Post-Secondary Schooling and Parental Resources: Evidence from the PSID and HRS

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**Abstract**

We examine the association between young adult post-secondary schooling and parental financial resources using two data sets that contain high quality data on parental resources, the Panel Study of Income Dynamics (PSID) and the Health and Retirement Study (HRS). We find that the association is 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 post-secondary schooling to completing a four year degree. Using the Transition to Adulthood (TA) supplemental to the PSID, we also find that financial resources strongly affect post-secondary schooling at all levels of high school achievement, and particularly for those at the highest level of achievement.

**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 post-secondary 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 post-secondary education can have important implications to the persistence of inequality across generations.[[1]](#footnote-1)

Despite the long-standing efforts to make higher education accessible, numerous studies have found a strong differences in college attendance by family income level, with these differences existing for students of all achievement levels (e.g., Smith, Young, 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 achievingstudents 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 post-secondary education and income, these patterns indicate an important avenue through which inequality is transmitted across generations.

In attempting to understand the mechanisms underlying the correlation between family resources and post-secondary enrollments, economists have frequently examined the role of credit constraints—the notion that some young adults may not have access to sufficient funds to obtain the desired level of schooling. Although early studies found little evidence that credit constraints affected college attendance in the 1980’s, studies examining more recent time periods have concluded that credit constraints are important for some.[[2]](#footnote-2) Other potential mechanisms that could lead to the positive correlation between family income and attendance are difference in tastes or ability that are correlated with financial resources, or even reverse causality—the possibilities 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 that, although they use data sets that contain detailed information about the child, they use data sets that contain much weaker information regarding the parents. For example, several prominent data sets rely on the child’s report of parental income, a measure which likely contains substantial measurement error. Those data sets that do interview parents directly often collect financial information years before or after the child is making the decision to attend college, missing any anticipated or unanticipated changes in resources that are most proximate to the attendance decision. Moreover, most data sets only collect information about the income of parents, but parental wealth could also play a 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? Do other parental characteristics matter after controlling for financial resources? And, how does the relationship between financial resources and college attendance 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 these initial families and their children. For a subsample of young adults in the PSID, we additionally make use of the Transition to Adulthood (TA) supplement, which includes additional information on the academic preparedness of the young adults. We supplement our PSID results with results from the Health and Retirement Study (HRS), a nationally representative survey of the population approximately ages 50 or older and their partners/spouses.

We find that both parental income and wealth have sizable and independent associations with college attendance, that these relationships persist throughout 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 completion of 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 low-income students in the top third of the GPA distribution have a lower probability of attending college than high-income students in the lowest GPA tercile. We conclude that the effect of familial resources can be powerful enough to offset differences in academic performance.

Our paper is organized as follows. In the first section we summarize briefly the large literature focusing on the role of financial status in affecting college attendance, noting the limits imposed by the available data. We then discuss the data we use to implement the analyses contained in this work. Section 3 presents our results for income and wealth, and section 4 examines how these estimated effects compare with the importance of high school GPA. The last section summarizes are findings and discusses the implications of our results.

**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 represent an important avenue through which inequality is transmitted across generations, 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 socio-economic backgrounds of those who attend college and those who do not.

Unfortunately, despite the centrality of measures of familial resources in these studies, the data sets on which they have relied contain far richer information on the children themselves than on the financial resources of the parents. For example, two data sets commonly used to examine college attendance, the High School and Beyond study (HSB) and the National Educational Longitudinal Study (NELS), have only a child’s report of his parents’ income, which undoubtedly contains substantial measurement error. Two other data sets, the National Longitudinal Study of Youth 1979 (NLSY79) and the National Longitudinal Study of Youth 1997 (NLSY97), interview parents to obtain information on family income, but do so only during the first wave of the panel. Because children were 14-22 years old at the beginning of the NLSY79 and 12-16 in the NLSY97, the reports of parental income could be several years away from when many of the children were making the decision to attend college. However, even an accurate and timely report of parental income still overlooks the fact that the ability of parents to pay for college could also depend on parental wealth. Of these widely used data sets, only the NLSY97 collects information about both parental income and wealth, but again, does so only at the initial interview.

