POSTSECONDARY SCHOOLING AND PARENTAL RESOURCES: EVIDENCE FROM THE PSID AND HRS

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Abstract

We examine the association between young adult postsecondary schooling and parental financial resources using two datasets that contain high-quality data on parental resources: the Panel Study of Income Dynamics (PSID) and the Health and Retirement Study (HRS). We find the association to be pervasive—it exists for income and wealth, it extends far up the income and wealth distributions, it remains even after we control for a host of other characteristics, and it continues beyond simply beginning postsecondary schooling to completing a four-year degree. Using the Transition to Adulthood supplement to the PSID, we also find that financial resources strongly affect postsecondary schooling for all levels of high school achievement, and particularly for those at the highest level.

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1. INTRODUCTION

Education has long been viewed as an important public good and is subsidized in numerous ways by various levels of government. With respect to postsecondary education, these subsidies occur, for example, through the existence of tax-supported, public universities and federal grants and loans. Moreover, given that education is one of the primary avenues through which young adults can move up through the income distribution, the accessibility of postsecondary education can have important implications for the persistence of inequality across generations.[1]

Despite long-standing efforts to make higher education accessible to all, numerous studies have found strong differences in college attendance by family income level, with these differences existing for students of all achievement levels (e.g., Smith et al. 1997 and Ellwood and Kane 2000) and becoming stronger over time (e.g., Belley and Lochner 2007; Bailey and Dynarski 2011; Lovenheim and Reynolds 2011). Recent work has further shown that, even among high-achieving students who apply to college, low-income students select far less competitive institutions than their higher income peers (Avery and Hoxby 2012; Hoxby and Turner 2013). Given the well-documented correlation between postsecondary education and income, these patterns indicate an important avenue through which inequality is transmitted across generations.

In attempting to understand the mechanisms underlying the association between family resources and postsecondary enrollment, economists have frequently examined the role of credit constraints—the notion that some young adults may not be able to access the funds needed to obtain the desired level of schooling. Although early studies found little evidence that credit constraints affected college attendance in the 1980s, studies examining more recent time periods have concluded that credit constraints are important for some.[2] Of course, other potential mechanisms could lead to the same positive association. One could posit that there exist differences in tastes or ability that are correlated with financial resources and with attendance, or even reverse causality—the possibility that families that value education work more or save more in order to afford additional years of schooling.

An important limitation of many of these previous studies is they use datasets that, although typically including detailed information about the child, have rather weak information regarding parental financial resources. At least one frequently used dataset relies on the child's report of parental income, a measure that likely contains substantial measurement error. Those surveys that do interview parents often collect financial information in broad categories or years before or after the child is making the decision to attend college, missing changes in resources that are most proximate to the attendance decision. Moreover, most previously used datasets have little information about parental wealth, which could also play a prominent role in the attendance decision.

In this paper, we use high-quality data on parental income and wealth to examine three questions. How are family financial resources related to college attendance? How important are other parental characteristics once we control for financial resources? Lastly, how does the relationship between financial resources and college attendance

1. Numerous recent papers have examined inequality and the persistence of inequality, including Piketty and Saez (2003), Kopczuk, Saez, and Song (2010), and Chetty et al. (2014).
2. See Lochner and Monge-Naranjo (2012) for a recent review of the credit constraint literature.

vary with high school achievement? Our primary data are from the Panel Study of Income Dynamics (PSID), a biennial survey (in recent years) that began in 1968 and has continuously followed this cohort of families and their descendants. For a subsample of young adults in the PSID, we also make use of the Transition to Adulthood (TA) supplement to the PSID, which includes additional information on the academic preparedness of the young adults. We supplement our PSID results with those from the Health and Retirement Study (HRS), a nationally representative survey of the population approximately aged 50 years or older and partners/spouses.

We find that both parental income and wealth have sizable and independent associations with college attendance, that these relationships persist through large swaths of the income and wealth distributions, and that these relationships remain even after controlling for a host of other parental characteristics. We further find that these strong associations extend beyond just the decision to enter college but also affect the probability of completing four years of college. Moreover, our results are remarkably similar in the PSID and HRS. Finally, when considering how the association between financial resources and college outcomes varies by student achievement, we find that financial resources strongly affect postsecondary schooling for all levels of high school achievement, and particularly for those students at the highest level. In fact, the relationship between college attendance and income is strong enough that the highest resource/lowest achieving young adults are substantially more likely to attend college than are the lowest resource/highest achieving young adults.

Our paper is organized as follows. In the next section we briefly summarize the large literature that examines the role of financial status for college attendance, noting the limits imposed by the available data. We then discuss the data we use to implement the analyses contained in this paper. Section 4 presents our empirical results and section 5 summarizes our findings and discusses their implications.

2. BACKGROUND AND LITERATURE REVIEW

The potentially important role of parental contributions to the human capital acquisition of young adults and the possibility that these contributions affect intergenerational inequality has been the subject of a rich body of literature in economics. Many of the mechanisms through which resources affect educational attainment were laid out in Becker (1975) and Becker and Tomes (1979, 1986), including the potential importance of credit constraints. Since those early papers, numerous empirical studies have documented the substantial differences in the socioeconomic backgrounds of those who attend college and those who do not.

Unfortunately, despite the centrality of measures of familial resources in these studies, the datasets on which they have relied contain far richer information on the children than on the financial resources of the parents. For example, the High School and Beyond study (HSB) contains only a child's report of his parents' income for all observations, which undoubtedly contains substantial measurement error.[3] Three other datasets, the National Longitudinal Study of Youth 1979 (NLSY79), the National Educational Longitudinal Study 1988 (NELS88), and the National Longitudinal Study of

3. There is a parental questionnaire that is administered to about 10 percent of the HSB 1980 cohort and it contains a categorical question on family income as well.

Youth 1997 (NLSY97), use parental interviews to obtain information on family income, but do so only during the first wave of the panel. Because children were between 14 and 22 years old at the beginning of the NLSY79 (eighth graders in NELS88 and those in grades 12–16 in the NLSY97) the reports of parental income could be several years away from the time at which children were making the decision to attend college. Even an accurate and timely report of parental income, however, still overlooks the fact that the ability of parents to pay for college also depends on parental wealth. Of these widely used datasets, only the NLSY97 collects information about both parental income and wealth, but again, does so only at the initial interview.

Despite these data limitations, previous studies have shed important light on the relationship between child and family characteristics and college attendance. For example, using both the HSB and the NELS, a National Center for Education Statistics report (Smith et al. 1997) points to a strong positive relationship between college enrollment and the socioeconomic status of the parent even among the children in the highest achievement quartile (p. 64). These findings are echoed in many other studies (e.g., Ellwood and Kane 2000 and Kinsler and Pavan 2010). Several studies using the NLSY79 and NLSY97 examine the change in these relationships over time and find that the importance of parental income has increased over this two-decade period (e.g., Belley and Lochner 2007; Bailey and Dynarski 2011; Lovenheim and Reynolds 2011). Other studies have found that these income gradients become flatter once one also controls for ability differences (e.g., Cameron and Heckman 1998; Carneiro and Heckman 2002).

