The Effect of Education on Equity Holdings*

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Abstract

We study the effect of education on ownership of equity in the form of traded stocks or business ownership. Using data from the Panel Study of Income Dynamics we find that education is positively correlated with equity holding. We use the number of colleges in the county where the head grew up to identify a causal effect of education. We find that more colleges in the county increased the education levels of individuals from disadvantaged families, which in turn significantly raised the likelihood of equity holdings by these individuals.

JEL Classification: G11, I20.

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1 Introduction

We demonstrate that higher education is associated with higher propensity to own stock or business equity using data from the Panel Study of Income Dynamics (PSID). A high correlation between education and equity ownership need not reflect a causal relation because unobserved variables such as household attitudes, preferences, and abilities are likely to affect both the propensity to own equity and the choice of more or less education. We uncover the causal effect of education on household participation in the stock market or proprietary business ownership by using instrumental variables techniques. As instruments for education, we use the number of 4-year colleges in the county when the respondent was 17, arguably orthogonal to household future decisions to hold stocks or own businesses, its preferences, and future income prospects. We find a strong and significant effect of education on the incidence of household stock and business ownership for individuals who report growing up in non-privileged households.

Many households in the United States choose not to participate in the stock market. Understanding this non-participation phenomenon is important for several reasons. First, there is substantial heterogeneity in household wealth holdings after controlling for household demographic characteristics and income (e.g., Campbell 2006). Low participation rates in the stock market may help explain part of this heterogeneity as households who have stocks in their portfolios may end up with higher wealth (compared to otherwise similar households) because stocks offer, on average, higher returns than other assets. Low participation rates can also result in low wealth holdings by the average household at the time of retirement. Furthermore, low participation in the stock market can contribute towards an explanation of the equity premium puzzle—the inability of the consumption-based asset pricing model to reconcile the low correlation between aggregate consumption growth and stock excess returns with plausible levels of risk aversion. Indeed, as suggested by several studies (e.g., Attanasio, Banks, and Tanner 2002, Vissing-Jørgensen 2002a) what may matter for the determination of stock excess returns and stock prices in the economy is the consumption risk of those who do participate in the stock market.

Another component of household investment that entails high risk is business ownership. Running a business is similar to holding stocks in the sense that both endeavors are risky but provide potentially high returns. As Heaton and Lucas (2000) show, business owners are, on average, wealthier than households that do not own businesses. We argue that business equity

and stocks hold similar characteristics and focus on understanding the effect of education on the probability of holding risky equity in either form.

College openings will potentially lower the cost of college education for a family by lowering the distance between a college of choice and the family's residence. For example, this may allow students to live at home and save on the cost of shelter or it may make it easier for students to hold a part time job near the college. For students who face relatively high costs of borrowing during college years, this lower cost of college may have a strong impact on the tendency to obtain a college degree.[1] College openings may potentially affect the propensity to go to college through other channels, for example, by aggressive recruiting of students. We show that the effect of college openings almost fully is due to children from less advantaged homes becoming more likely to go to college while children from more wealthy homes are not affected by college openings.

Why does education affect the probability of participating in the market for risky assets? Haliassos and Bertaut (1995) and Alan (2006) show that small fixed stock market entry costs—such as gathering and processing the relevant information about the stock market—can account for the non-participation phenomenon.[2] Since education may lower these fixed entry costs, households with more educated members may end up with a higher incidence of stock ownership. Our paper is also related to the recent literature that stresses the importance of individual skills, such as the ability to devise and implement financial plans, and financial literacy for household wealth accumulation and stock ownership. van Rooij, Lusardi, and Alessie (2007) explore the effect of households' financial literacy—the knowledge and understanding of basic financial concepts related to stocks and bonds—on households' stock ownership. Using the exposure to economics courses while in high school as an instrument for the respondent's financial literacy, they find a significant and large effect of household's financial knowledge on the probability of owning a stock. In a related paper, Ameriks, Caplin, and Leahy (2003) show that households with higher propensities to plan—in particular, those with better mathematical skills and who are keen on detailed vacation planning—accumulate more wealth. More schooling therefore can raise the chances of household's participation in the stock market by enhancing the mathematical

[1] For a formal model, see Cameron and Taber (2004).

[2] Similarly, Perraudin and Sørensen (2000) argue that observed zero holdings of stocks and bonds by many U.S. households can be attributed to the fixed and proportional costs of holding non-zero amounts of these assets and monitoring costs of the chosen portfolio containing non-zero amounts of stocks and bonds.

ability of its members.[3]

Hong, Kubik, and Stein (2004) find that households who know their neighbors and frequently attend church, who they label as more sociable, have a higher probability of participating in the stock market. Sociability can also be affected by schooling: while in college, individuals enroll in many elective courses and this fosters interactions amongst students, who hone their communication skills and expand their social networks.

Interestingly, even after controlling for financial literacy (van Rooij, Lusardi, and Alessie 2007) and the intensity of social interaction (Hong, Kubik, and Stein 2004), the above-mentioned studies still find that education is positively correlated with stock market participation. This implies that education is a multifaceted concept and there are many other potential channels besides social interaction, financial literacy, and mathematical abilities through which education may affect individual decisions to own stocks.