Even with the limitations resulting for the data themselves, previous studies have shed important light on the relationship between child and family characteristics and college attendance. For example, using both the HS&B survey and the NELS, a National Center for Education Statistics (1997) report points to a strong positive relationship between college enrollment and the SES 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 in affecting college attendance has increased over this two-decade period (e.g., Belley and Lochner 2007, Bailey and Dynarski 2011, and Lovenheim and Reynolds 2011). Other studies have found that that these income gradients become flatter once one also controls for ability differences (e.g., Cameron and Heckman 1998 and Carneiro and Heckman 2002).

With respect to the role of wealth, Belley and Lochner (2007), use the first wave of the NLSY97 to find that wealth remains an important determinant of college attendance even after controlling for family income and demographic characteristics. Conley (2001) find similar results based on the 1984 PSID wealth supplement.[[3]](#footnote-3)

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 have found that credit constraints affect relatively few families.[[4]](#footnote-4) Similarly, Stinebrickner and Stinebrickner (2008), using a unusual institutional setting in which high education is nearly free, find that many students who drop out of school would continue to do so even if credit constraints were alleviated.[[5]](#footnote-5) In contrast, Brown, Scholz, and Seshadri (2012), relying on an identification strategy that involves later parental transfer behavior, finds a 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), “…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 GPA, allowing use to examine how the role of financial resources vary with student achievement.

**3. The Data**

In this section, we briefly discuss the main features of the PSID, our primary data source for this analysis. We focus on the PSID because it provides a representative 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 its young adults. We supplement these analyses with some similar descriptive work using the Health and Retirement Study (HRS). Although the HRS is a sample of individuals 50 and over, and thus provides a selected sample of children finishing high school (i.e., children with parents who were somewhat older than average at the child’s birth), it also contains very high quality income and wealth data and includes recent immigrants in its sampling frame, along with an oversample of individuals in heavily black and Hispanic areas.

**3.1. 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 thereafter. In each wave, the core PSID survey collects information on income, household structure, and the labor supply of the head and wife. Detailed information on wealth was collected in 1984, 1989, 1994, and in each survey beginning in 1999.

Using the core surveys, we select all 19- and 20-year olds in the years in which wealth was collected (1984, 1989, 1994, and biennially starting in 1999) through the 2009 wave.[[6]](#footnote-6) 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.[[7]](#footnote-7) 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 Supplement (CDS). This supplement included children ages 0 to 12 in 1997 and collected detailed information about their education and home environment. When the children in the CDS reached the age of 18 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 collects 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.

Using the TA supplement data, we select a sample of all young adults that graduate from high school and self-report their GPA and merge these data with the core survey data on parental resources. We are limited to high school graduates because, for the analysis using this subsample, we examine the relationship between GPA and college attendance and GPA is available only for graduates.[[8]](#footnote-8) These restrictions leave us with 646 young adults. We refer to this sample as our “TA Sample.”

While the PSID sampling frame of following a nationally representative sample from 1968 and their descendants provides an extraordinarily long panel, it remains the case that it is representative of the population in 1968, therefore is not necessarily representative of the current US population. Most notably, it lacks observations on recent immigrants (unless they marry into the PSID sample).[[9]](#footnote-9) We therefore supplement these analyses with data from the HRS.

**3.2. The Health and Retirement Study (HRS)**

The HRS began in 1992 as a biennial panel survey of individuals born between 1931 and 1941 and their spouses or partners. In 1998, the HRS was merged with a companion survey, the Asset and Health Dynamics Study (AHEAD), and two additional cohorts of respondents to create a sample that was approximately representative of the US population ages 50 or older. These individuals have been interviewed biennially, with additional cohorts added in 2004 and 2010 to retain a sample that was approximately representative of the 50 and older population 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 the income of each adult child’s own family, his schooling level, marital status, and cash transfers between the parents and child.[[10]](#footnote-10)

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 whose had at least one parent age 50 or older when they graduated from high school.