With respect to the role of wealth, Belley and Lochner (2007) use the first wave of the NLSY97 and find that wealth remains an important determinant of college attendance even after controlling for family income and demographic characteristics. Conley (2001) finds similar results based on the 1984 PSID wealth supplement.[4]

Of course, these associations between financial resources and college attendance could be caused by numerous underlying mechanisms, including credit constraints, tastes (i.e., the children of high earnings parents have a stronger taste for college), ability (i.e., the children of high earnings parents are better at academics), and reverse causality (i.e., parents earn or save more to pay for the expenses of children who wish to attend college), to name just a few. Several studies using the NLSY datasets have found that credit constraints affect relatively few families.[5] Similarly, Stinebrickner and Stinebrickner (2008), using an unusual institutional setting in which college is nearly free, conclude that many students who drop out of school would continue to do so even if credit constraints were alleviated.[6] In contrast, Brown, Scholz, and Seshadri (2012), relying on an identification strategy that involves later parental transfer behavior, find a

4. This study is perhaps the closest to ours. We build on it by using almost twenty-five years of additional PSID data, including data on young adult grade point average from the TA survey; examining the effects of income and wealth throughout their entire distributions; and showing comparable results from the HRS to probe the robustness of our findings.
5. For example, Cameron and Taber (2004) and Keane and Wolpin (2001) use the NLSY79, and Johnson (2013) uses the NLSY97.
6. Stinebrickner and Stinebrickner (2008) study the dropout decision at a rural Kentucky college where the direct costs of attendance are basically zero, implying that factors other than high direct costs matter. Of course, even absent tuition, attending college can be expensive in terms of opportunity cost, and this cost could vary with economic status.

somewhat larger role for credit constraints. Two studies that have attempted to exploit idiosyncratic variation in housing values to identify the causal effect of wealth changes on college attendance find that increases in housing wealth positively affect college outcomes (Lovenheim 2011; Lovenheim and Reynolds 2013).

Our work contributes to the literature in several important dimensions. First, as noted by Lovenheim (2011, p. 742), "previous literature has almost exclusively focused on family income." With our data, we are able to examine the relationship between schooling and both parental income and wealth using high quality measures of each. Furthermore, the financial measures in both the PSID and the HRS are of very high quality (e.g., Smith 1995; Brown, Duncan, and Stafford 1996; Juster, Smith, and Stafford 1999). Finally, for a subset of our PSID young adults, we have detailed information about high school grade point average (GPA), allowing us to examine how the role of financial resources varies with student achievement.

3. THE DATA

In this section, we briefly discuss the main features of our datasets. We focus on the PSID because it provides a sample of parent–child pairs for children who are making the college-attendance decision and contains rich additional information for both parents and a subsample of young adults. We supplement these analyses by repeating several of them with the HRS.

The Panel Study of Income Dynamics (PSID)

The PSID is a longitudinal study that began in 1968 with approximately 5,000 families. It has since followed these families and their direct descendants, interviewing them annually from 1968 through 1997 and biennially starting in 1999. In each wave, the core PSID survey collects information on income, household structure, and the labor supply of the head of family and spouse. Detailed information on wealth was collected in 1984, 1989, 1994, and in each survey starting in 1999.

Using the core surveys, we select all 19- and 20-year-olds in the years in which household wealth was collected (1984, 1989, 1994, and in each survey starting in 1999) through the 2009 wave.[7] For each of these 19- and 20-year-olds, we construct a set of contemporaneous family characteristics that includes parental income and wealth information, and the parental report of the young adult's educational attainment.[8] This process yields 3,953 young adults in the target age range, of whom 3,677 can be matched to a parent who provided the required household information. We refer to these 3,677 young adults as our "Full Sample."

In 1997 and then again in 2002 and 2007, the PSID undertook a supplemental data collection effort for a subsample of the children, referred to as the Child Development

7. The original PSID sample was composed of two components—a random sample of the United States and an oversample of the poor. We make use of children from both components, so we use the sample weights throughout our analysis. Because our basic unit of analysis is the child, we use the individual weights.
8. We define the parent of these young adults to be the last head of household (looking backward up to four years and including the current wave) to identify the young adult as being his child or stepchild. In addition, the core interviews collect relatively little information about family members other than the head and his wife, such as age, education, marital status, and employment status. Thus, we are limited in our ability to systematically examine the characteristics of the young adult when we use this broader sample.

Supplement (CDS). This supplement included children ages 0 to 12 years in 1997 and collected detailed information about their education and home environment. When the children in the CDS reached the age of 18 years and stopped attending high school, the PSID began a new supplement called the Transition into Adulthood (TA) to follow these children as they left their family homes and formed their own families (which would then be followed given the PSID core sampling scheme). The TA supplement was administered biennially starting in 2005 and collected detailed information about high school performance (including GPA), college attendance and post-high school training, family formation issues, employment, and attitudes about a variety of social, personal, and career issues.

From the TA supplement, we select a sample of all young adults who graduated from high school and who reported their GPA (GPA was only collected from high school graduates).[9] We then merge these data with the core survey data on parental resources. These restrictions leave us with 646 young adults. We refer to this sample as our "TA Sample."

Although the PSID sampling frame of following a nationally representative sample and their descendants from 1968 forward provides an extraordinarily long panel, it lacks individuals who immigrated to the United States after 1968, unless they married into the PSID sample.[10] We therefore supplement these analyses with the HRS.

The Health and Retirement Study (HRS)

The HRS began in 1992 as a biennial panel survey of individuals born between 1931 and 1941 and includes their spouses or partners. In 1998, the HRS was merged with a companion survey, the Asset and Health Dynamics Study, and two additional cohorts of respondents were added to create a sample that was approximately representative of the U.S. population aged 50 years or older. These individuals have been interviewed biennially, with additional cohorts added in 2004 and 2010 to retain a sample that is approximately representative of the population aged 50 years and older in these years.

The HRS collects detailed information about the income, wealth, employment, family structure, and health of the respondents. The HRS also collects a good deal of information about each of the respondents' children, including each child's family income, schooling level, and marital status.[11]

Using these data, we construct a sample of children of the HRS respondents who were 19-, 20-, or 21-year-olds in one of the years 1992, 1998, and 2004. By focusing on the years in which new cohorts entered the HRS, we obtain a sample of young adults from households with parents who are as young as possible within the survey framework. Across the three years we have a total of 3,188 young adults who had at least one parent age 50 years or older when they graduated from high school.

9. Given that high school dropouts tend to have low GPAs, the attendance/GPA gradient would be steeper if they were included.
10. Although the PSID has added Hispanic subsamples since its initial sample was selected, the requisite data do not exist for these newer respondents.
11. See Haider and McGarry (2016) for an analysis of educational transfers from parents to children in the HRS.

Issues when Analyzing Both Datasets

In both datasets, our measure of educational attainment of the children comes from reports of the parents. Importantly, these questions ask whether the young adult is "in school" and the highest grade completed.[12] Thus, our primary outcome is most appropriately interpreted as whether the young adult is obtaining *any* postsecondary schooling, although we often refer to it as "attending college."

Although we treat the PSID and HRS as similarly as possible in our analyses, important differences do exist. Most importantly, because the HRS is designed to be representative of older households, we can study only the behavior of young adults with a parent in the relevant age range. Tabulations from the PSID show that just 35 percent of the 19- to 20-year-olds in that survey have a household head (typically a parent) that is over the age of 50 years. Moreover, these young adults are not a random subset of young adults but are likely to be later-born children and born to parents with higher education. Again using the PSID, we find that 41 percent of children who attend college have a household head over the age of 50 years, but only 28 percent of children who do not attend college do. Even though we include measures of parental age in our regressions, the PSID and HRS samples are fundamentally representative of different populations, and the results from the two datasets are not directly comparable.

We note two final issues. Because the PSID defines the father/male to be the head of the household in two-parent families, we adopt this language when discussing the HRS. In addition, because of the small number of Hispanics in the PSID, we do not include a Hispanic indicator variable when analyzing the PSID, but do so when analyzing the HRS.

4. FAMILY FINANCIAL RESOURCES AND ATTENDING COLLEGE

Our analyses focus on three questions: (1) How do financial resources relate to college attendance? (2) How important are other parental characteristics after controlling for these resources? And lastly, (3) How does the relationship between financial resources and college attendance vary with high school achievement?

Family Resources and College Attendance

We begin by pooling the 19- to 20-year-olds in nine PSID waves and dividing them into those who were attending college at the interview date and those who were not. The first two columns of table 1 show the mean of various family characteristics for these two groups. Young adults who are observed to be attending college come from households that are more likely to have two parents (0.78 versus 0.62) and to have a head of household who is older (49.2 years old versus 47.2), more educated (13.3 years of schooling versus 11.8), and less likely to be black (0.14 versus 0.22). We also find that parental financial resources are substantially greater for attendees. For example, the median household income for parents of those attending postsecondary school is approximately $86,000, but is only $56,000 for non-attendees. The income gaps

12. Based on this wording, it is unclear the extent to which parents should report various certificate programs or nondegree activities as school enrollment or count them in the total of number of years of education.

