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ESTIMATING CAUSAL EFFECTS OF EARLY OCCUPATIONAL CHOICE ON LATER HEALTH: EVIDENCE USING THE PSID

Jason M. Fletcher
Jody L. Sindelar

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Estimating Causal Effects of Early Occupational Choice on Later Health: Evidence Using the PSID

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ABSTRACT

In this paper, we provide some of the first empirical evidence of whether early occupational choices are associated with lasting effects on health status, affecting individuals as they age. We take advantage of data on occupational histories available in the Panel Study of Income Dynamics (PSID) to examine this issue. To the PSID data, we merge historical Census data that reflect the labor market conditions when each individual in the PSID made his first occupational choice. These data on labor market conditions (e.g. state-level share of blue collar workers) allow us to instrument for occupational choice in order to alleviate endogeneity bias. We use parental occupation as additional instruments. Since our instruments may have indirect effects on later health, we also control for respondent's pre-labor market health, education and several family and state background characteristics in order to make the instruments more plausibly excludable. We find substantial evidence that a blue collar occupation at labor force entry is associated with decrements to later health status, ceteris paribus. These health effects are larger after controlling for endogeneity and are similar across sets of instruments. We also find differences in the effects of occupation by gender, race, and age.

Jason M. Fletcher
Yale University
School of Public Health
60 College Street, #303
New Haven, CT 06510
jason.fletcher@yale.edu

Jody L. Sindelar
Yale School of Public Health
Yale University School of Medicine
60 College Street, P.O. Box 208034
New Haven, CT 06520-8034
and NBER
jody.sindelar@yale.edu

Introduction

Occupation may be an important determinant of health, one which has received relatively little attention in the economics literature. The potential significance of occupation in affecting health is due in part to the large number of hours spent working each week over many years. Exposure to different physical and psychological job conditions across occupations suggests that health may vary systematically by occupation. Occupation also affects income and fringe benefit coverage, such as paid sick leave and health insurance.

First occupation may have a durable impact on later health. Health habits, which are often established relatively early in life, may also be affected by first occupation both due to the direct effect of workplace (e.g. stress, ability to smoke on the job) and indirectly through social norms (e.g. socializing at bars after work versus enjoying sports together). One's first-occupation may be a critical determinant of later health as it sets in place a trajectory of job conditions, income and health insurance coverage which in turn affect health.

The importance of early occupation on later health is consistent with the growing body of economics literature indicating that early circumstances and choices have lasting effects on later health. Case et al. (2005), Almond (2006) and Van den Berg et al. (2007) provide compelling evidence that conditions in utero affect long-term health and other life outcomes. Growing up in poverty and other early conditions have been shown to be highly correlated with adverse adult outcomes (see Johnson and Schoeni 2007 and cites therein). Similarly, health habits are often initiated in youth and set in motion a trajectory of lifetime health habits (e.g. Gruber 2001, Williams 2005). Studies have shown that labor market circumstances at time of workforce entry have long-lasting effects (e.g. Raaum and Roed 2006). There is ample evidence that years of schooling, which is determined when relatively young, has long-term impacts on both health and occupation (Cutler and Lleras-Muney 2006, Lleras-Muney 2005, and Fletcher and Frisvold 2008). However, there is also some evidence that the impact of education is reduced as one ages (Cutler and Lleras-Muney, 2006); in contrast occupation may increase in importance as a factor of production of health as individuals age (Case and Deaton 2003).

Despite the growing literature on early choices and conditions, relatively little is known regarding the long-term health implications of choice of first occupation. We advance the literature by examining whether early occupational choices affect later health outcomes using data from the Panel Study of Income Dynamics (PSID). The PSID dataset contains data on key relevant measures: first occupation after completing education, health later in life and a rich set of pre-labor market characteristics including parent's education, respondent's childhood health status, years of schooling, and adolescent health habits (smoking). The latter serves both as a risk preference proxy and a health production input. Information on state of birth also allows us to control for state-level characteristics during childhood.

We advance the literature by our focus on causality. Simultaneity between health and occupation is difficult to address, especially when examining contemporaneous measures of each. We use several mechanisms to make progress on assessing causal relationship. First we use occupation when young (first occupation) which is predetermined (Granger causality) for the somewhat older individuals that we select to be in our data set. Second, we use controls for childhood conditions including education of mother and father, smoking as a teenager, and own health when under age sixteen. These are rarely available in national surveys of adults but it allows us to control for important predictors of future health. Use of own health when young in essence absorbs the health aspects of other early conditions. The set of childhood controls together help to control for potential pathways of early factors on later health. Third, we use an instrumental variable approach, and are able to propose instruments from two different domains to address potential endogeneity (Murray, 2006 and Basu et al. 2007). In particular, we merge external data from the Census to measure state-level share of blue collar workers when the survey respondents were entering the labor market. We also examine the use of father's occupation.

Overall, we find evidence that early choice of blue collar employment substantially reduces health at later ages and show that our two-stage results are larger than standard OLS results. We find substantial variation in the effects of blue collar employment on health by age, race, and gender. We also show that our instruments are strong predictors of initial blue collar employment and pass over-identification tests.

Background

There is substantial evidence that occupation affects health through factors such as job conditions, income, fringe benefits (such as health insurance) and occupational prestige. Further, there is evidence that early occupation affects later labor market factors. A separate line of research indicates that early conditions in life can affect later health. Taken together, the multiple lines of research suggest that early occupation could affect later health. However, there is little direct evidence on the latter. We briefly review some relevant literature.

Occupation affects health.

Occupational medicine and sociology literatures indicate that occupation can affect health through job conditions such as job stress, latitude on the job, risk of injury and other workplace hazards as well as others (Rom and Markowitz, 2006). A series of studies use PSID data from 1968 to 1991 to examine the role of job stress and job control on mortality. They find that cumulative exposure to adverse working conditions, low control jobs, and passive work significantly increases mortality. The studies indicate the importance of considering health determinants from a life course approach (e.g. Karasek, Theorell et al. 1988; Amick and Celentano 1991).