**3.3. Issues when Analyzing Both Data Sets**

In both data sets, our measure of educational attainment of the children comes from reports of the parents. Importantly, these questions ask about whether the young adult is “in school” and the highest grade completed.[[11]](#footnote-11) Thus, our primary outcome is most appropriately interpreted as whether the young adult is obtaining *any* post-secondary schooling, although we often simplify our terminology by discussing our results as if the young adult is 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 19-20 year olds in that survey have a household head (typically a parent) that is over the age of 50. Moreover, because higher SES parents tend to be older when their children are born, we will have a sample that is more likely to attend college than would a sample of randomly drawn young people in this age group. Again using the PSID, we find that 41 percent of children who attend college have a household head over the age of 50, but only 28 percent of children who do not attend college do. Although 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 data sets are not directly comparable. We view the results from the HRS as supplemental to our main PSID analysis providing a robustness check on our results and allowing us to examine behavior of Hispanics.

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 identifier when analyzing the PSID, but do so when analyzing the HRS.

**4. Family Financial Resources and Attending College**

Our analyses focus on three questions. How do financial resources relate to college attendance? How important are other parental characteristics such as schooling after controlling for these resources? And, how does the relationship between financial resources and college attendance vary with high school achievement?

**4.1. Family Resources and College Attendance**

We begin by pooling the 19-20 years olds in nine PSID waves and dividing them into those who were attending college (or, more accurately, post-secondary schooling) 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 attend college come from households that are more likely to be two-parent household (0.78 versus 0.62) and have a head that is older (49.2 years old vs. 47.2), more educated (13.3 completed years vs. 11.8), and less likely to be black (0.14 vs. 0.22). We also find that parental financial resources are substantially greater for attendees. For example, the median household income for parents of attendees is approximately $86,000, but is only $56,000 for non-attendees. The absolute gaps 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 entire income (panel A) and wealth (panel B) distributions. Each panel plots the relationship between college attendance and the financial resource measure using a local regression in order to demonstrate in a flexible manner how attendance varies over the entire income or wealth distribution (labeled “Local”).[[12]](#footnote-12) In addition, because income and wealth are correlated with each other and with the other observable characteristics shown in Table 1, we show these attendance/financial resource relationships based on a logistic parametric model that jointly controls for both measures of financial resources entered as a quartic. We do so with each financial measure alone (“Quartic”) as well as in conjunction with the other financial measure and observable characteristics (labeled “Quartic with X’s”).[[13]](#footnote-13) We draw vertical lines at the 10th, 25th, 50th, 75th, and 90th percentiles to focus our discussion.[[14]](#footnote-14)

As panel A 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 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 when moving from the 75th to the 90th percentile (from $109,200 to $155,500). Thus, we estimate that each additional $10,000 in income between the 10th and 25th percentiles is associated with an increase in college attendance of 4.3 percentage points, while 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 enormous differences in the relevant income levels.

The relationship between college attendance and wealth, shown in panel B, also shows a strong positive relationship, although one that flattens sooner than the attendance/income relationship. 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.

Turning to the parametric specifications, it readily can be observed that the quartic specifications without controls (solid line) match the non-parametric 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]](#footnote-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 relationship is dampened substantially. The finding that the income relationship is dampened reflects the fact that income and wealth are correlated, as expected. Despite this, both measures remain predictive of college attendance, implying that they each contain some independent information about the role of financial resources.

*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 (an age at which most people have completed their education) in the final year of our data. We then examine separately those individuals who were enrolled in college at ages 19/20 and completed at least four years of college (although not necessarily with a bachelor’s degree) versus those individuals who were enrolled at ages 19/20 and completed less than four years of college.[[16]](#footnote-16) We present these results in Figure 2, showing just the local regression results.

The top panel plots the relationship between three attendance outcomes and income for our restricted sample: attended at 19/20 (the dotted line), attended at 19/20 and completed less than 4 years of college (solid line), and attended at 19/20 and completed at least 4 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.[[17]](#footnote-17) 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 less than 4 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 less than 4 years.

The relationship between these three attendance outcomes and wealth are shown in the lower panel 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 4 years of college and wealth is largely parallel, although the relationship between completing less than 4 years and wealth is somewhat 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.[[18]](#footnote-18)

*HRS Results*. We repeat our analysis thus far using our HRS sample, and the similarities with the PSID are striking. Except for the difference in the age of the 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 similar. For example, there are large differences between the attendees and non-attendees in their parental household structure, parental education, and parental 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.

