs in different ways. For example, a construction worker who breaks a leg would be limited in his work, but a lawyer would not. While this highlights another benefit of schooling—having a better chance of acquiring a job that can be performed mostly independently of physical health—it also demonstrates that, with this variable, there could be a measured health difference between two people even though their physical conditions are the same. Another shortcoming of this health indicator is that some may report having a work-limiting health condition as an ex-post justification for not working. Fortunately, the other two health measures (whether a person has limited mobility and whether personal care is needed) should not be subject to the shortcomings of the first one.

IV. The Effects of Educational Attainment on Health

Empirical Model

The empirical model estimates the effects of schooling on health when the exogenous variation in years of schooling comes from differences in state unemployment rates during a person's teenage years. The following two equations are estimated:

³ There is mixed evidence as to whether a self-reported health measure is valid. See Sammartino (1987) for a brief review of the literature.

$$S = X\gamma_1 + \lambda(UR) + u \quad 1$$

$$Y^* = X\gamma_2 + \beta S + \varepsilon \quad 2$$

where S is the years of school completed (as reported in 1990), Y^* is the health outcome variable (to be explained shortly), X is a vector of exogenous determinants of the health outcome, UR is the average unemployment rate for a respondent's state of birth during the years in which he turned 15, 16, and 17 years old, and u and ε are error terms. It is assumed that $E[u | X, UR] = 0$ and $\text{var}(\varepsilon) = \sigma_\varepsilon^2 = 1$.

To correct for potential biases, the model is solved by substituting the fitted value for S from equation (1) for the actual value for S in equation (2), for which it is assumed that $E[\varepsilon | X, UR] = 0$. This procedure makes variation in years of schooling come solely from determinants that should be exogenous to health as an adult 30 to 40 years later. Since the health outcomes are dichotomous, equation (2) is estimated by a probit model in which the outcome variable is Y^* (the propensity to have the health condition), which is represented in the data by Y , where:

$$\begin{aligned} Y &= 0 \text{ if } Y^* \leq 0 \\ &= 1 \text{ if } Y^* > 0. \end{aligned} \quad 3$$

The vector X includes year-of-birth and state-of-birth dummy variables, and the average personal income per capita (PI/C), student-teacher ratio, and average teacher salary relative to (PI/C) for the respondent's state of birth over the four years in which he or she was 14, 15, 16, and 17.^{4,5} The year-of-birth dummy variables are meant to capture

⁴ The student-teacher ratio is the number of full-time students enrolled in public schools divided by the full-time instructional staff in public schools.

age differences in the health outcomes and the rising trend in school attendance and educational attainment through the late 1940s and the 1950s. The state-of-birth dummy variables are included to control for state-level differences in the quality of education, parental influences, and the propensities to acquire more education. The student-teacher ratio and relative teacher salaries for a state could also reflect the quality of education and perhaps the importance a state places on encouraging further schooling. The average state personal income per capita is included since family income may be indicative of the nutrition and health care families can provide to children. In addition, personal income per capita could capture part of the income effect associated with changes in state unemployment rates. For these three state-level variables and for the state unemployment rate, the effects on education and health would only come from within-state changes in the variable relative to changes in other states since the model controls for year of birth and state of birth.

While one may argue that occupational variables should be included in the model estimating the probability of having a work-limiting health condition, including occupational variables may cause the estimates to be inconsistent. People's occupations could be endogenous to both their educational attainment and health. A person who strives for a white-collar job will probably have more schooling than someone aiming for a blue-collar job. And health problems may limit work to a lesser extent for white-collar jobs. In addition, a health-conscious person may be more likely to avoid certain dangerous jobs, so a person with greater health as an adult may have selected into a less-

⁵ These state-level school variables come from the Biennial Surveys of Education by the Department of Education. I use these four-year averages rather than the three-year averages used for the unemployment rate because the data are reported as two-year averages, so the four-year average will maintain a balance that the three-year measure could not.

dangerous job. Nevertheless, the results for the model using the “work-limiting health condition” variable may partly reflect the effect of education on access to better jobs.

The key exclusion restriction assumption is that within-state changes in the unemployment rate relative to other states in a person's teenage years does not affect a person's health as an adult except for its effect through years of schooling, once one controls for the other factors represented in vector X. While this is arguably the case, there are a few concerns about the validity of the instrument.