An influential set of longitudinal studies examine how current occupation affects contemporaneous health (e.g. Marmot 1983; Marmot and Smith 1997; Marmot et al, 1997). A key finding is that lower occupational status is associated with worse health, controlling for demographics, health habits and income, among other factors. These papers focus on social position, occupational stress, and job control as mechanisms for the impact on multiple measures of health, including coronary heart disease, self-reported health, morbidity and health related behaviors (e.g. Bosma, Marmot et al. 1997; Ferrie, Martikainen et al. 2005). Both health and occupation are measured contemporaneously, leaving open the question of simultaneity.

In the economics literature, evidence on the impact of occupation on health is relatively sparse. Case and Deaton (2003), using repeated cross-sectional surveys, provide evidence that individuals in manual occupations have more rapidly declining self-reported health as they age. Choo and Denny (2006) use synthetic cohorts and

parsimonious empirical models and find that manual workers in Canada face rapid decreases in health, even controlling for chronic conditions.

Early conditions matter.

There is much evidence that a large set of early life conditions have long-lasting health impacts. For example, Almond (2006) provides evidence that individuals who were exposed to influenza in utero had higher rates of adult physical disability and other negative outcomes. Case, Fertig, and Paxson (2005) find that maternal smoking during pregnancy predicts poor adult health of the affected children. Johnson and Schoeni (2007) show that low birth weight is associated with poor educational and health outcomes. There is also a wide variety of evidence of a link between birth quarter and later health outcomes such as mortality, which when linked with nutritional intake and maternal infections during pregnancy, is suggestive of the consequences of early conditions on later health (Costa and Lahey 2005).[1]

Choices made during adolescence, especially health habits, also have been found to affect later health. These can affect later health both through the direct effects on health and also via the serial correlation of these health habits over time (e.g. Gruber 2001, Williams 2005). For instance, most smokers start smoking before age 18; very few start smoking after this age. Thus the habit of smoking as an adult has its origins in youth.

Conceptually, the adolescent choice that is likely most similar to occupation is educational choice. Occupational and educational choices are both made during late adolescence/early adulthood. Both can potentially affect life trajectories and can each be thought of as both consumption and investment decisions. While there is substantial evidence that education has long run impacts on health, there is very little literature examining the exact mechanism. Most researchers treat education as a critical factor but also as a "black box" Quality of the school, the courses taken, grades etc. are typically not delineated in production functions of health for adults (see Fletcher and Frisvold 2009 for a recent example, though). Rather, researchers examine relationships between years of

[1] For example, there is evidence that being born in a 19th century recession in the Netherlands led to increased mortality (van den Berg et al. 2006). There is also a large literature in epidemiology that links famines to later health outcomes (see Almond 2006 for cites).

schooling and measures of health[2]. Similarly, we treat occupation as a black box that, if found to be an important factor of production of health, should be further analyzed for the explicit mechanisms. For example, occupation too could be decomposed into specific aspects, including environmental characteristics, work schedules, psycho-social aspects of the job, impact of peers and social norms and fringe benefit generosity. However, the first step is to determine if there is an interesting and important relationship between first occupation and later health. This is the aim of the paper.

There is also substantial evidence in the economics literature that early occupational choices affect later wages levels, wage growth trajectories, and occupational mobility (Parent 2000, Kamborouv and Manovskii 2006, Pavan 2005, Oreopoulos et al. 2008). Von Wachter and Bender (2006) have found that labor market conditions faced by a young worker affect later labor market success. Thus, early occupation has been found to have an impact on later labor market factors, such as income, that in turn have been shown to affect health.

Causality

Despite the potential importance of first occupation on later health, this topic has been examined in only a small number of studies in the economics literature and no studies have directly attempted to estimate causal effects. We are aware of only three papers in the economics literature that have examined the effects of occupation on health using longitudinal datasets, which allows controls for selection into occupations. Mare (1990) uses the Older Men cohort of the National Longitudinal Study (1966) and provides evidence that first occupation affects mortality, even controlling for later occupational choices and a rich set of background variables. Sindelar et al. (2007 use the Panel Study of Income Dynamics and show that first occupation is associated with self-rated health status and heart attacks in later life, controlling for pre-labor market characteristics such as health status and other important background factors. Fletcher (2008) uses the Wisconsin Longitudinal Study (WLS) and sibling fixed effects to provide evidence that first occupation is associated with health outcomes measured at age 50 and near retirement. While these results are compelling, none of the studies are able to completely address the endogeneity of occupation and some of the datasets used contain

[2] Cutler and Lleras-Muney (2006), Lleras-Muney (2005), and Fletcher and Frisvold (2008) are examples.

important limitations.[3] [4] This current paper contributes to the small and growing literature on the effects of first occupational choice by using a rich dataset with pre-labor market controls as well as pursuing an instrumental variable strategy to estimate causal effects.

Data and Methodology

In this study, we use data from the Panel Study of Income Dynamics (PSID), which is a representative longitudinal study that began in 1968 that focuses on economic and demographic behaviors of individuals and households over time.[5] The PSID has data on current health as well as early health, first occupation and other information about the family when the individual was young. These data combined with the ability to match state level data provide the opportunity to begin to assess causality in the relationship between first occupation and later health,

Analytic Sample. Since our primary variable of interest is initial occupational choice, we focus on individuals in the PSID who were surveyed in the mid-90s and early 2000s, when information was gathered retrospectively on first occupation. Approximately 8,400 individuals aged 30 and over reported a valid 3-digit census occupational code for their first occupation. We select these older individuals to avoid examining essentially contemporaneous data on health and occupation. As we describe below, we use an instrumental variables strategy in some of our analyses, which also has implications for our analysis sample. In particular, we use information from the Census and self-reports of father's occupation during the respondent's childhood. Approximately 7,500 individuals reported their father's occupation. In order to merge the Census data, we need information on the state the respondent grew up in, which is available for 4,870 individuals.[6] After dropping individuals with incomplete data, our

[3] The NLS begins when individuals are ages 45-55 , collects retrospective information on occupation and has limited pre-market controls. The WLS contains only individuals from Wisconsin in a specific cohort.
[4] In a complementary literature, Oreopoulos et al. (2008) use variation in workforce entry conditions to show that early shocks to labor demand have long term effects on income. We are not aware of any research that uses this strategy to examine health outcomes.
[5] http://psidonline.isr.umich.edu/Guide/Overview.html
[6] Unfortunately, information on which state the respondent grew up in was only asked of heads of households since the 1990s in the family data. This feature of the data skews our sample towards males and single mothers due to the PSID definition of a head of household. We are able to add a few hundred individuals to the sample, who were asked their state of birth in 1997 and 1999 but our sample is still not representative of wives in the PSID survey. We examine this issue to some degree in our robustness

analysis sample is 4,700. Summary statistics for our analysis sample are presented in Table 1. Appendix Table 1A shows that the analysis sample and the full sample are very similar (except for gender).

