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Equal Opportunity for All?

Parental Economic Resources and Children's Educational Achievement

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Equal Opportunity for All?: Parental Economic Resources and Children's Educational Achievement

We investigate the roles of parents' economic resources in children's educational attainment and test the liquidity constraint hypothesis. Using data from the Panel Study of Income Dynamics, we find that parents' liquid assets have significantly positive associations with years of schooling, high school graduation, and college attendance. We find that the relationship between liquid assets and education is non-linear: children from negative liquid asset households have a higher chance of finishing high school but a lower chance of graduating college than those from zero liquid asset households. Results suggest that we should consider assets when seeking to understand educational mobility.

Key words: *liquidity constraint hypothesis; education; assets (wealth); economic resources; cohort*

Education is key to social and economic success and serves as a major mechanism for intergenerational transmission of socioeconomic status (Blau and Duncan 1967; Haveman and Wolfe 1995; Kane 2004; Mare 1992). Social scientists and policy makers have shown a continual interest in educational mobility, reflecting its importance in social stratification. Parents' economic resources, especially family income, have been a major focus of research on intergenerational educational mobility. Several empirical studies have identified family income as one of the strongest predictors of children's educational outcomes (Haveman and Wolfe 1995; Kane 2004).

Researchers, however, have not reached agreement on the mechanisms by which parents' economic resources affect their children's educational attainment. The liquidity constraint hypothesis argues that lack of economic resources deters children's progress in the educational system because low-income children have difficulty financing a college education. That is to say, low-income families do not have sufficient income or assets to pay for their children's tuition and living costs, and an imperfect credit market may prevent parents from borrowing to pay these expenses (Haveman and Wolfe 1995; Kane 1996). However, other researchers claim that short-term liquidity constraints are not as obstructive as the liquidity constraint hypothesis suggests (Cameron and Heckman 1998; Carneiro and Heckman 2002). Instead, they attribute educational gaps between high- and low-income children to the long-term effects of parental resources on general child development (e.g., cognitive skills) and college readiness (Cameron and Heckman 1998; Carneiro and Heckman 2002).

Researchers from both sides have examined the association between parents' income and children's educational outcomes to test the liquidity constraint hypothesis (Cameron and Heckman 1998;

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Carneiro and Heckman 2002; Christian 2007; Kane 1996 and 2004; Keane and Wolpin 2001). They have paid little attention to parents' wealth, however, especially their liquid assets, although assets may be a good indicator of a household's liquidity level for financing their children's education. Personal savings reduce or even eliminate the need to borrow, while tangible assets (e.g., a house) improve a household's access to the credit market by providing collateral. Given that household wealth is not perfectly correlated with its income (Weisbrod and Hansen 1968; Wolff 1990), we should consider parents' assets in order to advance current debates on liquidity constraints and expand our understanding of educational mobility in general.

Recent theoretical and empirical studies suggest that assets may be a more stable indicator of socioeconomic status and a better measure for socioeconomic inequality than income (Conley 1999; Keister 2000; Nam, Huang, and Sherraden, forthcoming; Oliver and Shapiro 1990; Shapiro 2004; Spilerman 2000). First, asset distribution, measured either with net worth or with liquid assets, is much more skewed than income distribution. In 2001, the top 1 percent of households owned 33.4 percent of the nation's wealth while the bottom 40% held only 0.3 percent. The comparable statistics for income are 20 percent and 10 percent respectively (Wolff 2004). Second, assets are a more stable form of economic resources than income. A household's income can change dramatically when its breadwinner loses a job or leaves the household, while assets often change much more slowly even during economic crises (Nam, Huang, and Sherraden forthcoming; Oliver and Shapiro 1990; Spilerman 2000). For these reasons, an increasing number of studies have examined the effects of asset inequality on social stratification in the United States (Conley 1999; Oliver and Shapiro 1995; Shapiro 2004; Spilerman 2000).

This study examines the association between parents' economic resources and children's educational attainment with a focus on parental assets. This study contributes to the literature by examining more diverse forms of economic resources than existing studies: we include three types of assets (net worth, liquid assets, and home ownership) in our analyses, as well as parents' income, and investigate whether different measures of economic resources produce distinct results. In addition, we test whether the effects of parents' liquid assets are linear by using a categorical measure of liquid assets consisting of high, modest, zero, and negative liquid assets. We pay special attention to negative liquid assets (household debts excessive of its liquid assets) because of its complicated relationship with the credit market. On one hand, negative liquid assets may indicate a household's access to the credit market: a household was able to borrow in the past to smooth consumption at the time of economic difficulties. On the other hand, negative liquid assets reflect future financial constraints because a households that are already in debt may have difficulty securing a loan in the future (Gruber, 2001).