The first concern is that a state or local youth unemployment rate may have a component reflecting some supply-side factors, such as willingness to quit school to work. Since one's willingness to quit school may be correlated with time preferences, the state unemployment rate could be correlated with adult health. I address this empirical problem in two ways. First, the state unemployment rates are those for workers covered by unemployment insurance (UI), who are primarily adults.^{6,7} This measure should hardly be affected by teenage labor supply and enrollment decisions. Second, the model includes state-of-birth dummy variables, which should eliminate the effects of state-specific supply factors, unless, for the unlikely case, they changed significantly over the twelve years for which I used the state unemployment rates.

A second concern about the validity of the instrument stems from the possibility that a higher unemployment rate could reduce family income, which in turn could affect nutrition or health care utilization, which could also affect their health 30 to 40 years

⁶ Teenagers have an average job duration of three months (Kaufman, 1994), and states typically require a person to hold a job for at least six months to be eligible for unemployment insurance.

⁷ As mentioned earlier, this is the only unemployment rate available for all states before 1970. These unemployment figures are obtained from The Manpower Report of the President (various years).

later. I address this concern by including state personal income per capita measured over the same years as state unemployment rates. In effect, this should parcel out the income effect, leaving just the substitution effect of higher unemployment rates reducing the reward for work and therefore increasing educational attainment.

A final concern about the validity of using the unemployment rate during teenagehood as an instrument for years of schooling is that there is some evidence that health varies with the level of economic activity. Ruhm (2000) finds that predicted deaths from cardiovascular disease, liver ailments, and flu/pneumonia increase when the economy is strong. While these ailments are unlikely to cause deaths in teenagers, the explanation for these results shows how behavioral patterns can change as the economy changes. Ruhm finds evidence of changes in obesity, diet, exercise, and smoking when there are changes in the economy. To the extent that the teenagers in the later 1940s and the 1950s modified their behavior with changes in the economy in a way that affected their health 30 to 40 years later, the instrument used in this analysis may be invalid.

First-stage Results

Table 3 shows the first-stage results of the empirical model (equation (1)). A higher unemployment rate in one's teenage years leads to greater educational attainment. For the first sample—that is, whether the respondent has a work-limiting health condition—an increase of one percentage point in the average state unemployment rate over the three years a person turns ages 15 to 17 increased the number of years of schooling he completed, on average, by 0.039. The estimate is statistically significant at the one percent level. The estimate indicates that if the three-year moving-average of a

state's unemployment rate were to increase by one percentage point relative to other states, then 3.9 percent of the white males in that state would acquire one more year of schooling on average, or 7.8 percent would acquire one more semester of schooling on average. The estimates for the other two samples are very close, but slightly lower.

As for other factors, a higher student-teacher ratio is associated with less schooling. This is as it would be expected since more students per teacher would indicate less attention and lower benefits for students. Surprisingly, relative teacher salary has an estimated negative association with educational attainment for males, which suggests that the estimate is capturing the effects of some other influences besides the emphasis a state places on education.

The results from Table 3 establish the connection between state unemployment rates during a person's teenage years and educational attainment. Next, the fitted values for educational attainment from equation (1) are used to estimate the causal effects of schooling on health.

Health Analysis Results

Table 4 presents the estimates for the second stage: the health outcome equations. For each health measure, I show the estimates from the standard probit models and from the two-stage probit models. The coefficient estimate on average teacher salary, in the two-stage models, is negative and statistically significant for the probabilities of having a work-limiting health condition and of having mobility limitations. And the student-teacher ratio is significantly positively associated with the likelihood of having mobility limitations.