Variables. Health is self-reported in five categories that are typically used in self-reported health: poor, fair, good , very good and excellent. See Table 1 for means and other descriptive information. From the data on current occupation, we categorize individuals into blue collar occupations, or not. Specifically, the following occupational categories are considered to be blue collar: craftsman, operative, laborer, farmer, services. White collar occupational categories include: professionals, sales, managers, and clerical. We use retrospective data on first occupation. The question asked of the respondents is, "Thinking of your first full-time regular job, what kind of work did you do?" These data are critical to our study and while PSID is longitudinal, there are so few observations for which we are able to actually record data from the multiple waves (and know that it was in fact the first job) that the retrospective data are likely the best available for our purposes. Respondents were also asked about other aspects of their early life, including: their health prior to age 16, their parents' education, and whether they smoked when they were a teenager. The standard demographic information is also available for the respondent.

In order to construct one of our instruments, we create a Census data file using the Census years 1940-1990 available from IPUMS.[7] For each state x year[8] cell, we construct measures of the share of blue collar vs white collar employment. In particular, we calculate the number of workers aged 15-30 in each state in each year who work in blue collar occupations as a proportion of all workers of this age group.[9] We then merge this measure with the individuals in the PSID so that, for example, an individual who turned 18 in Texas in 1980 would be given our constructed measure of the proportion of workers aged 15-30 in Texas in 1980 who worked in blue collar occupations.

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checks, where we present results that do not use the state of birth information and only use father's occupation as the instrument.

[7] http://usa.ipums.org/usa/

[8] We linearly interpolate for years between census data points. We are aware of no other data source with information on state x year labor shares for the years we require—from 1940-1980+.

[9] We also experimented with creating differentials in average wages for this age group between blue collar and white collar occupations in each state and year. The wage differential measures were not as strong a predictor of first occupation as the measure we use.

After constructing and merging datasets, we then estimate a series of baseline and two-stage least square empirical models of the relationship between blue collar occupation upon work force entry and later health status. In particular, we estimate:

$$health_{it} = X_{it}\beta + \alpha Occ_{i0} + \varepsilon_{it} \quad (1)$$

where the health status for individual *i* at time *t* (2001) is a function of individual level characteristics that are predetermined at labor market entry (gender, age, race, schooling, health from ages 0-16, maternal and paternal education, and smoking status) and whether their first occupation was blue collar (Occ_{i0}).

We follow our baseline specification by estimating:

$$health_{it} = X_{it}\beta + \alpha Occ_{i0} + \varepsilon_{it} \quad (2)$$

$$Occ_{i0} = X_{it}\delta + Z_{it}\gamma + \upsilon_{it} \quad (3)$$

where we use two instruments in the Z vector that we describe above—father's occupation and proportion of blue collar occupations from the Census.

Instrument Validity

We propose two instruments: father's occupation and state employment condition (see Oreopoulos et al. (2008) for a similar approach). In order to be valid, these variables must be highly correlated with our endogenous variable (first occupation) and uncorrelated with the error term in the health production function (equation (2)). It is reasonable to imagine circumstances in which father's occupation is directly related to his child's health in middle age. We attempt to control for the primary links between father's occupation and child's adult health, including child's health though adolescence, child's educational attainment, and child's risk preference (proxied by smoking status). We claim that these are the primary potential direct pathways linking father's occupation and child's adult health and suggest that father's occupation may indirectly affect child's adult health through affecting the child's occupation choices, such as through providing job contacts and occupation-specific knowledge. Thus, our implicit assumption is that there is no residual effect of father's occupation on the respondent's adult health status after controlling for parents' education and respondent education and health endowment except through its impact on the respondent's occupational choice.

Since it is impossible to show the validity of father's occupation as an instrument, we take advantage of state level occupation characteristics as a second instrument, as outlined above. Like our first instrument, we are aware that it is possible to craft stories in which the proportion of same-aged individuals in one's state who have blue collar occupations at workforce entry might be correlated with unobservables in the health production function (equation 2), such as state-level expenditures on health care or education. Again, we attempt to minimize this possibility by controlling for the pathways through which these variables likely affect adult health, such as educational attainments and health during childhood. In robustness checks, we also control for state-level educational and health characteristics[10] that may be correlated with our instrument. We find our results to be robust to these additional controls.

We assume that any other links between our state-level occupational characteristic (percentage blue collar) and the respondent's health is an indirect effect through occupational choice. In particular, our state-level measure could affect occupational choice through information channels (young people in blue collar occupations transmit information about other blue collar opportunities) or demand factors. For example, a high proportion of blue collar jobs available increases the probability that the individuals will also obtain a blue collar job. The fact that a substantial proportion of the jobs in Michigan are blue collar increases the likelihood that a new entrant will start working in a blue collar job.

Even with our important pre-labor market controls, there may be remaining questions of the validity of each of our instruments. Importantly, the availability of two instruments allows us to use over-identification tests of the validity of our instruments. A further strength of our set of instruments is that they are drawn in two different domains (Murray, 2006 and Basu et al. 2007). Finally, we also show below that our main results are similar if we use both instruments or use them individually, which gives us increased confidence in our results.