In addition, we find that the relationships between attendance and financial resources illustrated in Figures 3 and 4 to be very similar to the PSID results in Figures 1 and 2. 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 3). 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 4). The strong similarity between the results for these two very different data sets suggests that are findings are broadly applicable.

**4.2. Other Socio-demographic Characteristics and College Attendance**

Tables 1 and 2 demonstrate the well-known associations between college attendance and many socio-demographic 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. Again, we specify college enrollment to be functions of a quartic in income and wealth when they are included. We first estimate the regression model with just the socio-demographic variables, then enter income (as a quartic) to replicate the most common controls in the literature, and then we add wealth to see 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 X’s” curves in Figures 1 and 3.

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 percentages points less likely to attend college when just standard demographics are included in the model (column 1). This difference declines to 6.1 percentages 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 vs. 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’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 data sets. 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.

The last characteristic we examine is the race / ethnicity of the parent. After controlling for income and wealth, coming from a household headed by black parent has no effect on enrollment in either the PSID or the HRS. While we can only include Hispanic ethnicity 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.[[19]](#footnote-19)

**4.3. Financial Resources and High School Achievement**

Our results thus far suggest that parental financial resources play an important role in the college attendance decision of the young adult, but of course, one would also 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 completedhigh school, our analysis is limited to those respondents. Table 1 provides descriptive statistics for this sample.

In Figure 5, we examine how several college attendance outcomes vary with income by GPA tercile. We divide GPA and financial resources by tercile rather than, say, quartile because of our small sample sizes. We present results based on logit specifications with income entered 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 the appendix table.

Panel A of Figure 5 shows the results for whether the young adult is attending college at ages 19 or 20, the same outcome examined in Figure 1; college attendance rates are higher when compared to those in the previous sections because our TA sample only 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 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.[[20]](#footnote-20)

In the remaining panels of Figure 5, we look instead at fulltime attendance (panel B) and fulltime/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 fulltime 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 bottom GPA tercile.[[21]](#footnote-21) 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, fulltime 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 fulltime attendance at a 4-year institution.

Finally, in Figure 6, we show the robustness of our results for any attendance to a variety of alternative specifications Panel A1 of Figure 6 replicates the results from Panel A of Figure 5, 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 that these initial increases and later declines are somewhat steeper than what is in the underlying data. Panels A2 and B2 are similar to B1 and B2, 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 provide evidence about the relationship between post-secondary 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 post-secondary schooling, or college attendance, of their children is pervasive. The association is strong and fairly constant between the 10th and 90th percentile of the income distribution and between the 10th and 75th percentile of the wealth distribution, and holds even when we control for both financial measures simultaneously and for several other parental characteristics thought to effect schooling outcomes. Not only is there a strong association between resources and post-secondary schooling, but there is also a strong association between resources and completingfour years of college among those who do attend. Finally, this relationship can be observed at all levels of high school achievement as measured by high school GPA. For example, for all terciles of GPA, we find that post-secondary schooling increases with parental resources. This association is strong enough that the rate of college attendance for the highest resource/lowest achievement young adults was substantially higher than for the lowest resource/highest achievement young adults.

We also examined the associations between post-secondary schooling and other socio-demographic characteristics with empirical models that jointly included the socio-demographic characteristics and our high quality measures of income and wealth. Income and wealth continued to be significant predictors of post-secondary schooling, as did the education level of the head. The negative association with female headship was substantially reduced. We also found no significant difference in attendance between young adults who come from black- versus white-headed households when financial resources were included in the model, and children from Hispanic were more likely to obtain post-secondary schooling.

It is important to note that our results are only suggestive regarding the important economic question regarding the extent to which credit constraints affect post-secondary 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 are taken into account, nor have we modeled the decision to attend college. However, a simple model of credit constraints is likely to be insufficient to explain our findings. Specifically, we find that attendance continues to increases 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 that 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 wealths in the PSID and HRS) levels. Perhaps even more suggestive were our results analyzing financial resources and GPA jointly. Especially for the top two terciles of GPA, income and wealth had a consistent effect on 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.