Background

Existing evidence unequivocally shows that parents' economic resources, especially income, are major determinants of children's educational achievement (Haveman and Wolfe 1995; Kane 2004; Neckerman and Torche 2007). Two different theoretical perspectives offer distinct explanations of this strong association: short-term liquidity constraints and long-term association between economic resources and children's cognitive skills and intellectual ability.

The short-term liquidity constraint perspective argues that education, especially college education, requires considerable amounts of investment. Poor households are less likely than their high- or

middle-income counterparts to have savings for their children's future education because their income level barely covers their current consumption needs. In a perfect credit market, low-income children would be able to borrow for their education against their future earnings, but in the current credit market where lenders are wary of risks, credit for educational costs is not easily available to low-income children. Thus, liquidity constraints are likely to keep low-income children from accomplishing their full educational potential (Becker 1964; Becker and Tomes 1979; Kane 1995 and 1996).

Empirical evidence for the liquidity constraint perspective includes price sensitivity toward higher education among youth, particularly low-income youth. Kane (1996) shows that high school graduates tend to enter college later in high-tuition states (measured by average tuition of public colleges and universities in a state) than their peers in states with lower tuition levels. These effects are strongest among blacks and low-income whites. Because delays in college entry defer the benefits and costs of higher education and the marginal impacts of these delays must be negative among those who enter college, Kane concludes that the negative correlation between tuition and timing of college entry is consistent with the hypothesis of credit constraints. Other studies also show that low-income children's college enrollment rates are more sensitive to college costs than high- and middle-income children, using state college tuition (Kane 1994 and 1995) and geographic proximity to a college (Card 1995). In addition, Ellwood and Kane (2000) show that differing college enrollment rates by family income do not completely disappear when children's academic preparation is controlled for, although a large portion of the association between parents' income and children's educational attainment is explained by this variable. A recent study (Christian, 2007) shows that low-income children are more likely to attend school during an economic boom, when they are more likely to get financial assistance from family, while upper-income children are more likely to attend school during economic recession because the opportunity costs of education are lower. Different responses to business cycles by family income are consistent with the liquidity constraint hypothesis.[1]

Not everyone, however, agrees with the liquidity constraint argument. Some researchers argue that a strong relationship between parents' income and children's educational attainment in existing studies may be an artifact of their correlations with other unobserved characteristics, especially with children's cognitive skills. According to this position, high-income parents tend to have better cognitive skills and intellectual ability than their low-income counterparts, which contribute at least partially to their superior economic status. At the same time, their cognitive skills are likely to help them prepare their children for higher education. In summary, a strong association between parental income and children's education is spurious and cannot be attributed to the short-term liquidity constraint faced by low-income households (Cameron and Heckman 1998; Carneiro and Heckman 2002; Keane and Wolpin 2001).

Using data from the National Longitudinal Study of Youth (NLSY), Cameron and Heckman (1998) find that statistical significance of the family income effect disappears or dramatically weakens at

[1] Christian (2007) also finds that responses to business cycles do not differ by parents' home ownership status. Since the liquidity constraint hypothesis expects home owners' children's college enrollment to be counter-cyclic and that of renters' children to be pro-cyclic, similar patterns of response between these two groups do not support the hypotheses. Christian concludes that his empirical analyses produce mixed evidence for the liquidity constraint hypothesis.

every stage of educational attainment, after controlling for the cognitive ability measure (Air Force Qualifying Test score). Using the same data and taking into account the roles of cognitive ability in educational attainment, Carneiro and Heckman (2002) estimate that only 8% of youth have their education constrained by lack of access to the credit market. Keane and Wolpin (2001) suggest that relaxing credit constraints would not improve low-income children's educational attainment. According to their simulation results, allowing students to borrow enough to cover their educational costs would not have any effect on their educational attainment because it would affect students' consumption and work hours but would not encourage students on the margins to continue their education.

Despite continued interest in the roles of liquidity constraints in educational attainment, little research has been done about the effects of parents' assets. The lack of attention is puzzling, considering the key role of household assets in financing education. Income is usually insufficient to cover higher education, even among high-income households, and assets often fill gaps between college expenses and current income. Assets can prevent children from dropping out of school by providing an economic buffer when their families face economic loss or unemployment. Home ownership in a decent neighborhood and good school district is likely to increase children's chance of graduating high school and entering college (Conley 1999; Keister 2000; Oliver and Shapiro 1990; Shapiro 2004; Sherraden 1991). In addition, asset ownership has a close tie to the accessibility of credit. Liquid assets reduce households' need to borrow for education, and physical properties facilitate borrowing by providing collateral to lenders. Households with a larger amount of cash and savings borrow less for education, whereas those with larger home equity tend to borrow greater amounts (Cha, et al. 2005).