[10] For our state-level characteristics, we use education data from Card and Krueger (1992) on pupil-teacher ratios, term length and teacher wages and health data from Lleras-Muney (2005) on number of hospitals and number of physicians. We extend the Lleras-Muney health data through 1958 and use linear interpolation for all data to fill in missing values.

Results

Table 2 presents baseline results predicting health status in 2001 for our analysis sample[11]. We begin in column 1 by using standard OLS regression analysis to present the age/sex adjusted correlation between blue collar employment at labor force entry (henceforth "blue collar employment") with self-reported health status.[12] Results indicate a significant decrease in self reported health status of 0.4 units. This magnitude is similar to an increase in age of 20 years. Ordered probit results are nearly identical with our OLS results in all analyses and are presented in Table 4A. In column 2, we add race and education controls and show that the association between blue collar employment and health status is reduced by half to 0.2 units, which is similar to a 10 year age increase. In column 3, we control for our full vector of pre-labor market characteristics, and the association is reduced by another 25% to 0.14 units—a seven year age increase, but remains highly significant. Childhood health is a significant predictor of adult health; in particular, reporting excellent health in childhood is highly correlated with adult health (the omitted category is good health). Very good health as a child also increases adult health, but the magnitude is about half that of excellent childhood health, as would be expected. Table 3A in the appendix shows that our baseline results are similar when estimated using our analysis sample or the full sample of individuals (some of whom we drop because of missing data on state of birth or paternal occupation). Finally, column 4 shows that the results are robust to including state-level health and education characteristics measured at birth and at age 15.

In Table 3, we examine the heterogeneity of the baseline results by age, race, and gender. We find that the association between blue collar employment and health status is 50% larger for individuals ages 30 to 50 than individuals older than 50. Young males report a larger health advantage than young females, although this is likely partly due to the construction of the analysis sample—women in the sample are likely single mothers. The black-white health gap seems to grow as individuals age. In columns 3 and 4 we find that the association is greater for females than males and in columns 5 and 6 we find

[11] All analyses use robust standard errors clustered at the state-of-birth level.
[12] See Smith (2007) for evidence that the self-rated health measures in the PSID are a reasonable overall measure of health outcome.

that the association between blue collar employment and health is greater for white respondents, both in terms of significance and magnitude.

In Table 4, we attempt to estimate causal effects of blue collar employment on health by using two instruments—state-level share of blue collar workers at age 18 and whether the respondent's father was in a blue collar occupation. Column 1 presents our baseline two-staged least square results. Our instrumented results imply a stronger relationship between blue collar employment and health status—a 0.63 unit reduction (vs. the 0.14 reduction using OLS). As shown in the table, the F-statistics are sizable (most over 10) and we cannot reject the validity of the instruments using over-identification test. Like previous results, using a two-staged framework within an ordered probit specification produced very similar results and are presented in Table 4A in the appendix.[13] In column 2, we again include state-level health and education characteristics measured at birth and age 15; if anything, the results are slightly larger than our baseline results. Importantly, results that only use one of the two instruments are very similar, but have larger standard errors and are presented in appendix Table 5A.

As shown in Table 4, our IV results are substantially larger than the OLS results. This may seem surprising because many omitted variable bias stories (e.g. ability bias) would suggest that the IV estimates should be lower. However, our results match those in the literature estimating schooling effects on wages or health, where IV estimates are usually larger than OLS (Card, 1999, Currie and Moretti 2003). In principle, part of the difference between IV and OLS results could be explained by measurement error, though this argument may be more compelling in the schooling literature. The more likely reason for the IV/OLS result difference is heterogeneous impacts of occupation on health. In this case, IV estimates may exceed OLS estimates because (1) with heterogeneous effects, the OLS estimates do not have a clear direction of bias and (2) IV estimates show the effect of occupation on marginal individuals (LATE), which could be larger than the effect on average (Carnerio et al. 2007, Imbens and Agrist 1994). The simple story consistent with larger effects for the "marginal" blue collar worker is that workers likely

[13] In order to generate the two stage ordered probit results, we relied on the conditional recursive mixed process estimator ("cmp") add-on to Stata 10. See David Roodman, 2007. "CMP: Stata module to implement conditional (recursive) mixed process estimator," Statistical Software Components S456882, Boston College Department of Economics, revised 01 Jul 2008.

sort into occupations based on their multidimensional "match" with the job, which includes the worker's ability to absorb hazardous job conditions. Thus, it may be the case that "marginal" workers are those that are least able to absorb job conditions that are detrimental to health status, which would lead to larger long term declines in health status.

In the remainder of the columns of Table 4, we find evidence that the effects of blue collar employment increase with age, are greater for males, and may be greater for non-white respondents, although the results stratified by race are not estimated precisely and the instruments have only moderate strength. Differences in the impact of blue collar by gender and race may relate to the fact that fewer whites and fewer females have blue collar jobs. Further, it may be that characteristics of the blue collar and white collar jobs are systematically different by race and gender, e.g. women in these cohorts were more likely to be secretaries and teachers in the white collar jobs and were less likely to be well-paid managers. Also, women in blue collar jobs may have had less physically strenuous and hazardous jobs as compared to men in blue collar jobs.

Conclusions

Although there is much evidence across the social sciences to suggest that early occupational choices could affect long term health, little research has been able to directly examine the potential links. In this paper, we use the PSID combined with Census information to present the first attempt to estimate a causal relationship between blue collar employment at labor market entry and later health status. We find large effects of blue collar employment, which are similar to aging an individual between 7 and 30 years. We also find large heterogeneity in the impact of early occupation on health, which appear to grow with age and disproportionately affect males and minority respondents. Our results extend the literature by using an instrumental variables strategy in combination with direct controls for childhood health and other early family conditions. Results from both the OLS and the IV approach suggest that interventions that mitigate the adverse health effects of starting ones working life in a blue collar job could be productive in enhancing health when older, ceteris paribus. While we aim to suggest causality, however, even if this has not been incontrovertibly established, our

results indicate this area merits further research. A fertile area for further research could be to investigate the mechanisms linking early labor market choices to later health as well as examine ways to mitigate these effects.