The rest of the paper is organized as follows. In Section 2, we describe the data we use. In Section 3, we present our preliminary results. Section 4 concludes.

2 Data

2.1 Ownership of risky assets

We compile household wealth, income and demographic data from the PSID. Information on household wealth is obtained from the PSID wealth supplements available at five-year intervals starting in 1984, and every other year from 1999 to 2005. We use wealth data for 1984, 1989, 1994, 1999, 2001 and 2003. Households may hold stock directly, by purchasing shares in publicly traded companies, or indirectly, in their pension funds and retirement accounts. In 1984 and 1989, heads of household were asked the following question about family stockholding:

> "Do you (or anyone in your family living there) have any shares of stock in publicly held corporations, mutual funds, or investment trusts, including stocks in IRAs?"

In 1999, 2001 and 2003, the PSID reports answers to a similar question that asked respondents to disregard stock holdings in employer-based pensions or IRAs. There is a separate question on whether the household had any money in private annuities or IRAs. In 1994, the

[3]Hansen, Heckman, and Mullen (2006) show that individuals with more schooling achieve higher scores on standardized tests of individual mathematical reasoning.

question about stock ownership excluded stocks held in IRAs and employment-based pensions but the PSID did not include a separate question about money held in IRAs and private annuities.[4] Thus, for the 1994, 1999, 2001, and 2003 wealth supplements we are able to construct measures of households' direct or indirect stockholding or just direct ownership, while we can only construct a measure of direct or indirect stock ownership when using 1984 and 1989 data. Further, since some households may hold negligible amounts in stocks, we consider a household to be a stock owner if it holds more than $500 in stocks in 1982–1984 prices. Our first measure of stock ownership is a dummy variable equal to one if a household holds stocks worth $500 or more directly or indirectly in any of the following years: 1984, 1989, 1994, 1999, 2001 or 2003, and zero otherwise. Our measure of direct stockholding is an indicator variable equal to one if a household owns stock worth $500 or more directly in any of the following years: 1994, 1999, 2001, or 2003.

Stocks, relative to other forms of household savings such as bonds or savings accounts, entail higher risk which is compensated with higher returns on average. Another component of household investment that entails high risk is business ownership. Heaton and Lucas (2000), using U.S. data from the Survey of Consumer Finances, show that business owners are, on average, wealthier than households that do not own businesses. It appears that running a business is similar to holding stocks: both endeavors are very risky and both provide high returns on average. Thus, we combine information on household stockholding and business ownership, and say that a household has risky equity if it owns stocks, or a business.

Table 1 provides some summary statistics for the data used in our empirical analysis. 25 percent of households own stocks in 1984, and this fraction rises over time to 58 percent in 2003. This pattern reflects the well-known aggregate trend of stock market participation of U.S. households. Similarly, the proportion of households who own businesses rises from 15 percent in 1984 to 22 percent in 2003. The fraction of households who own a business at least once during this period is 30 percent, indicating that some businesses are destroyed during the period. 59 percent of households own stock, directly or indirectly, or a business during the 1984–2003 period.

[4]Since our measure of stock ownership uses the answers in all of the supplements, we believe this data discrepancy will be of no importance for our analysis.

2.2 The instrument and environmental variables

From the PSID main yearly family and individual files, we collect data on age, education and the county of residence for the head when s/he was 17. Since individuals report their age with some noise (e.g., an individual may report the same age in two adjacent annual files), we construct a consistent measure of age for each individual.[5] Using this age measure, we calculate the head's birth year and the year when s/he was 17. Similarly, we construct a consistent measure of education for households who were finished with formal schooling.[6] The PSID also collects information on the county where the respondent grew up. Since we do not have data on the county of residence when the respondent was 17 (the age when college availability has potentially the largest effect on individuals' schooling decisions as they approach high school graduation), we utilize this variable instead.

The instrument for own schooling is the number of colleges per 1,000 college-age persons in the county where the head grew up (college-age defined as being 18-22 years of age). Currie and Moretti (2003) construct a dataset that contains the availability of colleges in U.S. counties for 1960–1996. Our regression sample comprises heads who turned 17 during this period. The average head became 17 in 1975 and grew up in a county with 0.09 colleges per 1,000 college-age persons (see Table 1). There is substantial variation in the availability of colleges, with "college-scarce" counties having zero colleges, and "college-abundant" counties having nearly 4 colleges per 1,000 persons age 18 to 22.

Individual schooling and holdings of risky assets may be affected by the quality of the environment and individual experiences in childhood and adolescence. For individuals who grew up in the same county at about the same time, we are able to construct some measures of the overall quality of the county.[7] We focus on county median income but also explored the effect of the percentage of urban population and the median house value in the county (results not reported for brevity).[8] In addition, the PSID allows us to measure individual-specific background vari-

[5] We drop households whose head reports an age in 1989 which exceeds the age reported in 1984 by more than seven years. We also impute missing values for age by using the closest non-missing observation on age from the individual files for the years 1984–1999, 2001 and 2003. We then drop households whose age difference in adjacent years exceeds two years, and then set the individual's age in year $t+1$ to the age in year t plus one if they differ.