Despite the insights provided by our analysis, several important shortcomings exist. 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. As recent work suggests, there are likely to be important difference in college that the child attends (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 association between parental financial resources and college attendance and completion is strong. Given the established, high returns to education, particularly those to completing a 4-year college degree, these associations represent an important avenue through 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 an avenue worth exploring.

**Appendix**

Appendix Table 1: Point Estimates and Standard Errors for Select Quantities

from Figures 1 and 4

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
|  | 10th | 25th | 50th | 75th | 90th |
| Figure 1: PSID |  |  |  |  |  |
| Income ($1000s) | 21.3 | 41.7 | 69.4 | 109.2 | 155.5 |
| Attendance at income percentile  | .307(.016) | .395(.012) | .500(.013) | .627(.017) | .778(.024) |
| Wealth ($1000s) | 0 | 15.5 | 82.1 | 219.7 | 505.7 |
| Attendance at wealth percentile | .313(.017) | .359(.012) | .488(.015) | .663(.024) | .617(.052) |
|  |  |  |  |  |  |
| Figure 3: HRS |  |  |  |  |  |
| Income ($1000s) | 12.0 | 32.6 | 66.7 | 120.8 | 205.2 |
| Attendance at income percentile | .388(.019) | .464(.014) | .613(.015) | .778(.020) | .908(.025) |
| Wealth ($1000s) | .6 | 33.6 | 143.0 | 369.9 | 859.5 |
| Attendance at wealth percentile | .358(.020) | .443(.015) | .642(.020) | .768(.028) | .914(.049) |
|  |  |  |  |  |  |

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

Appendix Table 2: Income and Wealth Coefficients for Table 3

|  |  |  |  |
| --- | --- | --- | --- |
|  | PSID Full Sample |  | HRS |
|  | (1) | (2) | (3) |  | (1) | (2) | (3) |
|  |  |  |  |  |  |  |  |
| Income / 102 |  | 3.1(0.4) | 3.2(0.4) |  |  | 2.9(0.3) | 2.1(0.3) |
| Income square / 104 |  | -7.5(1.4) | -9.9(1.8) |  |  | -7.2(1.2) | -6.0(1.2) |
| Income cubic / 106 |  | 5.1(1.3) | 8.9(2.0) |  |  | 6.4(1.4) | 5.8(1.4) |
| Income quartic / 109 |  | -9.8(2.9) | -19.3(4.6) |  |  | -17.6(4.5) | -16.7(4.6) |
| Wealth / 103 |  |  | 1.8(0.4) |  |  |  | 3.5(0.5) |
| Wealth square / 106 |  |  | -3.0(1.0) |  |  |  | -15.4(2.6) |
| Wealth cubic / 109 |  |  | 1.4(0.6) |  |  |  | 20.5(4.2) |
| Wealth quartic / 1013 |  |  | -1.9(0.9) |  |  |  | -80.8(19.1) |
|  |  |  |  |  |  |  |  |

Notes: These coefficients are from the regressions that are specified in Table 3.

Appendix Table 3: Logit Coefficients for Figure 5

|  |  |  |  |
| --- | --- | --- | --- |
|  | Panel A | Panel B | Panel C |
|  |  |  |  |
| Middle GPA tercile | -.059(.550) | -.834(.572) | -.382(.466) |
| Top GPA tercile | .047(.650) | -.653(.520) | -.572(.525) |
| Income | .006(.003) | .002(.003) | -.001(.003) |
| Income \* Middle GPA tercile | .004(.006) | .014(.007) | .010(.004) |
| Income \* Top GPA tercile | .008(.008) | .016(.006) | .016(.005) |
|  |  |  |  |

Notes: These are the logic coefficients that are used to construct Figure 5. All results are weighted.