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Tables

Table 1
Descriptive Statistics
Analysis Sample

Variable	Obs	Mean	Std Dev	Min	Max
Health Status (1=poor, 5=excellent)	4700	3.59	1.05	1	5
Poor Health	4700	0.03	0.18	0	1
Fair Health	4700	0.11	0.32	0	1
Good Health	4700	0.29	0.45	0	1
Very Good Health	4700	0.35	0.48	0	1
Excellent Health	4700	0.21	0.41	0	1
First Job = Blue Collar	4700	0.61	0.49	0	1
Male	4700	0.65	0.48	0	1
Age	4700	48.05	12.29	30	79
Non White	4700	0.29	0.45	0	1
Education	4700	13.41	1.96	11	17
Initial Health	4700	4.27	0.86	1	5
Poor Initial Health Status	4700	0.01	0.10	0	1
Fair Initial Health Status	4700	0.03	0.16	0	1
Good Initial Health Status	4700	0.14	0.35	0	1
Very Good Initial Health Status	4700	0.28	0.45	0	1
Excellent Initial Health Status	4700	0.48	0.50	0	1
Missing Initial Health Status	4700	0.06	0.23	0	1
Maternal Education	4700	11.79	2.47	5	18
Paternal Education	4700	11.61	3.02	5	18
Smoke as Teen	4700	0.20	0.40	0	1
Missing Family Information	4700	0.24	0.42	0	1
State Characteristics					
Number of Physicians (Birth Year) (10000s)	4700	0.82	0.86	0.00	3.79
Number of Hospitals (Birth Year) (1000s)	4700	0.23	0.14	0.00	1.47
Pupil-Teacher Ratio (Birth Year) (10s)	4700	1.98	0.62	0.00	5.09
Term Length (Birth Year) (10s)	4700	17.91	1.03	11.54	23.68
Teacher Wage Rate (Birth Year) (1000s)	4700	8.70	4.17	0.52	22.33
Number of Physicians (Year 15) (10000s)	4700	0.82	0.70	0.00	3.90
Number of Hospitals (Year 15) (1000s)	4700	0.23	0.11	0.00	0.94
Pupil-Teacher Ratio (Year 15) (10s)	4700	1.70	0.52	0.00	5.20
Term Length (Year 15) (10s)	4700	17.99	1.10	11.00	24.20
Teacher Wage Rate (Year 15) (1000s)	4700	10.97	3.44	2.33	23.58
Instruments					
Paternal Blue Collar Occupation	4700	0.53	0.50	0	1
%Blue Collar (Census)	4700	0.52	0.06	0.30	0.76

State characteristics from Card and Krueger (1992) for education data, Lleras-Muney (2005) for health data, which has been extended through 1958 using the same sources. All missing state data was linearly interpolated.

Table 2
Association between First Occupation and Health Status:
Baseline Specification

Outcomes= Health Status (2001)				
Sample	Full	Full	Full	Full
Specification	Baseline OLS	with Race/Education	Add'l Vars	State Xs
First Job = Blue Collar	-0.398***	-0.188***	-0.142***	-0.142***
	(0.029)	(0.033)	(0.032)	(0.034)
Male	0.349***	0.203***	0.170***	0.167***
	(0.031)	(0.034)	(0.034)	(0.034)
Age	-0.022***	-0.023***	-0.020***	-0.013***
	(0.001)	(0.001)	(0.002)	(0.003)
Non White		-0.326***	-0.257***	-0.247***
		(0.046)	(0.047)	(0.046)
Education		0.087***	0.060***	0.062***
		(0.008)	(0.008)	(0.008)
Poor Initial Health Status			-0.248	-0.257
			(0.194)	(0.195)
Fair Initial Health Status			-0.276**	-0.275**
			(0.104)	(0.105)
Very Good Initial Health Status			0.242***	0.241***
			(0.053)	(0.054)
Excellent Initial Health Status			0.561***	0.565***
			(0.049)	(0.050)
Missing Initial Health Status			0.247***	0.246***
			(0.090)	(0.091)
Maternal Education			0.015*	0.014*
			(0.008)	(0.008)
Paternal Education			0.023***	0.023***
			(0.006)	(0.006)
Smoke as Teenager			-0.038	-0.036
			(0.049)	(0.050)
Missing Family Information			-0.044	-0.045
			(0.040)	(0.040)
Constant	4.662***	3.585***	3.016***	2.961***
	(0.043)	(0.141)	(0.173)	(0.365)
Observations	4700	4700	4700	4700
R-squared	0.113	0.158	0.216	0.217

Robust standard errors clustered at the state-level in parentheses. State characteristics in column 4 are listed in Table but not reported
*** p<0.01, ** p<0.05, * p<0.1

Table 3
Association between First Occupation and Health Status:
Age, Race, and Gender Differences