[6] We restrict our analysis to households whose head's maximum reported level of schooling during 1984–1999, 2001 and 2003 is equal to the minimum reported level of schooling during the same time span.

[7] We obtain county-level information from Haines (2004) who compiled county-level data for 1790–2000 from historical decennial census and county data books (for the more recent years).

[8] These measures are highly correlated and we decided to control for median income in the county when an individual was 17 in all our regressions. Our results are robust to inclusion of all three county measures.

ables. In particular, heads of household were asked about their fathers' and mothers' schooling, whether they lived with both parents, and whether their family was poor, of average well-being or rich when they were growing up.

The father's and mother's schooling variables in the PSID are categorical and may be reported with some noise. For example, a head may report that his/her father finished 9–11 grades (some high school) once and 12 years (a high school graduate) in a different year. It is less likely that heads once reporting that their father finished just high school, will report in another sample year that their father finished college. To avoid the loss of information due to inconsistent records on parents' education, we construct the following categorical measure of the father's and mother's education. Father's schooling is an indicator variable equal to one if the head consistently reports that his/her father finished at least high school, and zero otherwise. We construct an analogous measure for schooling of the head's mother. Since father's and mother's schooling are highly correlated and our sample sizes are not large, it is unlikely that we can statistically distinguish their separate effects on individual schooling or holdings of risky assets. Therefore, we compressed the two variables into one, adding both parental schooling dummies. We call this variable parents' education. It is equal to zero if neither parent completed high school, equal to one if one of the parents finished at least high school, and equal to two if both parents attained high school diplomas or more education. The typical head of household in our sample grew up in a family with at least one parent who finished high school or more education (see Table 1). The majority of our sample heads, about 82 percent, grew up in a family of two parents.

Further, we construct an indicator variable for whether the head of household grew up in a poor, of average well-being, or rich family. It is equal to one if the head's family was rich, and zero otherwise. About 30 percent of heads in our sample recall growing up in a rich family. Household heads, on average, attain one year of schooling beyond high school (13 years), are predominantly male, and 70 percent of them have been (not necessarily continuously) married during the sample period.

3 Estimation

In this section, we first discuss the validity of our instrument. We then present our main results.

3.1 Validity of the instrument

Currie and Moretti (2003) study the effect of maternal education on health outcomes of children at birth. We follow Currie and Moretti (2003), instrumenting years of schooling with the number of colleges per 1,000 college-age persons in the head's county when he or she was 17, where "head's county" is short-hand for the county in which the head grew up. Currie and Moretti (2003) provide a detailed discussion of the validity of the instrument. For our purposes, the instrument is valid if it is effective at predicting education in our sample, and if it is unrelated to unobservable variables that affect household risky asset holdings such as, for example, heads' or their parents' attitudes towards risk or household earning capacities. We present some evidence on the effectiveness of the instrument in Tables 2 and 3. The most likely source of correlation between parents' attitudes and college availability would be if certain parents systematically moved to counties with more colleges. Currie and Moretti (2003) explore this issue in detail and find little evidence of such a pattern. They further guard against such correlations by including county dummies. Our sample is too small for doing this but we include state dummies and Currie and Moretti (2003) also verify, for a smaller sample from the National Longitudinal Survey of Youth (NLSY), that the first stage estimates are very close whether county or only state dummies are included.

In Table 2, we regress individual years of schooling on the number of 4-year colleges per 1,000 persons age 18–22 in the heads' county at age 17. In addition, we control for parental education, an indicator for growing up in a rich family, an indicator for growing up with both parents, and median income in the county when the head was 17. More recent cohorts attain, on average, more years of schooling and have access to more colleges in their county. We, therefore, included a full set of year-of-birth dummies, and cohort dummies in order to control for the correlation between the availability of colleges and individual years of schooling due to aggregate trends in schooling. Geographical areas may have different endowments and industrial structure (e.g., agricultural versus manufacturing states) and therefore may permanently differ in their demand for an educated workforce. Areas with relatively higher demand for skilled workers might attract more educated individuals and build more colleges in order to support a sustainable supply of skilled workers. In order to control for such factors, we include dummies for the state where the head grew up.

In column (1), we present results for a sample that includes only white heads. We find that

increasing the number of colleges per 1,000 college-age persons by one, holding everything else constant, increases individual education by about 0.7 years.[9] The effect is significant at the 2 percent level. Children who grew up in better environments—in more educated, richer, and stable families, and income rich counties—attain higher levels of schooling. In column (2), we do the same regression for a sample of non-white heads. We find that changes in the availability of local 4-year colleges do not affect non-white heads—a similar result but for a sample of black females was found in Currie and Moretti (2003). For this sample, the effects of family background and the quality of the neighborhood, measured by median income in the county, are weaker. Surprisingly, we find that having rich parents, holding everything else constant, is associated with lower individual schooling for our sample of non-white heads. Since the instrument is ineffective at predicting education for the non-white sample, we restrict our analysis to the sample of white heads only. In columns (3) and (4) of Table 2, we repeat the analysis of columns (1) and (2), adding the availability of 2-year colleges to the previous set of regressors. For the sample of white heads, the effect of 2-year colleges on own education is positive but imprecisely estimated. It appears that there may be an effect of 2-year college openings on non-whites but the effect is not statistically strong enough to allow reliable estimation by two-stage least squares. To sum up, we find a strong and statistically significant effect of 4-year college openings on years of schooling of white heads, and we will utilize this sample in our further analysis.