A small number of existing studies have examined the roles of parental assets in children's educational attainment. Using a sample of children of white mothers in Detroit area, Axinn, Duncan, and Thornton (1997) find liquid assets and home equity have significantly positive associations with levels of education, after controlling for parental income and other family backgrounds. Conley (2001) focuses on parents' net worth with a sample of individuals ranging in age from 8 to 19 in the 1984 PSID data. He finds that parents' net worth significantly increases children's chances of college enrollment and graduation after family income and other family background variables are controlled for. He also finds that the fit is significantly better in a model with two separate measures of income and net worth, as opposed to a combined measure of these two variables. Based on these findings, Conley (2001) concludes that "wealth is not analytically or conceptually reducible to an equivalent income stream" (p.68). Zhan and Sherraden (2003) show significant effects of liquid assets on high school graduation among children from female-headed households. Children from households with liquid assets of $3,000 or more are significantly more likely to graduate from high school than those without any savings. This positive effect is mediated at least partly through its effect on mothers' expectations of their children's education. The study finds that home ownership does not make a significant impact on high school graduation rates (Zhan and Sherraden 2003). By contrast, other studies show home ownership positively affecting children's educational attainment (Green and White 1997; Kane 1994).

Invaluable as they are, these previous studies are not free from limitations. First, these studies do not examine whether different forms of assets have distinct effects on educational attainment. As described above, Conley (2001) relies on net worth while Axinn, Duncan, and Thornton (1997) and Zhan and Sherraden (2003) use liquid assets and housing assets. Two other studies (Green and

White 1997; Kane, 1994) focus on home ownership. No study directly investigates whether overall asset holdings (net worth) have distinct effects from liquid asset holdings or home ownership. Different forms of household assets, however, may represent different levels of liquidity. Net worth is considered a summary indicator of total available economic resources to the household and a comprehensive measure of long-term economic well-being since it includes every type of asset. Liquid assets are easily converted to cash and therefore readily available for educational expenses. Tangible assets, on the other hand, cannot be used directly for education but can be used as collateral in the credit market (Nam, Huang and Sherraden forthcoming; Spilerman 2000; Wolff 2002). Home value also affects educational attainment through its indirect effects on the quality of public schools and neighborhoods (Conley 1999, Gruber 2001; Oliver and Shapiro 1995; Shapiro, 2004).

Furthermore, existing studies do not closely investigate the impact of negative liquid assets (household debt exceeding savings), despite its distinctive relationship with the credit market. On the one hand, negative liquid assets indicate that a household borrowed to enable its consumption in times of economic hardship. Accordingly, households with negative liquid assets may be in a better position than those with zero liquid assets, who may not be able to access the credit market when it is needed. On the other hand, negative liquid assets also indicate economic vulnerability in the future. Because lenders are often reluctant to provide loans to households with large unsecured debt, households with negative liquid assets may experience difficulties in relaxing liquidity constraints and financing their children's education through the credit market (Gruber, 2001).

This study looks at parental assets as a way to investigate the associations between economic resources and educational attainment. We categorize parents' assets into net worth, liquid assets, and home ownership to see whether different types of assets have distinct effects. In addition, we create a categorical measure of liquid assets to test the assumption that the effects of liquid assets may not be linear and that households with negative liquid assets may be better off than those with zero liquid assets due to their ability to borrow. This study also uses more recent data than a previous study that measures children's education outcomes in 1995 (Conley, 2001). We employ education outcome variables measured in 2003 and 2005. Findings of this study expand our knowledge on economic inequality and social stratification by focusing on the role of wealth in educational mobility, which has received little attention despite the fact that wealth is more unequally distributed than income.

Methods

Data and Sample Selection

This study uses individual data from the Panel Study of Income Dynamics (PSID). The PSID first interviewed a nationally representative sample of 4,802 families in 1968 and continued to collect data from the same families until 1997 and every two years thereafter. The PSID also followed children after they left their parents' house. The PSID provides rich information on individual and household characteristics, including educational achievement, household income, and household composition (Hill 1992). The PSID collected household wealth data (including assets and liabilities) every five years between 1984 and 1999, and every two years thereafter .The wealth data in the PSID is considered to be of higher quality than other survey data (Curtin, et al. 1989; Ratcliffe, et al. 2007). The PSID is also considered an ideal dataset for studying intergenerational mobility because data

was collected directly from the parents when their children were young, and directly from the children after they had left their parents' households. Accordingly, the PSID is less likely to be contaminated with measurement errors due to memory problems or inadequate information than data sets that rely on children's own retrospective reports on their childhood experience (Hill 1992; Ratcliffe, et al. 2007; Solon 1992). The PSID sample is designed to be representative of the non-immigrant U.S. population as a whole, when weighted (Hill 1992). In addition to individual data from the PSID, this study uses state unemployment rate data collected by the Bureau of Labor Statistics.