Outcomes= Health Status (2001)						
Sample	Age < 50	Age >= 50	Male	Female	Non White	White
Specification	OLS	OLS	OLS	OLS	OLS	OLS
First Job = Blue Collar	-0.141***	-0.102*	-0.084**	-0.223***	-0.086	-0.147***
	(0.037)	(0.055)	(0.039)	(0.048)	(0.069)	(0.036)
Male	0.237***	0.043			0.224***	0.141***
	(0.033)	(0.062)			(0.045)	(0.038)
Age	-0.021***	-0.018***	-0.022***	-0.017***	-0.028***	-0.017***
	(0.003)	(0.003)	(0.002)	(0.003)	(0.004)	(0.001)
Non White	-0.172***	-0.422***	-0.225***	-0.284***		
	(0.050)	(0.075)	(0.056)	(0.052)		
Education	0.043***	0.088***	0.071***	0.046***	0.054***	0.061***
	(0.011)	(0.012)	(0.010)	(0.016)	(0.015)	(0.009)
Poor Initial Health Status	-0.287	-0.172	-0.014	-0.655**	-0.132	-0.295
	(0.187)	(0.339)	(0.266)	(0.323)	(0.248)	(0.239)
Fair Initial Health Status	-0.272**	-0.263	-0.387***	-0.144	-0.171	-0.325***
	(0.118)	(0.192)	(0.137)	(0.140)	(0.154)	(0.121)
Very Good Initial Health Status	0.245***	0.264***	0.179***	0.348***	0.215***	0.258***
	(0.053)	(0.081)	(0.057)	(0.090)	(0.070)	(0.062)
Excellent Initial Health Status	0.611***	0.505***	0.514***	0.629***	0.503***	0.591***
	(0.053)	(0.082)	(0.067)	(0.070)	(0.088)	(0.051)
Missing Initial Health Status	0.230**	0.326**	0.183	0.353***	0.107	0.338***
	(0.103)	(0.159)	(0.128)	(0.116)	(0.130)	(0.099)
Maternal Education	0.000	0.032**	0.014	0.014	0.012	0.016**
	(0.010)	(0.012)	(0.011)	(0.010)	(0.016)	(0.008)
Paternal Education	0.038***	0.006	0.023**	0.023***	0.022**	0.022***
	(0.007)	(0.009)	(0.009)	(0.007)	(0.009)	(0.007)
Smoke as Teenager	-0.049	-0.004	-0.023	-0.032	-0.076	-0.023
	(0.042)	(0.077)	(0.053)	(0.092)	(0.088)	(0.055)
Missing Family Information	-0.024	-0.060	-0.060	-0.016	0.059	-0.103**
	(0.051)	(0.066)	(0.051)	(0.059)	(0.055)	(0.050)
Constant	3.203***	2.606***	3.126***	3.062***	3.191***	2.887***
	(0.216)	(0.323)	(0.212)	(0.285)	(0.392)	(0.188)
Observations	2884	1816	3048	1652	1345	3355
R-squared	0.183	0.200	0.203	0.222	0.202	0.194

Robust standard errors clustered at the state-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4
Association between First Occupation and Health Status:
2SLS Specifications:
Gender and Racial Differences

Outcomes= Health Status (2001)								
Sample	Full	Full	Age < 50	Age >= 50	Male	Female	Non White	White
Specification	2SLS	State Xs	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
First Job = Blue Collar	-0.629*	-0.794*	-0.284	-0.888*	-0.868**	-0.411	-0.773	-0.557
	(0.333)	(0.459)	(0.402)	(0.463)	(0.423)	(0.481)	(0.632)	(0.347)
Male	0.316***	0.362***	0.277**	0.298*			0.385**	0.276**
	(0.106)	(0.136)	(0.120)	(0.167)			(0.151)	(0.114)
Age	-0.021***	-0.017***	-0.021***	-0.019***	-0.023***	-0.018***	-0.026***	-0.019***
	(0.002)	(0.005)	(0.003)	(0.003)	(0.002)	(0.003)	(0.005)	(0.002)
Non White	-0.224***	-0.209***	-0.170***	-0.286**	-0.203***	-0.260***		
	(0.052)	(0.055)	(0.048)	(0.137)	(0.057)	(0.080)		
Education	0.017	0.003	0.030	0.021	-0.004	0.031	-0.006	0.024
	(0.030)	(0.039)	(0.040)	(0.039)	(0.042)	(0.037)	(0.049)	(0.031)
Poor Initial Health Status	-0.280	-0.304	-0.297	-0.246	-0.054	-0.672**	-0.195	-0.316
	(0.198)	(0.206)	(0.185)	(0.335)	(0.275)	(0.323)	(0.265)	(0.244)
Fair Initial Health Status	-0.275***	-0.267***	-0.265**	-0.324	-0.381***	-0.147	-0.118	-0.339***
	(0.096)	(0.096)	(0.119)	(0.206)	(0.127)	(0.133)	(0.141)	(0.116)
Very Good Initial Health Status	0.220***	0.215***	0.244***	0.185**	0.149**	0.339***	0.223***	0.228***
	(0.050)	(0.048)	(0.052)	(0.092)	(0.063)	(0.081)	(0.068)	(0.063)
Excellent Initial Health Status	0.540***	0.538***	0.605***	0.468***	0.499***	0.613***	0.524***	0.557***
	(0.045)	(0.044)	(0.053)	(0.074)	(0.065)	(0.075)	(0.089)	(0.048)
Missing Initial Health Status	0.226**	0.220**	0.229**	0.207	0.159	0.342***	0.098	0.318***
	(0.091)	(0.090)	(0.101)	(0.187)	(0.123)	(0.116)	(0.131)	(0.099)
Maternal Education	0.009	0.007	-0.001	0.018	0.009	0.010	-0.002	0.013*
	(0.008)	(0.008)	(0.010)	(0.013)	(0.011)	(0.015)	(0.019)	(0.007)
Paternal Education	0.017**	0.015*	0.035***	0.003	0.012	0.022***	0.016	0.017*
	(0.008)	(0.009)	(0.010)	(0.010)	(0.011)	(0.008)	(0.011)	(0.009)
Smoke as Teenager	-0.008	0.005	-0.041	0.046	0.016	-0.016	-0.072	0.008
	(0.057)	(0.065)	(0.049)	(0.088)	(0.052)	(0.100)	(0.093)	(0.065)
Missing Family Information	-0.032	-0.028	-0.021	-0.043	-0.054	-0.006	0.087	-0.097**
	(0.039)	(0.041)	(0.052)	(0.065)	(0.050)	(0.069)	(0.060)	(0.048)
Constant	3.986***	4.341***	3.481***	4.096***	4.954***	3.416***	4.461***	3.721***
	(0.646)	(1.061)	(0.812)	(0.873)	(0.961)	(0.885)	(1.042)	(0.690)
Observations	4700	4700	2884	1816	3048	1652	1345	3355
R-squared	0.179	0.151	0.179	0.115	0.113	0.215	0.131	0.166
F-statistic	18.481	9.322	11.978	22.297	19.606	8.257	7.037	12.420
P-value of J-statistic	0.792	0.494	0.671	0.472	0.854	0.638	0.834	0.998

Robust standard errors clustered at the state-level in parentheses. State characteristics in column 4 are listed in Table but not reported. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 1A
Comparison between Analysis Sample and Full Sample