For the availability of 4-year colleges to be a valid instrument, this variable should affect college graduation rates more than the completion of some college. Otherwise, the variable may be proxying for some general trend in education that we are not capturing with our regressors in Table 2. In Table 3, we first consider the effect of 4-year colleges on whether the head is a high school drop-out or just finished high school—column (1). We find that one more college per 1,000 college-age persons in the county reduces the probability that the head finished 12 or less years of schooling by 13 percentage points.[10] Similarly to Currie and Moretti (2003), we find that 4-year colleges do not affect completion rates of some college—column (2). The effect of 4-year colleges on the likelihood of individual college graduation is strong and significant at about the 3 percent level. One more college per 1,000 college-age persons increases the probability of college

[9]The effect is somewhat smaller than the one additional year found in Currie and Moretti (2003) but their result is based on a sample of females, while our sample consists predominantly of males as seen in Table 1. Perhaps, the difference is due to the fact that education of males is less affected by changes in the availability of local colleges.

[10]Most of this effect is due to a reduction in the number of high school graduates.

graduation by about 13 percent. Thus, it appears that the increase in the college graduation probability is due to a reduction in the number of persons who finish only high school.

3.2 Equity holding. OLS and IV Regressions

Much of the literature on portfolio composition present OLS regressions. For comparability, we start with a cross-sectional regression of household risky equity ownership on heads' education, parents' education, and exogenous background variables and demographic controls. Results are reported in Table 4, column (1). Our measure of risky equity ownership is a dummy variable equal to one if the household reports owning stock worth more than $500 (directly or indirectly) and/or a business any year during our sample period (1984, 1989, 1994, 1999, 2001 or 2003). Consistent with previous studies, we find that more educated households have larger propensities to own risky equity. Holding other variables constant, one more year of schooling increases the probability of owning risky equity by 5 percent. Male headed households and older households are more likely to own stock, as are households whose heads have more educated parents. Once we control for own education and parental education, background variables such as the quality of the county where the head grew up, the head growing up with both parents or having rich parents while young seem not to have a significant effect on risky equity ownership.

Own education is correlated with many unobserved household characteristics, such as preferences towards risk and abilities, and so it may capture the effects of these omitted variables on the probability of owning risky equity. We use the number of 4-year colleges in the county where the head grew up when s/he was 17 to identify the effect of schooling on risky equity ownership. Column (2) in Table 4 reports our results. One more year of schooling raises the probability of owning risky equity, holding other factors constant, by about 20 percent, an effect four times larger than the OLS effect. Parental education loses its significance in IV-regressions.

As a robustness check, in columns (3) and (4), we include some further but potentially endogenous controls (income, wealth, marital status and family size).[11] In OLS regressions, we find that married, wealthier, and higher income households have larger propensities to own a stock, consistent with previous studies (e.g., Campbell 2006, Vissing-Jørgensen 2002b). Family size is inversely related to risky equity ownership. Introducing these additional controls lowers

[11] Our measure of wealth is household net worth inclusive of net business wealth; income is the average combined labor and transfer income of the head and wife for 1980–1997, 1999, 2001, and 2003. We require that income in a given year is above $1,000 in 1982–1984 prices, otherwise we set it to missing.

somewhat the point estimate on the education variable, from 0.05 to 0.03. In IV-regressions—column (4)—the pattern for own education is the same (the point estimate on education goes down from 0.20 to 0.18 and is less precisely estimated), while parental education loses significance. In this case, of the additional controls only wealth and marital status retain significance. Apparently, college education affects holdings of risky equity through many channels—wealth, income, ability to process information about the economy and financial markets, ability to plan, preferences towards time, etc. Our result that education retains its significance in IV regressions, controlling for wealth and income, indicates that the effect of education extends beyond its indirect effects through wealth and income.

In Table 6 we present estimates from a probit probability estimation. The estimates are presented in terms of the marginal impact on the probability of owning equity and therefore have the same interpretation as in the Table 4. The estimates are very close to those of the previous table implying that the results are robust to this modeling choice.

Why does the parental education variable lose significance in the IV-regressions while the coefficient on own education increases substantially? Our conjecture is that our instrument mainly affects the disadvantaged. Individuals face a trade-off between the cost of college and the return to college. If a college gets build nearby, the cost of attending college for disadvantaged individuals goes down as the student can live at home instead of having to move and pay dorm fees. If the poor, typically born in families with less educated parents, are more likely to be credit constrained then our parental education variable may be capturing credit constraints broadly defined. Thus, the parental variable captures part of the effect of college availability nearby which also explains the larger coefficient on own schooling when instrumented. Two check the validity of our conjecture, we split our sample by parental wealth.