Table 1. Household Characteristics by College Attendance of 19- and 20-Year-Olds, PSID

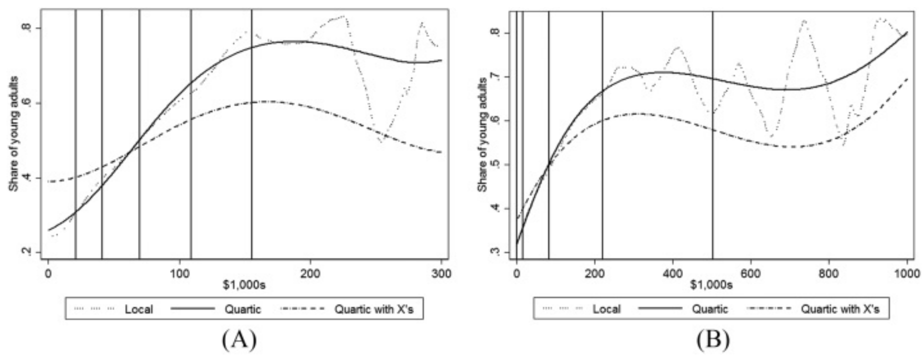
	Attending, Full Sample			Attending, TA Sample		
	Yes	No	Diff.	Yes	No	Diff.
N	1,772	1,905		439	207	
Weighted fraction	0.51	0.49		0.70	0.30	
Student characteristics						
Male	0.46	0.55	***	0.46	0.56	
High school GPA				3.26	3.10	**
Parent characteristics						
Married HH	0.78	0.62	***	0.75	0.56	***
Single female HH	0.19	0.33	***	0.21	0.40	***
HH age	49.2	47.2	***	49.9	47.2	***
HH education	13.3	11.8	***	13.2	12.1	***
HH black	0.14	0.22	***	0.12	0.28	***
Income						
25th	54,479	30,973	***	61,471	34,950	***
Median	86,053	56,305	***	88,840	59,095	***
75th	127,837	85,100	***	143,331	88,147	***
Total wealth						
25th	44,191	4,980	***	47,415	4,631	***
Median	135,499	46,747	***	149,803	50,908	***
75th	313,136	129,415	***	339,388	140,555	***
Non-housing wealth						
25th	8,485	1,068	***	7,748	762	**
Median	43,443	12,102	***	38,227	14,464	**
75th	159,361	50,010	***	169,694	42,923	***
Average income						
25th	49,627	31,010	***	55,833	34,839	***
Median	78,329	49,458	***	84,115	53,209	***
75th	115,280	74,993	***	127,948	73,868	***

Notes: The Full Sample includes 19- and 20-year-olds in 1984, 1989, 1994, and biennially from 1999 to 2009. The TA Sample only includes those individuals who additionally were respondents to the TA Supplement in 2005, 2007, and 2009. All dollar values are adjusted to 2008 with the Personal Consumption Expenditures deflator. All tabulations are weighted. The "Diff." column contains the significance level for a two-tailed test for whether the characteristics are different. HH = head of household.

** Significant at the 0.01 level; *** significant at the 0.001 level.

are similar at the 25th percentile ($54,000 versus $31,000) and at the 75th percentile ($128,000 versus $85,000). The wealth gaps between attendees and non-attendees are even larger than the income gaps, both in relative and in absolute terms. The 25th percentile of total wealth for attendees is $44,000 versus $5,000 for non-attendees, with similarly striking gaps at the median ($135,000 versus $47,000) and the 75th percentile ($313,000 versus $129,000).

In figure 1 we examine how the relationship between attending college and financial resources varies over the distributions of income (panel A) and wealth (panel B). Each panel plots the relationship between college attendance and either income or wealth using a local regression in order to demonstrate in a flexible manner how attendance



Notes: These results are based on the 3,677 young adults in the PSID Full Sample. The vertical lines denote the 10th, 25th, 50th, 75th, and 90th percentiles of each distribution. The "Local" curves are based on local linear regressions. Bandwidths are $11,970 for panel A and $27,100 for panel B. The "Quartic" curves include a quartic one of the financial resources (income in panel A and wealth in panel B). The "Quartic with Xs" curves include a quartic in both financial resources and the additional covariates listed in the text.

Figure 1. College Attendance versus Income and Wealth, PSID. A. Attendance and Income. B. Attendance and Wealth.

varies with income and wealth. These relationships are labeled "Local" and shown as dotted lines.[13]

In addition, in each panel we also show plots from two parametric models. We first use a logit specification for college attendance with income entered as a fourth-order polynomial (panel A) and wealth (panel B). These curves are labeled "Quartic" and shown as solid lines. Because income and wealth are correlated with each other and with other observable characteristics shown in table 1, we also show a parametric specification that controls for both financial measures jointly, each entered as fourth-order polynomials, and the other observable characteristics from table 1. These curves are labeled "Quartic with Xs" and shown as dashed lines.[14]

To focus our discussion, we draw vertical lines at the 10th, 25th, 50th, 75th, and 90th percentiles in each panel. The point estimates and standard errors for these attendance rates are in the Appendix; statistical statements in the following paragraphs are based on applying two-tailed tests to whether a particular difference equals zero.

As panel A of figure 1 demonstrates, there is a strong and nearly linear relationship between income and college attendance from the 10th percentile of income up through the 90th percentile based on the local regression (dotted line). For example, the rate of college enrollment increases from 0.31 to 0.39 (p-value < 0.001) when moving from the 10th to the 25th percentile of the income distribution (from $21,300 to $41,700) and from 0.63 to 0.78 (p-value < 0.001) when moving from the 75th to the 90th percentile (from $109,200 to $155,500). Thus, we estimate that each additional $10,000 in

13. For each local regression, we use a local linear regression with an Epanechnikov kernel and the asymptotically optimal constant bandwidth (the "rule of thumb" bandwidth). See the figure notes for the values of each bandwidth.
14. Specifically, in addition to a quartic in income and wealth, the regressions include indicators for each of the PSID waves, indicators for the age of the household head (40 or less, 41–45, 46–50, 51–55, 56 and over), an indicator for whether the parental household was headed by a female, the years of schooling of the household head, and the race of the household head, and an indicator for the sex of the child. The graphs hold each of these other characteristics at their sample mean.

income between the 10th and 25th percentiles is associated with an increase in college attendance of 4.3 percentage points, and each additional $10,000 in income between the 75th and 90th percentiles is associated with an increase in college attendance of 3.3 percentage points. These effects are surprisingly similar given the large differences in the level of income. The local linear regression line fluctuates considerably above the 90th percentile, which is due to the smaller sample size in this region.

The relationship between college attendance and wealth (panel B) also shows a strong positive relationship, although one that flattens at lower percentiles than was the case for income. For example, each additional $10,000 in wealth between the 10th and 25th percentiles is associated with an increase in college attendance of 3.0 percentage points, whereas $10,000 in wealth between the 50th and 75th percentiles is associated with an increase of just 1.3 percentage points; the total change in attendance between the 75th and 90th percentiles is statistically indistinguishable from zero (p-value = 0.42), which is unsurprising given the fluctuations in the local linear regression line above the 75th percentile.