	Analytic Sample			Full Sample		
Variable	Obs	Mean	Std Dev	Obs	Mean	Std.
Health Status (1=poor, 5=excellent)	4700	3.59	1.05	8387	3.55	1.07
Poor Health Status	4700	0.15	0.36	8387	0.16	0.37
First Job = Blue Collar	4700	0.61	0.49	8387	0.55	0.50
Male	4700	0.65	0.48	8387	0.48	0.50
Age	4700	48.05	12.29	8387	48.51	13.38
Non White	4700	0.29	0.45	7912	0.30	0.46
Education	4700	13.41	1.96	8387	13.37	1.92
Poor Initial Health Status	4700	0.01	0.10	8387	0.01	0.09
Fair Initial Health Status	4700	0.03	0.16	8387	0.03	0.16
Good Initial Health Status	4700	0.14	0.35	8387	0.16	0.37
Very Good Initial Health Status	4700	0.28	0.45	8387	0.28	0.45
Excellent Initial Health Status	4700	0.48	0.50	8387	0.47	0.50
Missing Initial Health Status	4700	0.06	0.23	8387	0.06	0.24
Maternal Education	4700	11.79	2.47	8387	11.79	2.35
Paternal Education	4700	11.61	3.02	8387	11.66	2.82
Smoke as Teen	4700	0.20	0.40	8387	0.18	0.39
Missing Family Information	4700	0.24	0.42	8387	0.35	0.48
Paternal Blue Collar Occupation	4700	0.53	0.50	7517	0.53	0.50
%Blue Collar (Census)	4700	0.52	0.06	5304	0.52	0.06

Appendix Table 2A
Descriptive Statistics of Analysis Sample
Males and Females

	Males			Females		
Variable	Obs	Mean	Std.	Obs	Mean	Std.
Health Status (1=poor, 5=excellent)	3048	3.68	1.04	1652	3.43	1.04
Poor Health Status	3048	0.13	0.34	1652	0.18	0.39
First Job = Blue Collar	3048	0.70	0.46	1652	0.45	0.50
Male	3048	1.00	0.00	1652	0.00	0.00
Age	3048	48.03	11.96	1652	48.08	12.90
Non White	3048	0.22	0.42	1652	0.40	0.49
Education	3048	13.56	2.02	1652	13.14	1.81
Poor Initial Health Status	3048	0.01	0.09	1652	0.01	0.10
Fair Initial Health Status	3048	0.02	0.14	1652	0.04	0.19
Good Initial Health Status	3048	0.13	0.34	1652	0.17	0.37
Very Good Initial Health Status	3048	0.28	0.45	1652	0.28	0.45
Excellent Initial Health Status	3048	0.50	0.50	1652	0.45	0.50
Missing Initial Health Status	3048	0.06	0.23	1652	0.06	0.23
Maternal Education	3048	11.88	2.45	1652	11.63	2.50
Paternal Education	3048	11.73	3.00	1652	11.39	3.04
Smoke as Teen	3048	0.23	0.42	1652	0.14	0.35
Missing Family Information	3048	0.22	0.42	1652	0.26	0.44
Paternal Blue Collar Occupation	3048	0.51	0.50	1652	0.57	0.49
%Blue Collar (Census)	3048	0.52	0.06	1652	0.52	0.06

Appendix Table 2A (continued)
Descriptive Statistics of Analysis Sample:
Racial Differences

	Nonwhite			White		
Variable	Obs	Mean	Std.	Obs	Mean	Std.
Health Status (1=poor, 5=excellent)	1345	3.30	1.04	3355	3.71	1.03
Poor Health Status	1345	0.22	0.41	3355	0.12	0.33
First Job = Blue Collar	1345	0.71	0.46	3355	0.58	0.49
Male	1345	0.51	0.50	3355	0.71	0.46
Age	1345	45.93	11.17	3355	48.89	12.62
Non White	1345	1.00	0.00	3355	0.00	0.00
Education	1345	12.75	1.64	3355	13.68	2.01
Poor Initial Health Status	1345	0.01	0.11	3355	0.01	0.09
Fair Initial Health Status	1345	0.03	0.17	3355	0.02	0.16
Good Initial Health Status	1345	0.19	0.40	3355	0.12	0.33
Very Good Initial Health Status	1345	0.25	0.43	3355	0.29	0.46
Excellent Initial Health Status	1345	0.43	0.49	3355	0.51	0.50
Missing Initial Health Status	1345	0.09	0.28	3355	0.04	0.20
Maternal Education	1345	11.07	2.45	3355	12.08	2.42
Paternal Education	1345	10.61	2.85	3355	12.02	2.99
Smoke as Teen	1345	0.14	0.35	3355	0.22	0.41
Missing Family Information	1345	0.33	0.47	3355	0.20	0.40
Paternal Blue Collar Occupation	1345	0.73	0.44	3355	0.45	0.50
%Blue Collar (Census)	1345	0.53	0.07	3355	0.51	0.06

Appendix Table 3A
Comparison of Baseline Results using Analysis and Full Samples

Outcomes= Health Status (2001)						
Sample	Analysis	Analysis with	Analysis	Full	Full with	Full
Specification	Baseline OLS	Race/Education	Add'l Vars	Baseline OLS	Race/Education	Add'l Vars
First Job = Blue Collar	-0.398***	-0.188***	-0.142***	-0.359***	-0.156***	-0.119***
	(0.029)	(0.033)	(0.032)	(0.024)	(0.028)	(0.027)
Male	0.349***	0.203***	0.170***	0.337***	0.201***	0.164***
	(0.031)	(0.034)	(0.034)	(0.023)	(0.025)	(0.025)
Age	-0.022***	-0.023***	-0.020***	-0.021***	-0.022***	-0.020***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Non White		-0.326***	-0.257***		-0.291***	-0.228***
		(0.046)	(0.047)		(0.037)	(0.037)
Education		0.087***	0.060***		0.097***	0.070***
		(0.008)	(0.008)		(0.007)	(0.007)
Poor Initial Health Status			-0.248			-0.226
			(0.194)			(0.173)
Fair Initial Health Status			-0.276**			-0.275***
			(0.104)			(0.098)
Very Good Initial Health Status			0.242***			0.266***
			(0.053)			(0.036)
Excellent Initial Health Status			0.561***			0.578***
			(0.049)			(0.038)
Missing Initial Health Status			0.247***			0.322***
			(0.090)			(0.049)
Maternal Education			0.015*			0.015**
			(0.008)			(0.006)
Paternal Education			0.023***			0.020***
			(0.006)			(0.005)
Smoke as Teenager			-0.038			-0.047
			(0.049)			(0.038)
Missing Family Information			-0.044			-0.073**
			(0.040)			(0.028)
Constant	4.662***	3.585***	3.016***	4.572***	3.366***	2.879***
	(0.043)	(0.141)	(0.173)	(0.037)	(0.106)	(0.118)
Observations	4700	4700	4700	6617	6584	6584
R-squared	0.113	0.158	0.216	0.130	0.176	0.232