3.3 Rich vs. Poor Parents

We divide our sample by parental wealth as recalled by the respondent.[12] We split households into those who report growing up with rich parents vs. those growing up with poor parents or parents of average wealth. Table 5 summarizes our findings.

OLS results reported in columns (1) and (2) are very similar for the two sub-samples. How-

[12]Since the PSID follows split-offs of original families over time, in principle, it is possible to collect actual parental wealth for some individuals. However, samples constructed this way are too small for reliable regression analysis and we use recall variables instead.

ever, IV results are not. First, our instrument predicts schooling for individuals with non-rich parents but it does not for individuals with rich parents. The estimated coefficient on own education in IV-regressions is significant for the sub-sample of non-rich background heads only (see columns (5) and (6) in Table 2). In this sub-sample, the point estimate is a bit lower than the estimated coefficient for the whole sample (0.15 vs. 0.20) and is significant at the 5 percent level. It appears that the IV estimate of the effect of schooling is to a very large extent driven by the sub-sample of individuals from non-rich family backgrounds. In column (5), using just exogenous variables and ignoring background controls, we find that the IV effect of education is virtually the same for the sample of individuals from non-rich families. Thus, it is unlikely that the estimated effect of education is capturing the effect of abilities and attitudes of parents towards children's education. In column (6), similar to column (4), we do not find any effects of education on the likelihood of risky assets' ownership for the sample of individuals from rich families.

Much of the effect of education we found in Table 5 may be due to college graduation. In Table 7, we explore this issue in a regression of risky equity ownership on an indicator variable that equals one if the head graduated from college or has more schooling. As before, we control for exogenous and background variables. OLS results for the total sample are presented in column (1). If the head of household finishes college or attains some education beyond college, the probability of a household holding risky equity increases by about 21 percent. Instrumenting college graduation raises the likelihood of risky equity holdings to 85 percent—column (2). As in regressions with a continuous measure of education, the effect of college graduation on the incidence of risky assets' holdings is to a large degree driven by the sub-sample of households with heads from non-rich family backgrounds. For this group, the head's college graduation raises the probability of household holdings of risky equity by about 65 percent. The estimated effect is significant at the 5 percent level. We cannot make any predictions on the effect of college graduation for households with heads from rich families since the instrument is not effective in predicting education and college graduation for this group.[13] However, the effect of education, moved by changes in the number of local colleges, on the disadvantaged is quite substantial. Our results suggest that construction of colleges in college-poor counties may be an effective policy not only for increasing the number of skilled workers but also for affecting

[13]For the effect of 4-year colleges on education of heads from rich and non-rich family backgrounds, see Table 2, columns (5) and (6).

saving patterns of individuals from disadvantaged backgrounds. Since risky equity, on average, generates higher wealth, increasing the education levels of the disadvantaged may better prepare them for retirement and help them buffer adverse shocks to their incomes.

One could argue that further schooling allows access to jobs that provide retirement accounts such as 401K plans and reduce the cost of indirect participation in the stock market. Although participation in such accounts is typically not compulsory, nor it requires that employees choose risky assets, behavioral economists find that investors are quite passive, rarely changing default options and reallocating their portfolios (e.g. Choi, Laibson, Madrian, and Metrick 2002). To explore the difference between direct and indirect stock ownership, in Table 8, we repeat the analysis of Table 5 for an alternative measure of risky equity holdings. Now, our dependent variable is a dummy equal to one if a household reports direct stock holdings of more than $500 in 1982–1984 prices, or owns a business in 1994, 1999, 2001, or 2003. Our regression samples are smaller since we lose information from the 1984 and 1989 wealth supplements. The results for this measure are very similar to those reported in Table 5 and can be briefly described as follows. OLS results for the effect of education are similar for households with different family backgrounds—see columns (1) and (2). The effect of education estimated in an IV regression for the total sample reflects the effect of education for households whose heads are from non-rich families—columns (3) and (4). Lastly, we cannot evaluate the effect of education on risky equity holdings by households whose heads are from rich families since the instrument does not predict education of these heads—column (5).

4 Conclusion

More educated individuals are more likely to hold equity in stocks or own businesses. This is partly due to the more educated having higher income and wealth but the effect of schooling goes beyond these channels. The level of schooling is partly a function of unobserved ability, attitudes, and taste variables but we isolate the causal effect of college-level schooling by instrumenting it with the number of colleges in the county where and when the household head grew up. We find a strong positive effect of college education on the propensity to own equity for households who report growing up in poor families or families of average wealth.