Turning to the parametric specifications, it is apparent that the quartic specifications with no controls (solid line) match the nonparametric local relationships quite well, with the parametric relationships being smoother, as expected. Thus, a quartic specification appears to be quite successful in capturing the relationship between attendance and financial resources.[15]

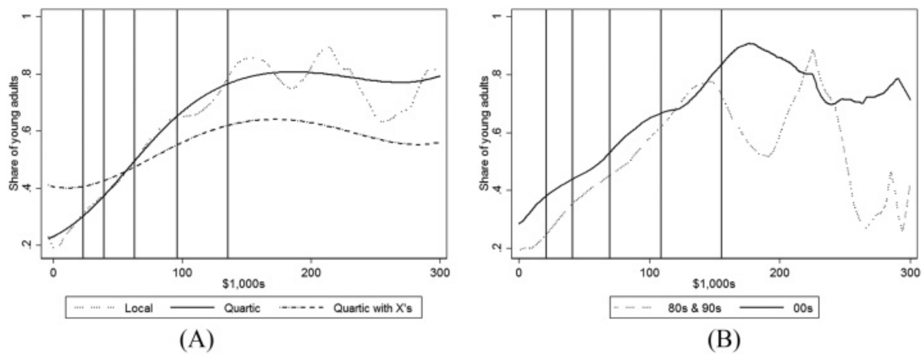
The parametric results that jointly control for income, wealth, and other observable characteristics (dashed line) demonstrate that the broad relationships we have stressed thus far continue to hold, although the income and wealth relationships are dampened. Despite this dampening, both financial measures remain predictive of college attendance.[16]

One drawback of the income results we presented thus far is that we were analyzing the relationship between college outcomes and current income, but it is likely that such educational decisions are more influenced by permanent or long-run income. It has been demonstrated in numerous contexts, going back to seminal studies by Modigliani and Brumberg (1954) and Friedman (1957), that current income is a noisy measure of permanent income. To analyze the extent to which such concerns appreciably affect the results presented so far, we follow the oft-used strategy of using income averaged over several periods. Specifically, for each observation, we take the average of current income and income two and four years previous to the interview.

The last rows of table 1 show the 25th, median, and 75th percentiles of our measure of average income by college attendance. The absolute levels and gaps are very similar for average income and for current income. In panel A of figure 2, we replicate panel A of figure 1 using our measure of average income rather than current income. The results

15. Empirically, a quadratic specification for income was sufficient to match its nonparametric counterpart, but a quadratic specification for wealth was much less successful in matching its counterpart: The quadratic specification for wealth exhibited too steep of an initial increase and too steep of an eventual decline relative to its nonparametric counterpart. For consistency, we use a quartic specification for both income and wealth.

16. In an alternative specification, we allowed for the relationship between income and attendance to vary by wealth level by interacting a quartic in income with indicators for whether an individual was in the middle or highest wealth tercile. Although the relationship between income and attendance was steeper for those in the lowest wealth tercile compared with those in the highest wealth tercile, the lack of precision in these estimates was such that the differences should only be considered as suggestive. In another alternative specification, we



Notes: Panel A is constructed identically to the lines in panel A of figure 1, but this panel uses average income. Panel B shows the relationship between attendance and income based on a local linear regression like panel A of figure 1, but panel B separates between those waves that were conducted in the 1980s and 1990s versus those conducted in the 2000s.

Figure 2. Sensitivity Analysis for College Attendance versus Income, PSID. A. Attendance and Average Income. B. Attendance and Income by Time Period.

for the two versions look very similar, with the main difference being that the average line is slightly steeper. For example, whereas the rate of college attendance increases from 31 to 78 percent (standard error [s.e.] = 2.4) when current income was used, it increases from 31 percent to 84 (s.e. = 2.8) when average income is used, a difference that is marginally statistically significant (*p*-value = 0.10).[17]

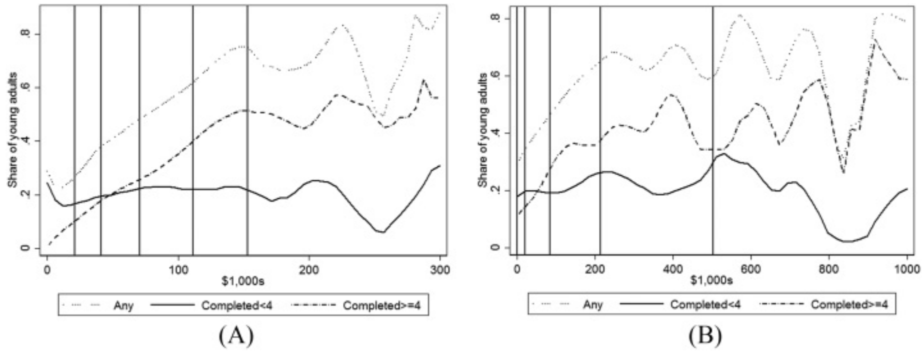
Given that previous studies have found that the relationship between attendance and income has become steeper over time (e.g., Belley and Lochner 2007 and Bailey and Dynarski 2011), we repeat the local regression estimates of panel A of figure 1, separately for the 1980s and 1990s waves versus the 2000s waves; the figure is provided in panel B of figure 2. Although our results indicate the fraction of students attending college increased for all income levels, we do not find systematic evidence that the relationship became steeper over time.

Attendance versus Completing Four Years

To examine whether the effects of income and wealth extend beyond the decision to attend college, we next examine their relationships with completing four years of college. To do so, we limit our sample to young adults who were at least 25 years old in the final year of our data.[18] We then examine separately those individuals who were enrolled in college at ages 19 and 20, and who completed at least four years of college (although not necessarily with a bachelor's degree) versus those individuals who were enrolled at ages 19 or 20 and completed less than four years of college.[19] We present these

examined whether our results appreciably changed if we looked at any college attendance by age 24, rather than attendance for 19- and 20-year-olds. Very little difference for these two attendance measures was found.

17. We also compared the results for wealth and average wealth using data from 2003 onwards, and the results once again were very similar.
18. Although age 25 is commonly used for such analysis, it is important to note that just over 40 percent of post-secondary students were age 25 or older in 2012 (NCES 2013). Thus, undoubtedly, we are underestimating completed schooling for the younger members of this sample.
19. Recall that this group of attendees with less than four years of college includes those who attended a trade school, completed (or failed to complete) a two-year degree, and who attended and failed to complete a



Notes: These results are based on the 2,461 young adults in the PSID Full Sample who reach aged 25 by the end of our sample period. The vertical lines denote the 10th, 25th, 50th, 75th, and 90th percentiles of each distribution. All curves are based on local linear regressions. The "Any" curves show the fraction of the sample that completed any college. The "Completed < 4" curves show the fraction of the sample that attended college and completed less than four years. The "Completed >= 4" curves show the fraction of the sample that attended college and completed at least four years. Panel A bandwidths are 10,970, 12,630, and 13,960 for "Any," "Completed < 4," and "Completed >= 4," respectively. Panel B bandwidths are 29,970, 41,460, and 28,810 for "Any," "Completed < 4," and "Completed >= 4," respectively.

Figure 3. College Attendance and Completion by Income and Wealth, PSID. A. Completion and Income. B. Completion and Wealth.

results in figure 3, showing just the local regression results (see the Appendix for point estimates and standard errors for select quantities from the figure).

Panel A plots the relationship between three attendance outcomes and income for our restricted sample: attended at 19 or 20 (the dotted line), attended at 19 or 20 and completed fewer than four years of college (solid line), and attended at 19 or 20 and completed at least four years of college by 2009 (dashed line). Just as we saw with the full sample in figure 1, the fraction attending college increases at a relatively constant rate between the 10th and 90th percentiles of the income distribution.[20] The line denoting the relationship between completing four years of college and income is approximately parallel to the attendance/income plot, but shifted down by approximately 25 percentage points. Thus, in proportional terms, the relationship between completing four years of college and income is even stronger than that between attendance and income. In contrast, the line denoting the relationship between completing fewer than four years of college is basically flat at about 25 percentage points (as must be the case given that this line is the difference between the other two), suggesting that income is not associated with attending college and completing fewer than four years.