Robust standard errors clustered at the state-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 4A
Results Comparing OLS and Ordered Probit Specifications

Outcomes= Health Status (2001)					
Sample	Full	Full	Full	Full	Full
Specification	OLS	OLS	Ordered Probit	2SLS	IV-Ordered Probit
CMP?[14]	No	Yes	Yes	No	Yes
First Job = Blue Collar	-0.142***	-0.142***	-0.167***	-0.629*	-0.705***
	(0.032)	(0.032)	(0.037)	(0.333)	(0.164)
Male	0.170***	0.170***	0.200***	0.316***	0.358***
	(0.034)	(0.033)	(0.037)	(0.106)	(0.055)
Age	-0.020***	-0.020***	-0.022***	-0.021***	-0.022***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Non White	-0.257***	-0.257***	-0.289***	-0.224***	-0.243***
	(0.047)	(0.047)	(0.052)	(0.052)	(0.056)
Education	0.060***	0.060***	0.069***	0.017	0.019
	(0.008)	(0.008)	(0.009)	(0.030)	(0.019)
Poor Initial Health Status	-0.248	-0.248	-0.262	-0.280	-0.291
	(0.194)	(0.194)	(0.208)	(0.198)	(0.201)
Fair Initial Health Status	-0.276**	-0.276***	-0.287***	-0.275***	-0.278***
	(0.104)	(0.103)	(0.110)	(0.096)	(0.100)
Very Good Initial Health Status	0.242***	0.242***	0.245***	0.220***	0.215***
	(0.053)	(0.053)	(0.056)	(0.050)	(0.056)
Excellent Initial Health Status	0.561***	0.561***	0.642***	0.540***	0.601***
	(0.049)	(0.049)	(0.054)	(0.045)	(0.056)
Missing Initial Health Status	0.247***	0.247***	0.271***	0.226**	0.240**
	(0.090)	(0.090)	(0.098)	(0.091)	(0.098)
Maternal Education	0.015*	0.015*	0.016*	0.009	0.009
	(0.008)	(0.008)	(0.009)	(0.008)	(0.009)
Paternal Education	0.023***	0.023***	0.027***	0.017**	0.020***
	(0.006)	(0.006)	(0.007)	(0.008)	(0.007)
Smoke as Teenager	-0.038	-0.038	-0.048	-0.008	-0.014
	(0.049)	(0.049)	(0.054)	(0.057)	(0.056)
Missing Family Information	-0.044	-0.044	-0.047	-0.032	-0.033
	(0.040)	(0.040)	(0.045)	(0.039)	(0.043)
Constant	3.016***	3.016***		3.986***	
	(0.173)	(0.173)		(0.646)	
Observations	4700	4700	4700	4700	4700
R-squared	0.216	.	.	0.179	.

Robust standard errors clustered at the state-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[14] CMP uses the conditional recursive mixed process estimator ("cmp") add-on to Stata 10. See David Roodman, 2007. "CMP: Stata module to implement conditional (recursive) mixed process estimator," Statistical Software Components S456882, Boston College Department of Economics, revised 01 Jul 2008.

Appendix Table 5A
Baseline 2SLS Results Using Each Instrument Separately

Outcomes= Health Status (2001) Specification Instrument	2SLS Father Occ	2SLS Father Occ	2SLS State Demand
First Job = Blue Collar	-0.537	-0.600	-0.501
	(0.435)	(0.452)	(0.443)
Male	0.295**	0.320**	0.284**
	(0.135)	(0.139)	(0.137)
Age	-0.020***	-0.020***	-0.020***
	(0.001)	(0.001)	(0.001)
Non White	-0.214***	-0.216***	-0.208***
	(0.042)	(0.043)	(0.047)
Education	0.029	0.024	0.037
	(0.038)	(0.039)	(0.039)
Poor Initial Health Status	-0.296	-0.278	-0.226
	(0.184)	(0.187)	(0.173)
Fair Initial Health Status	-0.312***	-0.332***	-0.298***
	(0.098)	(0.099)	(0.100)
Very Good Initial Health Status	0.205***	0.193***	0.245***
	(0.038)	(0.042)	(0.041)
Excellent Initial Health Status	0.528***	0.531***	0.570***
	(0.041)	(0.042)	(0.043)
Missing Initial Health Status	0.246***	0.240***	0.317***
	(0.055)	(0.056)	(0.048)
Maternal Education	0.008	0.008	0.012
	(0.008)	(0.008)	(0.008)
Paternal Education	0.018**	0.017*	0.015**
	(0.008)	(0.009)	(0.008)
Smoke as Teenager	-0.002	-0.009	-0.031
	(0.054)	(0.056)	(0.047)
Missing Family Information	-0.043	-0.034	-0.072**
	(0.035)	(0.035)	(0.029)
Constant	3.775***	3.871***	3.598***
	(0.841)	(0.863)	(0.858)
F-stats	25.980	22.896	24.046
Observations	5787	5613	6397
R-squared	0.207	0.189	0.203

Robust standard errors clustered at the state-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Column 2 uses the same specification as Column 1 but drops individuals who do not have information on state demand factors.