For the probability of having a work-limiting health condition, the estimate on years of schooling is -0.103 for males under the assumption of random selection into educational levels. Transforming the estimate into a marginal effect, the estimate implies that one year of school decreases the probability of having a work-limiting disability by 2.0 percentage points, which is shown in square brackets under the standard error of the estimate.⁸ In the two-stage model, the coefficient estimate on the predicted value for school is -0.126, indicating that a year of schooling reduces the probability of having a work-limiting health condition by 2.6 percentage points. The estimate is statistically significant at the one percent level, but the difference in the estimates on schooling in the standard probit and two-stage model is not statistically significant.⁹

The same applies to the probability of requiring personal care. The estimate increases a little in the two-stage probit model, remaining statistically significant. Under the two-stage probit model, a year of schooling is estimated to increase the probability of requiring personal care by 0.67 percentage points, compared to only 0.52 percentage points for the standard probit model. These marginal effects of -2.6 percentage points on the probability of having a work-limiting health condition and -0.67 percentage points on the probability of requiring personal care are large relative to the percentage of people who have such a condition: 12.5 and 3.2 percent, respectively.

As for the probability of having a mobility-limitation, the two-stage probit model estimate decreases to about one-fifth of the estimated standard probit model estimate, becoming insignificant.

⁸ The marginal effects are calculated at the mean values of the explanatory variables.

⁹ The standard errors are corrected for the presence of a fitted value.

The results for the probabilities of having a work-limiting health condition and of requiring personal care do not necessarily indicate that estimates from a standard probit model understate the beneficial health effects of schooling for the population. A new interpretation of two-stage least squares (2SLS) estimates, first introduced by Card (1994) and later proven to be the case under certain conditions by Angrist and Imbens (1995), offers a different implication. The interpretation suggests that the 2SLS estimate for the effects of schooling represents the average causal effect of schooling for people whose schooling level depends on the instrument and for levels of schooling that would be affected by the instrument.

If Card's (1994) and Angrist and Imbens' (1995) interpretation of 2SLS estimates applies to a two-stage probit model—which it probably does in the limit—then the estimate represents the causal effect of schooling on health for students whose schooling level depends on the state unemployment rate during their teenage years. These students are probably on the margin of dropping out and staying in high school since they could be induced to quit school if the labor demand conditions improved. Thus, the results imply that for these marginal students, there appears to be a causal effect of a high school education on health.

It is still plausible that the effects of schooling on health are lower at higher levels of schooling. Thus, health differences at higher educational levels of schooling--levels of schooling which would be unaffected by the state unemployment rates during a person's teenage years--may still be attributable to some form of selection bias. Nevertheless, these results indicate that schooling does have a strong beneficial effect on health.

VI. Conclusions

This paper proposes a new instrumental variable for estimating the causal effects of schooling on health. Individuals for whom the state unemployment rate was high during their teenage years have on average more educational attainment than others for whom the state unemployment rate was lower, *ceteris paribus*. This indicates that the substitution effect (from differences in the opportunity cost of attending school) overpowers the income effect (from differences in families' financial need for teenagers to work).

For two of the health measures, the estimated health effects of schooling are larger in the two-stage models than in models that assume random selection into schooling, although the difference is not significant. A year of schooling is estimated to reduce the probability of having a work-limiting health condition by 2.6 percentage points and to reduce the probability of requiring personal care by 0.67 percentage points. These results confirm that at least for white males and for a high school education, schooling does contribute to better health.

Table 1: State Unemployment Rates Among Unemployment Insurance-covered Workers: 1948-1959

	<u>Mean</u>	<u>Standard Deviation</u>		<u>Mean</u>	<u>Standard Deviation</u>
Alabama	4.72	1.40	Montana	4.28	1.74
Alaska	9.05	3.49	Nebraska	1.93	0.63
Arizona	3.29	1.13	Nevada	4.23	1.43
Arkansas	5.15	1.42	New Hampshire	5.84	2.05
California	4.68	2.09	New Jersey	5.08	1.38
Colorado	1.76	0.74	New Mexico	2.36	0.75
Connecticut	3.70	1.95	New York	4.98	1.42
Delaware	2.29	0.97	North Carolina	4.32	1.13
Washington, DC	1.77	0.51	North Dakota	3.68	1.19
Florida	3.27	0.91	Ohio	2.85	1.56
Georgia	3.52	1.07	Oklahoma	3.75	0.94
Hawaii	3.22	0.84	Oregon	5.55	1.45
Idaho	4.48	1.22	Pennsylvania	4.97	2.04
Illinois	3.54	1.29	Rhode Island	7.09	2.37
Indiana	3.00	1.31	South Carolina	3.59	1.04
Iowa	1.93	0.51	South Dakota	2.07	0.55
Kansas	2.47	0.69	Tennessee	5.98	1.56
Kentucky	6.24	2.32	Texas	1.82	0.78
Louisiana	3.61	1.01	Utah	3.01	0.84
Maine	6.55	1.97	Vermont	4.34	1.64
Maryland	3.33	1.49	Virginia	2.49	0.84
Massachusetts	4.40	1.52	Washington	5.60	1.33
Michigan	4.62	2.41	West Virginia	5.87	2.83
Minnesota	3.40	1.02	Wisconsin	2.54	1.07
Mississippi	5.45	1.35	Wyoming	2.35	1.00
Missouri	3.47	0.92			