The relationship between these three attendance outcomes and wealth is shown in panel B and the results are somewhat similar. As before, even with this restricted sample, there exists a strong positive relationship between any attendance and wealth through the 75th percentile of the wealth distribution. Over this range, the relationship between completing at least four years of college and wealth is largely parallel, although the relationship between completing fewer than four years and wealth is somewhat

four-year school. Furthermore, some subset of these students may complete their education after they turn 25, although we expect the number of such students to be small.

20. This line differs from the analogous line in figure 1 because it is based on a sample of those observed through age 25.

Table 2. Household Characteristics by College Attendance of 19- to 21-Year Olds, HRS

	Attending		
	Yes	No	Diff.
N	1,840	1,348	
Weighted fraction	0.62	0.38	
Student characteristics			
Male	0.46	0.58	***
Parent characteristics			
Married head of household	0.79	0.68	***
Single female head of household	0.12	0.18	***
Head of household age	54.6	54.6	
Head of household education	14.2	11.3	***
Head of household black	0.10	0.16	***
Head of household Hispanic	0.08	0.15	***
Income			
25th	47,564	19,108	***
Median	87,478	41,475	***
75th	153,009	73,085	***
Average Income			
25th			
Median			
75th			
Total wealth			
25th	79,587	6,329	***
Median	224,133	56,052	***
75th	495,524	169,147	***
Non-housing wealth			
25th	16,814	972	***
Median	85,752	12,777	***
75th	313,864	67,942	***

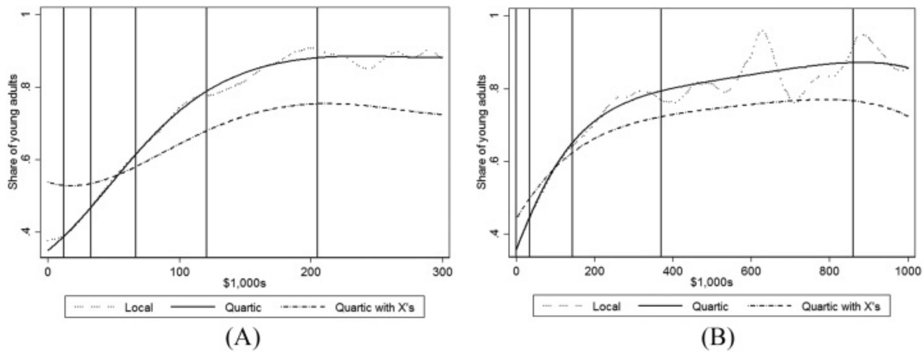
Notes: The sample includes 19-, 20-, and 21-year-olds in 1992, 1998, and 2004. All dollar values are adjusted to 2008 with the Personal Consumption Expenditures deflator. All tabulations are weighted by household weights. The "Diff." column contains the significance level for a two-tailed test for whether the characteristics are different.

*** Significant at the 0.001 level.

upward sloping. Based on these patterns, it appears that the strong relationships we observe between attendance and financial resources does not just exist for the decision to attend college but also is present in the decision of how much schooling to obtain.

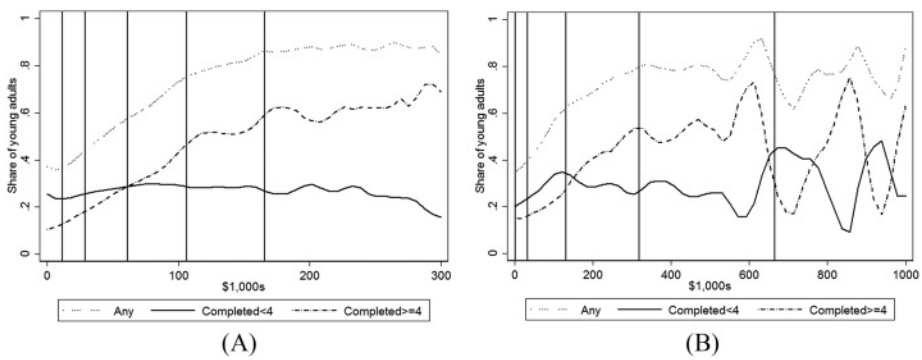
HRS Results

We repeat the PSID analyses in table 1 and figures 1 and 3 using our HRS sample, with the results presented in table 2 and figures 4 and 5. The similarities are striking. Except for the difference in the age of the household head between attendees and non-attendees found in the PSID (see table 1), the demographic and resource differences between the attendees and non-attendees in the HRS shown in table 2 are quantitatively



Notes: The vertical lines denote the 10th, 25th, 50th, 75th, and 90th percentiles of each distribution. The "Local" curves are based on local linear regressions. Bandwidths are $14,390 for panel A and $27,950 for panel B. The "Quartic" curves include a quartic one of the financial resources (income in panel A and wealth in panel B). The "Quartic with Xs" curves include a quartic in both financial resources and the additional covariates listed in the text.

Figure 4. College Attendance versus Income and Wealth, HRS. A. Attendance and Income. B. Attendance and Wealth.



Notes: The vertical lines denote the 10th, 25th, 50th, 75th, and 90th percentiles of each distribution. All curves are based on local linear regressions. The "Any" curves show the fraction of the sample that completed any college. The "Completed<4" curves show the fraction of the sample that attended college and completed less than four years. The "Completed >= 4" curves show the fraction of the sample that attended college and completed at least four years. Panel A bandwidths are 15,230, 17,040, and 13,660 for "Any," "Completed < 4," and "Completed >= 4," respectively. Panel B bandwidths are 28,490, 27,760, and 24,490 for "Any," "Completed < 4," and "Completed >= 4," respectively.

Figure 5. College Attendance and Completion by Income and Wealth, HRS. A. Completion and Income. B. Completion and Wealth.

similar to those found in the PSID. For example, there are large differences between the attendees and non-attendees in their parental household structure, education, income, and wealth. Also of note in the HRS, we find that the household head of attendees is much less likely to be Hispanic than the head of household for non-attendees (0.08 versus 0.15), implying that Hispanics are less likely to attend college.

Turning to the HRS results shown in figures 4 and 5, we again find that they are very similar to PSID results in figures 1 and 3. Just as we found with the PSID, attendance increases between the 10th and 90th percentiles of the income distribution at a fairly constant rate and increases between the 10th and 75th percentiles of the wealth distribution at a declining rate (see figure 4). In addition, we see the relationships dampened when income, wealth, and the other covariates are entered jointly. Finally, the attendance gradients with income and wealth are primarily due to completion gradients (see figure 5).

Table 3. Regressions of College Attendance on Parental Characteristics

	PSID Full Sample				HRS Sample		
	(1)	(2)	(3)	(4)	(1)	(2)	(3)
Head single female	−0.141	−0.061	−0.059	−0.052	−0.068	0.019	0.020
	(0.019)	(0.021)	(0.021)	(0.021)	(0.023)	(0.024)	(0.024)
Head education	0.046	0.032	0.031	0.029	0.056	0.043	0.041
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Head black	−0.010	0.017	0.027	0.023	−0.065	−0.027	−0.005
	(0.022)	(0.022)	(0.022)	(0.003)	(0.025)	(0.024)	(0.025)
Head Hispanic					0.070	0.090	0.093
					(0.029)	(0.028)	(0.028)
Income	No	Yes	Yes	No	No	Yes	Yes
Wealth	No	No	Yes	No	No	No	Yes
Average income	No	No	No	Yes	No	No	No
Dependent mean	0.514	0.514	0.514	0.514	0.624	0.624	0.624
R^2	0.129	0.151	0.160	0.154	0.176	0.207	0.221

Notes: The outcome variable is an indicator variable for college attendance (1 = yes). Financial measures are included as a fourth order polynomial. Head single female is an indicator variable (1 = yes). Head education is the number of years of education for the head. Head black is an indicator variable (1 = yes). When Head Hispanic is included, it is an indicator variable (1 = yes) for non-black Hispanics. Other regressors included are age category indicators, wave indicators, and young adult sex indicator (see the text for details on these variables). All results are weighted. Standards in parentheses are clustered by family and are robust to arbitrary forms of heteroskedasticity.