Appendix Table 4: Point Estimates and Standard Errors for Select Quantities

from Figure 5

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | 25th | 75th |
| Income ($1000s) | 52.3 | 125.6 |
| Any attendance, bottom GPA tercile | .572(.052) | .674(.057) |
| Any attendance, middle GPA tercile | .604(.052) | .754(.059) |
| Any attendance, top GPA tercile | .682(.058) | .857(.047) |
| FT attendance, bottom GPA tercile | .454(.051) | .494(.054) |
| FT attendance, middle GPA tercile | .427(.055) | .707(.072) |
| FT attendance, top GPA tercile | .495(.059) | .784(.048) |
| FT/4 attendance, bottom GPA tercile | .309(.046) | .286(.046) |
| FT/4 attendance, middle GPA tercile | .336(.047) | .480(.053) |
| FT/4 attendance, top GPA tercile | .365(.056) | .622(.056) |

Notes: These attendance rates are based on the logit regression specifying income linearly and interacted with each GPA tercile.

Appendix Table 5: College attendance by GPA and income terciles, PSID

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  | GPA tercile |  |
|  | Bottom | Middle | Top |
| Income terciles |  |  |  |
| Top | .745(.066) | .823(.047) | .914(.035) |
| Middle | .679(.055) | .761(.051) | .770(.052) |
| Bottom | .488(.047) | .474(.049) | .617(.063) |
|  |  |  |  |

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

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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 | .51 | .49 |  |  | .70 | .30 |  |
|  |  |  |  |  |  |  |  |
| Student characteristics |  |  |  |  |  |  |  |
| Male | .46 | .55 | \*\*\* |  | .46 | .56 |  |
| High school GPA |  |  |  |  | 3.26 | 3.10 | \*\* |
|  |  |  |  |  |  |  |  |
| Parent characteristics |  |  |  |  |  |  |  |
| Married HH | .78 | .62 | \*\*\* |  | .75 | .56 | \*\*\* |
| Single female HH | .19 | .33 | \*\*\* |  | .21 | .40 | \*\*\* |
| Head age | 49.2 | 47.2 | \*\*\* |  | 49.9 | 47.2 | \*\*\* |
| Head education | 13.3 | 11.8 | \*\*\* |  | 13.2 | 12.1 | \*\*\* |
| Head black | .14 | .22 | \*\*\* |  | .12 | .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 | \*\*\* |

NOTE: 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 PCE. All tabulations are weighted. The “Diff.” column contains the significance level for a two-tailed test for whether the characteristics are different: \* is .05, \*\* is .01, and \*\*\* is .001.

Table 2: Household characteristics by college attendance of 19-21 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 HH | 0.79 | 0.68 | \*\*\* |
| Single Female HH | 0.12 | 0.18 | \*\*\* |
| Head age | 54.6 | 54.6 |  |
| Head education | 14.2 | 11.3 | \*\*\* |
| Head black | 0.10 | 0.16 | \*\*\* |
| Head Hispanic | 0.08 | 0.15 | \*\*\* |
| Income |  |  |  |
|  25th  | 47,564 | 19,108 | \*\*\* |
|  Median | 87,478 | 41,475 | \*\*\* |
|  75th  | 153,009 | 73,085 | \*\*\* |
| 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 PCE. 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: \* is .05, \*\* is .01, and \*\*\* is .001.

Table 3: Regressions of College Attendance on Parental Characteristics

|  |  |  |  |
| --- | --- | --- | --- |
|  | PSID Full Sample |  | HRS |
|  | (1) | (2) | (3) |  | (1) | (2) | (3) |
|  |  |  |  |  |  |  |  |
| Head single female | -.141(.019) | -.061(.021) | -.059(.021) |  | -.068(.023) | .019(.024) | .020(.024) |
| Head education | .046(.003) | .032(.003) | .031(.004) |  | .056(.003) | .043(.003) | .041(.003) |
| Head black | -.010(.022) | .017(.022) | .027(.022) |  | -.065(.025) | -.027(.024) | -.005(.025) |
| Head Hispanic |  |  |  |  | .070(.029) | .090(.028) | .093(.028) |
|  |  |  |  |  |  |  |  |
| Income | No | Yes | Yes |  | No | Yes | Yes |
| Wealth | No | No | Yes |  | No | No | Yes |
|  |  |  |  |  |  |  |  |
| Dependent mean | .514 | .514 | .514 |  | .624 | .624 | .624 |
| R-square | .129 | .151 | .160 |  | .176 | .207 | .221 |

Notes: All results are weighted. Other regressors included are age category indicators, wave indicators, and young adult gender. Financial measures are included as a quartic.