Table 2: Summary Statistics Number of observations = 452,146		
	Mean	Standard Deviation
Has a work-limiting health condition	0.125	0.330
Has a mobility limitation	0.026	0.158
Requires personal care	0.032	0.176
Years of schooling completed	13.18	3.27
Age	51.23	2.89
Average state-of-birth UR at ages 15 to 17	3.1	1.52
State per capita real personal income at ages 15 to 17	6633.71	1344.49
Average teacher salary relative to personal income per capita at ages 15 to 17	2.14	0.22
Student-teacher ratio at ages 15 to 17	25.82	2.62

Table 3: First-stage results: The effects of state unemployment rates on educational attainment - Dependent variable = years of schooling completed			
	Work-limiting health condition	Mobility limitation	Requires personal care
Average state-of-birth UR at ages 15, 16, and 17	0.039 ^{***} (0.009)	0.036 ^{***} (0.009)	0.037 ^{***} (0.008)
(State per capita personal income)/1000	-0.008 (0.043)	0.001 (0.043)	-0.003 (0.042)
Average teacher salary relative to personal income per capita	-0.198 ^{**} (0.094)	-0.199 ^{**} (0.094)	-0.209 ^{**} (0.094)
Student-teacher ratio	-0.024 ^{***} (0.009)	-0.026 ^{***} (0.009)	-0.026 ^{***} (0.009)
Number of observations	434,375	424,971	428,116
R-squared	0.050	0.051	0.050

Notes:

The numbers in parentheses are standard errors.

Also included in the regressions are a constant and state-of-birth and age dummy variables.

State per capita personal incomes are in 1982 dollars.

*** denotes statistical significance at the 1 percent level

** denotes statistical significance at the 5 percent level

* denotes statistical significance at the 10 percent level

Table 4: The effects of educational attainment on the probability of having a work-limiting health condition						
	Dependent Variable					
	Work-limiting health condition		Mobility limitation		Requires personal care	
	Standard Probit	2-stage Probit	Standard Probit	2-stage Probit	Standard Probit	2-stage Probit
Years of schooling completed	-0.103 ^{***} (0.001) [-0.020]		-0.109 ^{***} (0.001) [0.0052]		-0.085 ^{***} (0.001) [0.0052]	
Predicted value for years of Schooling		-0.126 ^{***} (0.041) [-0.026]		-0.020 (0.028) [0.0012]		-0.097 ^{**} (0.046) [0.0067]
(State per capita personal income)/1000	-0.013 (0.022)	-0.010 (0.020)	-0.029 (0.038)	-0.014 (0.014)	-0.062 [*] (0.035)	-0.058 (0.051)
Average teacher salary relative to personal income per capita	-0.076 (0.049)	-0.076 ^{***} (0.029)	-0.170 ^{**} (0.081)	-0.134 ^{***} (0.020)	-0.079 (0.074)	-0.078 (0.059)
Student-teacher ratio	0.004 (0.005)	0.004 (0.003)	0.006 (0.008)	0.010 ^{***} (0.002)	0.003 (0.007)	0.004 (0.005)
Number of observations	434,375	434,375	424,971	424,971	428,116	428,116

Notes:

The numbers in parentheses are standard errors.

Also included in the regressions are a constant and state-of-birth and age dummy variables.

State per capita personal incomes are in 1982 dollars.

*** denotes statistical significance at the 1 percent level

** denotes statistical significance at the 5 percent level

* denotes statistical significance at the 10 percent level

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