The strong similarity between the results is reassuring regarding the generality of our findings.

Other Sociodemographic Characteristics and College Attendance

Tables 1 and 2 demonstrate the well-known associations between college attendance and many sociodemographic characteristics. As we saw in figure 1, when controlling for a set of these characteristics, the effects of income and wealth are less strong than when considered alone. We now discuss directly the other covariates we included in that regression, presenting these coefficients for both samples in table 3. We first estimate the regression model with just the sociodemographic variables. We then add just the quartic in income to replicate the most common specification in the literature. We then add wealth along with income to assess how the conclusions change with more complete controls for financial resources. The income and wealth coefficients for all models are reported in the Appendix, and the estimates from column 3 are used to generate the "Quartic with Xs" curves in figures 1 and 4.

Tables 1 and 2 revealed that college attendees were much less likely to be from a household headed by a single female. This difference remains strong in the PSID sample even when other household characteristics are included: A young adult from a single-mother household is 14.1 percentage points less likely to attend college when just standard demographics are included in the model (column 1). This difference declines to 6.1 percentage points with the inclusion of income (column 2), a fall of more than 50 percent, but remains statistically significant. The addition of wealth to the regression has little additional effect (to 5.9 percentage points, see column 3). In the HRS, the difference with only the basic controls is smaller than the analogous difference in the PSID (6.8 versus 14.1 percentage points) and completely disappears with the inclusion of financial resources (see columns 2 and 3). This difference in the results for the two surveys may stem from the differences in the age of the parents at the time of the birth of their child—single mothers who were older when their children were born may be in a better position to foster the educational attainment of their children. Regardless, based on both surveys, the differences in attendance between young adults from single mother families and other families appears to be largely driven by differences in financial resources.

The effect of a head of household's education on college attendance is somewhat smaller when income and wealth are included in the regression, but remains a strong and significant predictor of attendance in both datasets. In the PSID, the inclusion of wealth and income reduces the effect of an additional year of parental education on college attendance from 4.6 percentage points to 3.2 percentage points, a decline of 30 percent but still economically significant. A similar pattern is evident in the HRS—one year of parental education increases attendance by 5.6 percentage points with the basic controls (column 4) and 4.1 percentage points when controlling for income and wealth (column 6)—which again is a decline of nearly 30 percent. Thus, even after controlling for detailed measures of parental resources, the educational level of the parents remains strongly associated with the educational level of the young adult, a result that likely points to the importance of differences in tastes or ability by educational level.

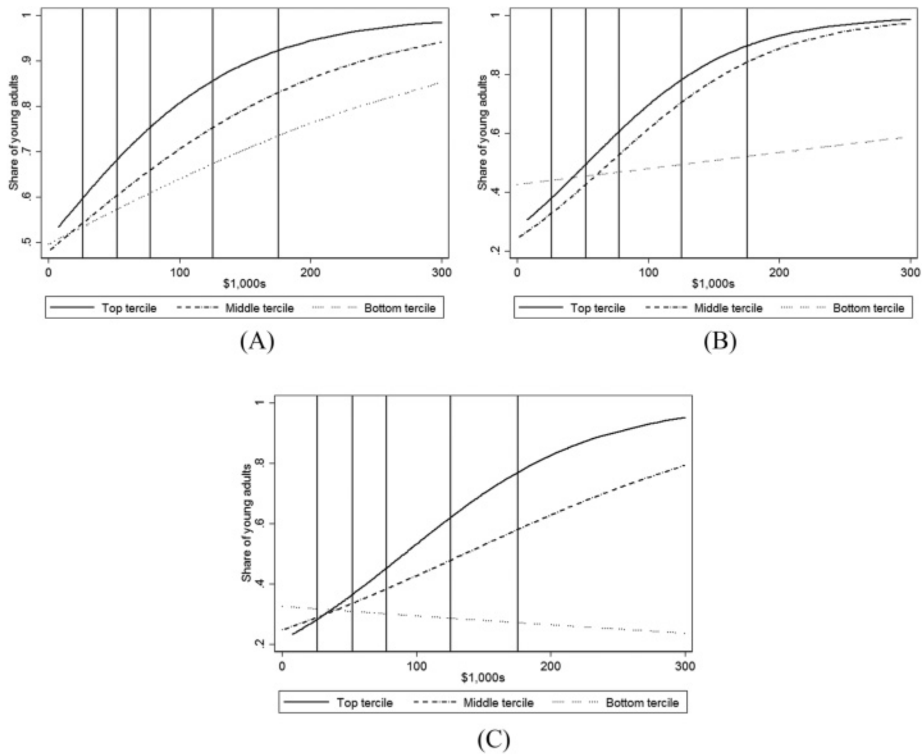
The last characteristic we examine is the race/ethnicity of the parent. After controlling for income and wealth, coming from a household headed by a black parent has no effect on enrollment in either the PSID or the HRS. Although we can include Hispanic ethnicity only in the HRS, we find a positive effect of having a Hispanic parent in the specification with only the basic controls (7.0 percentage points, column 3) and this effect becomes even larger with the inclusion of income and wealth (9.3 percentage points, column 6), although not statistically so. Thus, once we include parental financial resources, the black/white difference disappears, and there is some evidence that Hispanics attend college at higher than expected rates.[21]

Financial Resources and High School Achievement

Our results indicate that parental financial resources play an important role in the college attendance decision of the young adult, but of course, one would expect high school achievement to be an important factor as well. Although our data generally have less information about achievement than those used in other studies (which in turn lack high-quality data on financial resources), we have some information for those PSID young adults who were surveyed in the TA Supplement. For these young adults, we have self-reported information about high school GPA, which we use as a measure of preparedness for college. Because GPA is only collected for those TA respondents who completed high school, our analysis is limited to those respondents. Table 1 provides descriptive statistics for this sample.

In figure 6, we examine how several college attendance outcomes vary with income by GPA tercile. We divide GPA by tercile rather than, say, quartile because of our small sample sizes. We present results based on logit specifications with income entered

21. The fact that family background differences can largely account for racial and ethnic differences in schooling has been documented by others (e.g., Kane 1994).



Notes: These results are based on the 646 young adults in the PSID TA Sample. Each panel is based on a logit of the specified outcome on income, GPA tercile indicators, and income interacted with the GPA tercile indicators. The vertical lines denote the 10th, 25th, 50th, 75th, and 90th percentiles of the income distribution.

Figure 6. Type of College Attendance versus Income by GPA Tercile, PSID. A. Any Attendance by GPA Tercile. B. Full-time Attendance by GPA Tercile. C. Full-time/Four-year Attendance by GPA Tercile.

linearly and interacted with GPA tercile, graphing the results for ease of interpretation; the coefficient estimates from the logistic regression, select predictions and their standard errors are presented in Appendix table A.1.

Panel A of figure 6 shows the results for whether the young adult is attending college at aged 19 or 20, the same outcome examined in figure 1. College attendance rates are higher when compared with those in the previous sections because our TA sample includes only those young adults who graduated from high school. Within each GPA tercile, college attendance increases with income. For example, focusing on the top GPA tercile, 68.2 percent of students at the 25th percentile of income attend college, but 85.7 percent of students at the 75th percentile of income do. Attendance still increases with income for the bottom GPA tercile, but to a lesser extent: from 57.2 percent at the 25th percentile of income to 67.4 percent at the 75th percentile.

These relationships in panel A can be viewed from other angles that are similarly instructive regarding the importance of income for college attendance. For example, at low income levels, GPA tends to have little correlation with income—college attendance is very similar for all GPA curves at the 25th percentile of income. In addition, the association between college attendance and income is strong enough that the highest resource/lowest achieving young adults are substantially more likely to attend college than are the lowest resource/highest achieving young adults.[22]

In the remaining panels of figure 6, we look instead at fulltime attendance (panel B) and full-time/four-year attendance (panel C). Two striking patterns emerge. First, the positive gradient with income exists for the top two GPA terciles but not for the bottom GPA tercile. For example, moving from the 25th percentile to the 75th percentile increases full-time attendance from 49.5 to 78.4 percent for those students in the top GPA tercile, but only from 45.4 to 49.4 for those students in the bottom GPA tercile.[23] Second, at the lowest levels of income, GPA has very little association with college outcome variables. In fact, at the income levels around the 25th percentile, full-time college attendance is basically equal for the top and bottom GPA tercile students (49.5 versus 45.4 percent, respectively). Both of these findings hold in general when examining full-time attendance at a four-year institution.