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Table 1: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Ever owns stock or business†	0.59	0.49	0	1	2275
Ever owns stock or business‡	0.57	0.50	0	1	1821
Owns stock 1984	0.25	0.43	0	1	1049
Owns stock 1989	0.3	0.46	0	1	1519
Owns stock 1994	0.38	0.48	0	1	1789
Owns stock 1999	0.55	0.5	0	1	1121
Owns stock 2001	0.57	0.5	0	1	1090
Owns stock 2003	0.58	0.49	0	1	1041
Ever owns business	0.3	0.46	0	1	2275
Owns business 1984	0.15	0.36	0	1	1049
Owns business 1989	0.17	0.38	0	1	1519
Owns business 1994	0.19	0.39	0	1	1790
Owns business 1999	0.21	0.41	0	1	1121
Owns business 2001	0.23	0.42	0	1	1090
Owns business 2003	0.22	0.42	0	1	1041
Education (yrs.)	13.41	2.15	6	17	2275
Parents' edu: HS sum	1.43	0.8	0	2	2275
Lived with both parents	0.82	0.38	0	1	2275
Rich parents	0.3	0.46	0	1	2275
Age	36.33	7.56	22	51	2275
Male	0.8	0.4	0	1	2275
County median inc./10000	2.64	0.69	0.62	5.34	2275
(Log-) avg. inc.	5.56	0.63	2.48	8.05	2243
(Log-) avg. net worth	4.88	3.09	–8.38	11.5	2275
Ever married	0.70	0.46	0	1	2275
Family size	2.85	1.21	1	7	2275
College 4/1000	0.09	0.15	0	3.62	2275
Year at 17	1974.67	7.56	1960	1989	2275

Notes: †includes direct and indirect stockholding; ‡includes direct stockholding only.

Table 2: Regressions of Own Education on College Availability.

	(1) White	(2) Non-white	(3) White	(4) Non-white	(5) White & Rich par.	(6) White & Poor or Avg. par.
College 4/1000	0.65**	–0.22	0.66**	–0.24	–0.78	0.93***
	(2.49)	(–1.22)	(2.53)	(–1.41)	(–1.32)	(3.52)
College 2/1000			0.29	0.99		
			(0.82)	(1.62)		
Parents' edu: HS sum	1.08***	0.62***	1.09***	0.62***	1.35***	0.99***
	(19.66)	(12.08)	(19.68)	(12.04)	(10.65)	(16.13)
Lived with both parents	0.30***	0.17	0.30***	0.17	0.32*	0.35***
	(2.94)	(1.61)	(2.94)	(1.56)	(1.81)	(2.77)
Rich parents	0.34***	–0.25***	0.34***	–0.25***		
	(4.43)	(–2.61)	(4.43)	(–2.60)		
County median inc./10000	0.33***	0.22*	0.34***	0.22*	0.30**	0.34***
	(3.54)	(1.67)	(3.56)	(1.67)	(1.97)	(3.32)
Constant	11.47***	12.27***	11.43***	12.23***	12.80***	11.07***
	(24.86)	(19.62)	(24.74)	(20.07)	(10.16)	(21.57)
Year of birth dummies	Y	Y	Y	Y	Y	Y
Cohort dummies	Y	Y	Y	Y	Y	Y
State grew up dummies	Y	Y	Y	Y	Y	Y
Adj. R sq.	0.243	0.105	0.243	0.105	0.250	0.229
N	2558	1671	2558	1671	763	1795

Notes: The left-hand side variable is the respondent's reported years of completed schooling. "College 2/1000" is the number of 2-year colleges per 1,000 persons age 18–22 in the county where the respondent grew up when s/he was 17. "College 4/1000" is defined analogously for the number of 4-year colleges. Cohort dummies are constructed based on the year when the head of household was 17 following eight-year intervals: 1960–1967, ... , 1988–1996. Standard errors in parentheses clustered by the county where the respondent grew up. "Parents' edu: HS sum" is a dummy variable equal to 0 if parents did not finish high school (HS); 1—if one of them finished HS or more; 2—if both parents finished HS or more. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 3: Regressions of Education Dummies on College Availability.

	(1) 12 yrs. or less	(2) 13 yrs.–15 yrs.	(3) 16 yrs. or more
College 4/1000	–0.13**	–0.01	0.13**
	(–2.03)	(–0.13)	(2.23)
Parents' edu: HS sum	–0.22***	0.06***	0.16***
	(–18.11)	(5.40)	(16.30)
Lived with both parents	–0.04*	–0.00	0.05**
	(–1.76)	(–0.16)	(2.20)
Rich parents	–0.06***	–0.01	0.07***
	(–3.25)	(–0.27)	(3.83)
County median inc./10000	–0.08***	–0.00	0.08***
	(–3.64)	(–0.13)	(3.93)
Constant	0.91***	0.06	0.04
	(8.12)	(0.60)	(0.41)
Year of birth dummies	Y	Y	Y
Cohort dummies	Y	Y	Y
State grew up dummies	Y	Y	Y
Adj. R sq.	0.184	0.032	0.149
N	2558	2558	2558

Notes: The left-hand side variable is a dummy equal to one if the respondent's years of schooling fall into any of the indicated categories. Only white heads are in the sample. "College 4/1000" is the number of 4-year colleges per 1,000 persons age 18–22 in the county where the respondent grew up when s/he was 17. Cohort dummies are constructed based on the year when the head of household was 17 following eight-year intervals: 1960–1967, . . . , 1988–1996. Standard errors in parentheses clustered by the county where the respondent grew up. "Parents' edu: HS sum" is a dummy variable equal to 0 if parents did not finish high school; 1—if one of them finished HS or more; 2—if both parents finished HS or more. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 4: Ownership of Risky Assets and Own Education: Direct and Indirect Stockholding (more than $500 in stocks) or Business Ownership.