Figure 1: College Attendance versus Income and Wealth, PSID



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. The “Quartic” curves include a quartic in the financial resource being considered. The “Quartic with X’s” curves include a quartic in both financial resources and the additional covariates listed in the text.

Figure 2: College Attendance and Completion by Income and Wealth, PSID



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 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.

Figure 3: College Attendance versus Income and Wealth, HRS



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. The “Quartic” curves include a quartic in the financial resource being considered. The “Quartic with X’s” curves include a quartic in both financial resources and the additional covariates listed in the text.

Figure 4: College Attendance and Completion by Income and Wealth, HRS



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 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.

Figure 5: Type of College Attendance versus Income by GPA Tercile, PSID



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: Sensitivity of GPA Tercile Results, PSID



Notes: These results are based on the 646 young adults in the PSID TA Sample. Each panel is based on a logit. Panels 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.

1. Numerous recent papers have examined inequality and the persistence of inequality, including Pickety and Saez (2003); Saez, Kopczuk and Song (2010); and Chetty, Hendren, et al. (2014). [↑](#footnote-ref-1)
2. See Lochner and Monge-Naranjo (2012) for a recent review of the credit constraint literature. [↑](#footnote-ref-2)
3. This study is perhaps the closest to ours. We build on it by using almost 25 years of additional PSID data, including data on young adult GPA, expectations, and aspirations from the Transition to Adulthood 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. [↑](#footnote-ref-3)
4. For example, Cameron and Taber (2004) and Keane and Wolpin (2001) use the NLSY79, and Johnson (2011) uses the NLSY97. [↑](#footnote-ref-4)
5. Stinebrickner and Stinebrickner (2008) study the drop-out 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 well vary with economic status. [↑](#footnote-ref-5)
6. The original PSID sample was comprised of two components, a random sample of the US 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. [↑](#footnote-ref-6)
7. We define the parent of these young adults to be the last head of household (looking backwards up to four years and including the current wave) to identify the young adult as being their child or step-child. 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. [↑](#footnote-ref-7)
8. Given high school dropouts tend to have low GPA, the attendance/GPA gradient would be steeper if they were included. [↑](#footnote-ref-8)
9. Although the PSID has added Hispanic subsamples since its initial sample was selected, the requisite data does not exist for these newer respondents. [↑](#footnote-ref-9)
10. See Haider and McGarry (2012) for an analysis of educational transfers from parents to children in the HRS. [↑](#footnote-ref-10)
11. Based on this wording, it is unclear the extent to which parents should report various certificate programs or non-degree activities as school enrollment or count them in the total of number of years of education. [↑](#footnote-ref-11)
12. For each local regression, we use a local linear regression with an Epanchikov kernel and the asymptotically optimal constant bandwidth (the “rule of thumb” bandwidth). For the income plot in Figure 1, for example, this bandwidth is approximately $14,000. [↑](#footnote-ref-12)
13. 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. [↑](#footnote-ref-13)
14. The point estimates and standard errors for these attendance rates are in the appendix. [↑](#footnote-ref-14)
15. Empirically, a quadratic in income matches the non-parametric attendance/income relationship quite well. However, a quadratic in wealth fares less well, exhibiting too steep of an initial increase and too steep of an eventual decline relative to the non-parametric relationship. For consistency, we use a quartic specification for both income and wealth. [↑](#footnote-ref-15)
16. 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 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 extremely small. [↑](#footnote-ref-16)
17. This line differs from the analogous line in Figure 1 because it is based on a sample of those observed through age 25. [↑](#footnote-ref-17)
18. Unfortunately, our Full Sample does not allow us to analyze attendance versus completing a two-year degree or to consider part- versus full-time attendance. However, our TA Sample does, and we turn to these outcomes in the next section. [↑](#footnote-ref-18)
19. The fact that family background differences can largely account for racial and ethnic differences in schooling has been documented by others. For example, see Kane (1994). [↑](#footnote-ref-19)
20. To ensure that 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 3 GPA terciles and income terciles. See the appendix for the tabulations. [↑](#footnote-ref-20)
21. 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. [↑](#footnote-ref-21)