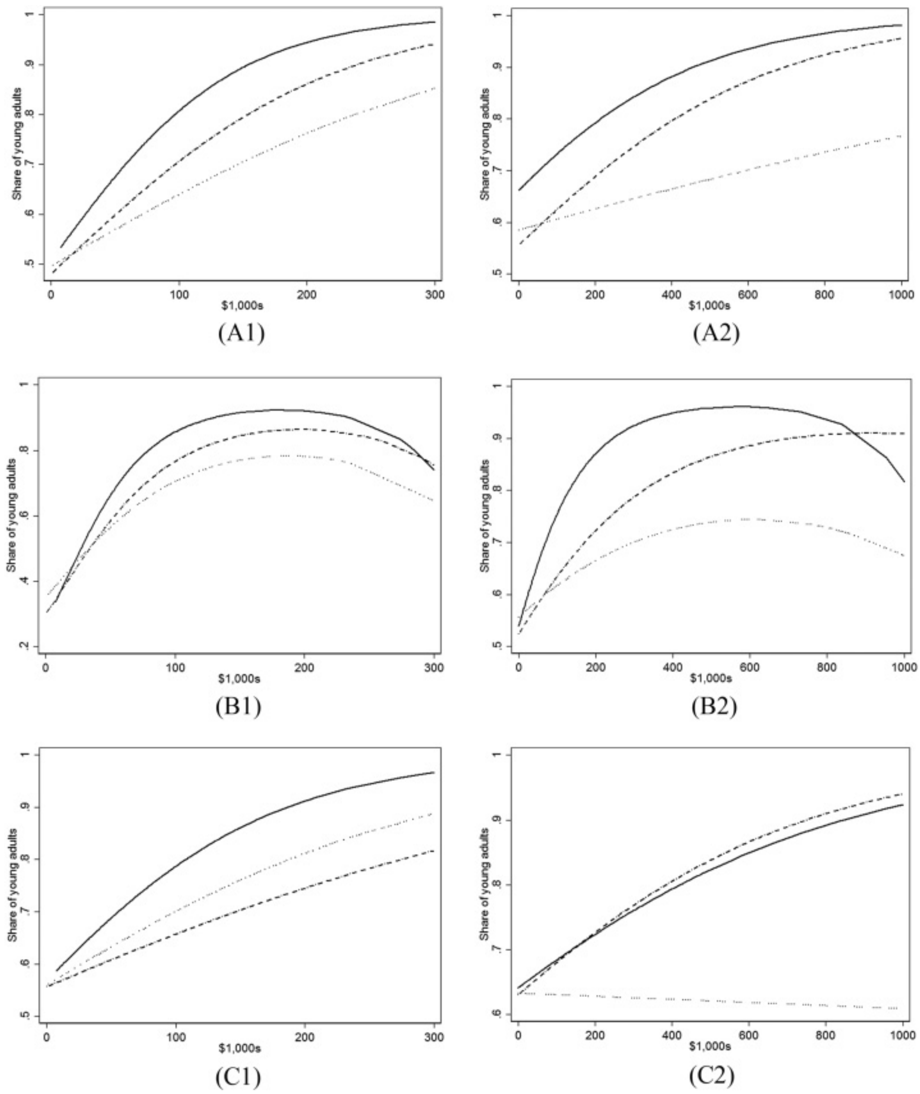
Finally, in figure 7, we show the robustness of achievement results for any attendance to a variety of alternative specifications. Panel A1 of figure 7 replicates the results from panel A of figure 6, which uses income as the measure of financial resources and specifies income to be a linear function interacted with GPA terciles. Panel B1 instead specifies income to be a quadratic function. This change leads to an inverted U-shaped pattern between attendance and income, but based on examinations of the full data, it appears these initial increases and later declines are somewhat steeper than what is in the underlying data. Panels A2 and B2 are similar to A1 and B1, respectively, but instead use wealth as the measure of financial resources. The results are very similar whether income or wealth is used. The final two panels show results from estimating a single model that includes income and wealth, each interacted with GPA terciles; panel C1 shows the income results and panel C2 shows the wealth results. Once again, these results are broadly the same—income and wealth matter most for the top two GPA terciles, and GPA matters very little for young adults from households with few financial resources.

5. SUMMARY AND DISCUSSION

In this paper, we examine the relationship between postsecondary schooling and the income and wealth of a potential attendee's parents. Our findings indicate that the association between the financial resources of parents and the postsecondary schooling of their children is pervasive. The association is strong and fairly constant between the 10th and 90th percentiles of the income distribution and between the 10th and 75th percentiles of the wealth distribution, and holds even when we control for both financial measures simultaneously and for several other parental characteristics thought to affect schooling outcomes. Not only is there a strong association between resources and postsecondary schooling, but there is also a strong association between resources and completing four years of college even among those who enroll in college.

22. To ensure these results were not driven by the parametric specification of income used in producing the panel, we also considered a far more descriptive approach. Specifically, we divided the sample into nine groups, defined by the interaction of the three GPA terciles and income terciles. See the Appendix for the tabulations.

23. Of course, these estimates should not be interpreted causally for numerous reasons. For example, young adults who have no intention of attending college may invest less in high school and thus obtain a lower GPA, regardless of family resources.



Notes: These results are based on the 646 young adults in the PSID TA Sample. Each panel is based on a logit. Panel A1 (A2) specifies the explanatory variables to be linear in income (wealth) and its interactions with GPA tercile indicators. Panel B1 (B2) specifies the explanatory variables to be quadratic in income (wealth) and its interactions with GPA tercile indicators. Panels C1 and C2 are based on a single logit model that includes both income and wealth and their interactions with GPA terciles.

Figure 7. Sensitivity of GPA Tercile Results, PSID. A1. Income, Linear. A2. Wealth, Linear. B1. Income, Quadratic. B2. Wealth, Quadratic. C1. Income, Linear Adjusted. C2. Wealth, Linear Adjusted.

Finally, this relationship between resources and schooling is observed across the distribution of high school GPA. For example, within each tercile of GPA, we find that postsecondary schooling increases with parental resources. This association is strong enough that the rate of college attendance for the highest resource/lowest achieving young adults was substantially higher than for the lowest resource/highest achieving young adults.

We also examine the associations between postsecondary schooling and other sociodemographic characteristics using empirical models that jointly include sociodemographic characteristics and our high-quality measures of income and wealth. Even with a large number of additional controls, income and wealth continue to be significant predictors of postsecondary schooling, as does the education level of the household head. The negative association with female headship is substantially reduced once we include income and wealth. We also find no significant difference in attendance between young adults who come from black- versus white-headed households when financial resources are included in the model, and children from Hispanic parents are more likely to obtain postsecondary schooling.

It is important to note that our results are only suggestive regarding the important economic question of whether credit constraints affect postsecondary schooling. Our results cannot speak to this question directly because we do not have information about the actual college costs for the young adults after various forms of financial aid and loans are taken into account, nor have we modeled the decision to attend college. A simple model of credit constraints is likely to be insufficient to explain our findings, however. Specifically, we find that attendance continues to increase with income (through $150,000 in the PSID and through $200,000 in the HRS) and wealth (through $200,000 in the PSID and through $350,000 in the HRS) at levels that are sufficiently high it seems unlikely that affordability is much of an issue. At these levels, perhaps income and wealth are instead proxying for tastes or ability.