	(1) OLS-1	(2) IV-1	(3) OLS-2	(4) IV-2
Education (yrs.)	0.05***	0.20**	0.03***	0.18*
	(9.64)	(2.28)	(4.94)	(1.76)
Parents' edu: HS sum	0.08***	–0.10	0.05***	–0.08
	(5.11)	(–0.94)	(3.61)	(–0.91)
Lived with both parents	0.04	–0.02	–0.00	–0.04
	(1.59)	(–0.42)	(–0.05)	(–1.10)
Rich parents	0.01	–0.04	–0.00	–0.05
	(0.45)	(–1.08)	(–0.17)	(–1.32)
Age	0.03***	0.04**	0.03***	0.03**
	(2.63)	(2.47)	(2.70)	(2.30)
Age sq./100	–0.03*	–0.04**	–0.04**	–0.04**
	(–1.69)	(–2.03)	(–2.38)	(–2.24)
Male	0.28***	0.28***	0.04	0.17*
	(10.89)	(9.48)	(1.13)	(1.78)
County median inc./10000	0.01	–0.04	–0.00	–0.03
	(0.31)	(–1.12)	(–0.11)	(–1.06)
Ever married			0.08**	0.08*
			(2.24)	(1.95)
Family size			–0.02**	0.02
			(–2.16)	(0.60)
(Log-) avg. inc.			0.15***	–0.07
			(7.46)	(–0.47)
(Log-) avg. net worth			0.05***	0.05***
			(10.99)	(9.37)
Constant	–1.17***	–2.69***	–1.51***	–2.18***
	(–4.63)	(–2.88)	(–6.34)	(–4.17)
State grew up dummies	Y	Y	Y	Y
F-statistics (instruments)		5.59**		4.13**
Adj. R sq.	0.205	—	0.325	0.021
N	2275	2275	2243	2243

Notes: The left-hand side variable is a dummy equal to 1 if a household owns stock (directly or in retirement accounts) or holds a business in any of the following years: 1984, 1989, 1994, 1999, 2001 or 2003; 0—otherwise. Only white heads are in the sample. The instrument for years of schooling is "College 4/1000." Standard errors in parentheses clustered by the county where the respondent grew up. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 5: Ownership of Risky Assets and Own Education: Direct and Indirect Stockholding (more than $500 in stocks) or Business Ownership. Sample Split by Parental Wealth.

	(1) OLS Poor or Avg.	(2) OLS Rich	(3) IV Poor or Avg.	(4) IV Rich	(5) IV Poor or Avg.	(6) IV Rich
Education (yrs.)	0.05***	0.05***	0.15**	–0.07	0.15***	–0.31
	(8.30)	(5.20)	(2.55)	(–0.35)	(2.81)	(–0.35)
Parents' edu: HS sum	0.07***	0.10***	–0.03	0.26		
	(4.25)	(3.17)	(–0.46)	(1.01)		
Lived with both parents	0.06**	–0.02	0.02	0.02		
	(2.07)	(–0.45)	(0.48)	(0.26)		
Age	0.03*	0.05*	0.03	0.04	0.02	0.07
	(1.74)	(1.90)	(1.56)	(1.18)	(1.20)	(1.33)
Age sq./100	–0.02	–0.05	–0.02	–0.03	–0.01	–0.06
	(–0.95)	(–1.47)	(–1.12)	(–0.50)	(–0.66)	(–1.02)
Male	0.28***	0.29***	0.27***	0.24**	0.27***	0.13
	(9.63)	(6.29)	(8.54)	(2.43)	(8.34)	(0.31)
County median inc./10000	–0.01	0.05	–0.04	0.09		
	(–0.44)	(1.23)	(–1.23)	(1.08)		
Constant	–1.09***	–1.39***	–1.97***	–0.07	–2.03***	3.72
	(–3.42)	(–2.98)	(–3.24)	(–0.03)	(–3.07)	(0.31)
State grew up dummies	Y	Y	Y	Y	Y	Y
F-statistics (instruments)			9.72***	1.70	10.03***	0.25
Adj. R sq.	0.207	0.194	0.079	–0.020	0.073	—
N	1595	680	1595	680	1595	680

Notes: The left-hand side variable is a dummy equal to 1 if a household owns stock (directly or in retirement accounts) or owns a business in any of the following years: 1984, 1989, 1994, 1999, 2001 or 2003; 0—otherwise. Only white heads are in the sample. The instrument for years of schooling is "College 4/1000." Standard errors in parentheses clustered by the county where the respondent grew up. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 6: Probit Regressions of Risky Assets' Ownership on Education: Direct and Indirect Stockholding (more than $500 in stocks) or Business Ownership. Sample Split by Parental Wealth.

	(1) Probit Total sample	(2) IV-Probit Total sample	(3) IV-Probit Poor or Avg.
Education (yrs.)	0.06***	0.19***	0.18***
	(9.11)	(5.46)	(3.93)
Parents' edu: HS sum	0.09***	–0.11	–0.06
	(5.21)	(–1.40)	(–0.80)
Lived with both parents	0.05*	–0.02	0.01
	(1.72)	(–0.56)	(0.14)
Rich parents	0.01	–0.05*	
	(0.30)	(–1.65)	
Age	0.03**	0.03**	0.02
	(2.21)	(2.47)	(1.07)
Age sq./100	–0.03	–0.04**	–0.02**
	(–1.27)	(–2.00)	(–0.81)
Male	0.32***	0.24***	0.26***
	(10.63)	(9.48)	(3.65)
County median inc./10000	0.00	–0.04	–0.05
	(0.17)	(–1.63)	(–1.61)
State grew up dummies	Y	Y	Y
F-statistics (instruments)		5.43**	11.47***
N	2252	2252	1582

Notes: The left-hand side variable is a dummy equal to 1 if a household owns stock (directly or in retirement accounts) or owns a business in any of the following years: 1984, 1989, 1994, 1999, 2001 or 2003; 0—otherwise. Only white heads are in the sample. Marginal effects are reported. The instrument for years of schooling is "College 4/1000." Standard errors in parentheses clustered by the county where the respondent grew up. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 7: Ownership of Risky Assets and College Graduation: Direct and Indirect Stockholding (more than $500 in stocks) or Business Ownership. Sample Split by Parental Wealth.

	(1) OLS Total sample	(2) IV Total sample	(3) IV Poor or Avg.	(4) IV Rich
College or more	0.21***	0.85**	0.65**	–0.43
	(10.02)	(2.27)	(2.44)	(–0.31)
Parents' edu: HS sum	0.10***	–0.01	0.03	0.26
	(7.10)	(–0.13)	(0.59)	(0.88)
Lived with both parents	0.05*	0.01	0.04	0.04
	(1.84)	(0.17)	(1.19)	(0.26)
Rich parents	0.01	–0.03		
	(0.66)	(–0.77)		
Age	0.03***	0.04***	0.03*	0.03
	(2.71)	(2.84)	(1.83)	(0.72)
Age sq./100	–0.03*	–0.05**	–0.03	–0.02
	(–1.72)	(–2.20)	(–1.29)	(–0.21)
Male	0.27***	0.27***	0.27***	0.24**
	(10.72)	(9.40)	(8.13)	(1.97)
County median inc./10000	0.01	–0.04	–0.04	0.10
	(0.33)	(–1.10)	(–1.20)	(0.78)
Constant	–0.62**	–0.48*	–0.39	–0.81
	(–2.42)	(–1.73)	(–1.11)	(–1.39)
State grew up dummies	Y	Y	Y	Y
F-statistics (instruments)		6.44**	10.36***	0.78
Adj. R sq.	0.198	—	0.058	—
N	2275	2275	1595	680

Notes: The left-hand side variable is a dummy equal to 1 if a household owns stock (directly or in retirement accounts) or holds a business in any of the following years: 1984, 1989, 1994, 1999, 2001 or 2003; 0—otherwise. Only white heads are in the sample. The instrument for years of schooling is "College 4/1000." Standard errors in parentheses clustered by the county where the respondent grew up. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Table 8: Ownership of Risky Assets and Own Education: Direct Stockholding (more than $500 in stocks) or Business Ownership.

	(1) OLS Poor or Avg.	(2) OLS Rich	(3) IV Total sample	(4) IV Poor or Avg.	(5) IV Rich
Education (yrs.)	0.05***	0.06***	0.18**	0.12*	–0.25
	(7.59)	(4.83)	(2.02)	(1.76)	(–0.43)
Parents' edu: HS sum	0.06***	0.05	–0.09	–0.01	0.48
	(2.75)	(1.43)	(–0.86)	(–0.16)	(0.59)
Lived with both parents	0.03	–0.08	–0.04	0.01	0.05
	(0.94)	(–1.36)	(–0.87)	(0.31)	(0.18)
Rich parents			–0.04		
			(–1.05)		
Age	0.01	0.06**	0.03*	0.01	0.04
	(0.67)	(2.43)	(1.85)	(0.69)	(0.62)
Age sq./100	–0.00	–0.07*	–0.04	–0.01	–0.01
	(–0.01)	(–1.97)	(–1.40)	(–0.24)	(–0.07)
Male	0.25***	0.21***	0.23***	0.24***	0.00
	(7.23)	(3.67)	(6.10)	(5.58)	(0.01)
County median inc./10000	0.02	0.07	–0.02	–0.01	0.18
	(0.61)	(1.55)	(–0.43)	(–0.24)	(0.80)
Constant	–0.96***	–1.72***	–2.48**	–1.56**	1.71
	(–2.65)	(–3.45)	(–2.58)	(–2.18)	(0.26)
State grew up dummies	Y	Y	Y	Y	Y
F-statistics (instruments)			4.47**	6.20**	0.53
Adj. R sq.	0.160	0.195	—	0.102	—
N	1274	547	1821	1274	547

Notes: The left-hand side variable is a dummy equal to 1 if a household directly owns stock or holds a business in any of the following years: 1984, 1989, 1994, 1999, 2001 or 2003; 0—otherwise. Only white heads are in the sample. The instrument for years of schooling is "College 4/1000." Standard errors in parentheses clustered by the county where the respondent grew up. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.