At the same time, other results suggest that credit constraints could potentially be important for some young adults. For example, we found very low rates of completing four years of college at the lowest income (under 15 percent at the 10th percentile of income in the PSID and the HRS) and wealth (under 20 percent at the 10th percentile of wealth in the PSID and HRS) levels. Perhaps even more suggestive are our results analyzing financial resources and GPA jointly. Especially for the top two terciles of GPA, income and wealth had a consistent association with attendance. Moreover, at low levels of income, GPA had no effect on college attendance and completion. But again, without more specific information about application behavior and financial aid, these results are only suggestive.

So what is gained by using our more detailed income and wealth data? As we noted already, most previous studies focus on the relationship between income and college attendance, and only a few analyze the relationship between wealth and college attendance. In contrast, we analyze these relationships nonparametrically and when controlling for other covariates.[24] Thus, whereas previous studies typically report how attendance rates vary by quartile of income (e.g., Smith et al. 1997; Bailey and Dynarski 2011), we find that a systematic relationship exists up through very high levels of income (over $150,000) and wealth (over $200,000)—it is exactly this pervasiveness that suggests that a simple credit constraint story is not sufficient to explain these relationships.[25]

24. Although Conley (2001) specifies models that include income and wealth, he uses much older PSID data (see footnote 3 for more details) and focuses on a simple, parametric (log odds-log) relationship.

25. If we collapse the PSID data into income quartiles, following table 1 in Smith et al. (1997, p. 34) and figure 2 in Bailey and Dynarski (2011), the gap in college attendance between the lowest and highest quartiles is very similar to what they found, about 50 percentage points. Belley and Lochner (2007) provide one set of results that jointly includes income and wealth (see their Table 5), finding that both play an independent role for

In addition, our joint analysis of income and wealth shows that both measures remain strongly predictive of attendance, even when controlling for the other. Thus, additional information on wealth is useful for characterizing the role of socioeconomic status on the attendance decision. With that said, even with the high-quality income and wealth data that we have here, parental education is a strong predictor of college attendance, further strengthening the case that taste or ability remains an important part of the attendance decision.

Despite the insights provided by our analysis, we end with several important caveats. Perhaps most importantly, we do not consider the role of financial resources in affecting graduation from high school and thus becoming "at risk" for attending college. In addition, we do not have any information about college quality, and recent work has documented systematic differences in college quality by student characteristics (e.g., Carnevale and Strohl 2013). This distinction regarding the quality of the school is important because there exists substantial evidence that the value of a college degree varies substantially with the quality of college, as do college completion rates.

Overall, our results suggest that the associations between parental financial resources and college attendance and completion are strong. Given the high returns to education, particularly those to completing a four-year college degree, these associations represent an important avenue through which inequality is transmitted across generations. Although the formulation of specific policy initiatives requires much more information regarding why these associations exist, the size of these associations suggest that it is a question that merits further investigation.

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APPENDIX A: ADDITIONAL DATA

Table A.1. Point Estimates and Standard Errors for Select Quantities from Figures 1 and 2

	10th	25th	50th	75th	90th
Figure 1: PSID					
Income ($1,000s)	21.3	41.7	69.4	109.2	155.5
Attendance at income percentile	0.307	0.395	0.500	0.627	0.778
	(0.016)	(0.012)	(0.013)	(0.017)	(0.024)
Wealth ($1,000s)	0	15.5	82.1	219.7	505.7
Attendance at wealth percentile	0.313	0.359	0.488	0.663	0.617
	(0.017)	(0.012)	(0.015)	(0.024)	(0.052)
Figure 2: PSID					
Income ($1,000s)	21.0	41.4	70.6	111.4	153.2
Completed < 4	0.168	0.197	0.225	0.220	0.218
	(0.016)	(0.013)	(0.014)	(0.018)	(0.028)
Completed >= 4	0.101	0.180	0.257	0.340	0.513
	(0.015)	(0.012)	(0.014)	(0.020)	(0.033)

Table A.1. Continued.

	10th	25th	50th	75th	90th
Figure 4: HRS					
Income ($1,000s)	12.0	32.6	66.7	120.8	205.2
Attendance at income percentile	0.388	0.464	0.613	0.778	0.908
	(0.019)	(0.014)	(0.015)	(0.020)	(0.025)
Wealth ($1,000s)	0.6	33.6	143.0	369.9	859.5
Attendance at wealth percentile	0.358	0.443	0.642	0.768	0.914
	(0.020)	(0.015)	(0.020)	(0.028)	(0.049)

Note: These attendance rates are based on estimates from the local linear regressions.

Table A.2. Income and Wealth Coefficients for Table 3

	PSID			HRS	
	(2)	(3)	(4)[a]	(2)	(3)
Income / 10^2	3.1	3.2	4.4	2.9	2.1
	(0.4)	(0.4)	(0.6)	(0.3)	(0.3)
Income square / 10^4	−7.5	−9.9	−12.9	−7.2	−6.0
	(1.4)	(1.8)	(3.2)	(1.2)	(1.2)
Income cubic / 10^6	5.1	8.9	12.1	6.4	5.8
	(1.3)	(2.0)	(4.6)	(1.4)	(1.4)
Income quartic / 10^9	−9.8	−19.3	−30.0	−17.6	−16.7
	(2.9)	(4.6)	(13.3)	(4.5)	(4.6)
Wealth / 10^3		1.8			3.5
		(0.4)			(0.5)
Wealth square / 10^6		−3.0			−15.4
		(1.0)			(2.6)
Wealth cubic / 10^9		1.4			20.5
		(0.6)			(4.2)
Wealth quartic / 10^{13}		−1.9			−80.8
		(0.9)			(19.1)

Notes: These coefficients are from the regressions that are specified in table 3.
[a]Column 4 uses average income rather than income.

Table A.3. Logit Coefficients for Figure 6

	Panel A	Panel B	Panel C
Middle GPA tercile	−0.059	−0.834	−0.382
	(0.550)	(0.572)	(0.466)
Top GPA tercile	0.047	−0.653	−0.572
	(0.650)	(0.520)	(0.525)
Income	0.006	0.002	−0.001
	(0.003)	(0.003)	(0.003)
Income * Middle GPA tercile	0.004	0.014	0.010
	(0.006)	(0.007)	(0.004)
Income * Top GPA tercile	0.008	0.016	0.016
	(0.008)	(0.006)	(0.005)

Notes: These are the logic coefficients that are used to construct figure 6. All results are weighted.

Table A.4. Point Estimates and Standard Errors for Select Quantities from Figure 6

	25th	75th
Income ($1,000s)	52.3	125.6
Any attendance, bottom GPA tercile	0.572 (0.052)	0.674 (0.057)
Any attendance, middle GPA tercile	0.604 (0.052)	0.754 (0.059)
Any attendance, top GPA tercile	0.682 (0.058)	0.857 (0.047)
FT attendance, bottom GPA tercile	0.454 (0.051)	0.494 (0.054)
FT attendance, middle GPA tercile	0.427 (0.055)	0.707 (0.072)
FT attendance, top GPA tercile	0.495 (0.059)	0.784 (0.048)
FT/4 attendance, bottom GPA tercile	0.309 (0.046)	0.286 (0.046)
FT/4 attendance, middle GPA tercile	0.336 (0.047)	0.480 (0.053)
FT/4 attendance, top GPA tercile	0.365 (0.056)	0.622 (0.056)

Notes: These attendance rates are based on the logit regression specifying income linearly and interacted with each GPA tercile. FT/4 = full-time/four year.

Table A.5. College Attendance by GPA and Income Terciles, PSID

	GPA tercile		
	Bottom	Middle	Top
Income terciles			
Top	0.745 (0.066)	0.823 (0.047)	0.914 (0.035)
Middle	0.679 (0.055)	0.761 (0.051)	0.770 (0.052)
Bottom	0.488 (0.047)	0.474 (0.049)	0.617 (0.063)

Notes: These results are based on the TA sample. All results are weighted.