The sample in this study consists of those who were 15-17 years old in 1994. We select an age range of 15-17, narrower than previous studies (Conley 2001; Zhan and Sherraden 2003), because parents' economic resources at earlier ages may not measure the level of liquidity constraints at the critical stages: high school graduation, college entrance, and college graduation. We include only whites and African Americans in our sample because the PSID, due to its 1968 sampling design, does not have enough cases for other racial and ethnic groups. We exclude those who have a missing value for either dependent or independent variables in the basic model of analysis. Because the PSID imputes missing cases for its major economic variables (e.g. income and net worth), the number of deleted cases due to missing information is small (N=27). The quality of PSID imputation has been determined reliable and accurate (Kim and Stafford 2000; Ratcliffe at al. 2007).

Measures

The outcome measure of this study is children's educational attainment observed at age 26 or 27. We use information collected in 2003 for those who were 17 in 1994 and in 2005 for those who were 15 or 16 years old. Because the PSID did not collect data in 2004, we cannot use educational outcome measures at age 26 for those who were 16 years old in 1994. We use one continuous and three dichotomous measures of educational attainment. A continuous measure indicates the total number of years of schooling an individual has obtained. In creating this measure, PSID assigns the number of schooling to those who have not obtained a high school diploma or GED. For those with high school diploma or GED, PSID constructs this variable by adding the number of years in college. To those who have attained some postgraduate education, PSID allocates a value of 17. In addition to the years of schooling variable, we construct three dichotomous measures: high school graduation (1 for 12 or more years of schooling and 0 otherwise), college attendance (13 or more years of schooling versus others),[2] and college graduation (16 or more years of schooling versus fewer

[2] Because of limitations in PSID individual-level data, we cannot differentiate those who never attended college after high school graduation from those who attended but dropped out of college before they had finished the first year. Both of these categories are grouped into 12 years of education. Household head's and spouse's education variables from PSID family data contain more accurate information: those who attended college but did not finish the first year have a value of 1 for college attendance but 0 for the number of years in college. However, these variables do not provide any information on those who were not household heads or spouses at the time of our adulthood observation (18 % of the sample). Since we cannot assume that a selection process into head/spouse status is random, we decided not to exclude the latter from our sample and use education variables created based on information from the individual dataset.

years).[3] These three outcome variables represent three sequential transitions in the process of formal educational attainment.

The major independent variables in this study are household assets and family income during childhood. As mentioned above, this study employs various types of household assets to investigate whether they have distinct effects on children's educational attainment: liquid assets, home ownership, and net worth, using variables in 1994 family wealth supplement data. Liquid assets are defined as the sum of financial assets (the amount of money in saving and checking accounts plus the total value of stocks, mutual funds, and investment trust) minus unsecured debt (the sum of credit card charges, student loans, medical and legal bills, and loans from relatives). Unsecured debt does not include secured debt such as home mortgage and vehicle loans. The home ownership variable is a dichotomous measure that assigns a value of 1 to households that report owning houses and a value of 0 otherwise. This study uses homeownership instead of home equity or home value that are available in PSID data because respondents tend to overestimate their home values and therefore home equity (Ratcliffe et al. 2007).[4] The net worth variable is constructed by adding the amounts of liquid assets, home equity, value of other real estate, vehicle equity, business or farm assets, and other assets. A family income variable is created by averaging three years of childhood family income (1992, 1993, and 1994); at least 3 years of income data is necessary for studying intergenerational mobility because income fluctuation over time must be accounted for (Conley 2001; Solon 1992).

This study also creates demographic and household characteristics, environmental variables, and proxy measures of cognitive skills. Demographic and household characteristics include household head's race,[5] education, and age; child's gender and birth order to mother; family size; the number of children (under age 18) in the household; and whether the subject had ever lived in a female-headed household. Time-invariant variables (race, gender, and head's education and age) are created according to the base-year information (1994), except the birth order to mother variable that was collected in 1993. Family size and the number of children are constructed with three year averages (1992-1994), while the experience of living in a female-headed family is a dichotomous variable: 1 for children who lived in this type of family at any time between 1992 and 1994. Two environmental variables are created: the southern origin variable and the state unemployment rate variable. The southern origin variable indicates whether an individual lived in a southern state or not in 1994. The unemployment rate variable is constructed by averaging three years of state unemployment rates from the Bureau of Labor Statistics during the childhood observation period (1992-1994).

[3] As in the case of college attendance, our measure of college graduation may have measurement errors since some people may not have graduated college even after four or more years in college, while others may have finished their college education in less than 4 years. Although education variables from PSID family data contain information on degree attainment (e.g., associate degree, bachelor's degree), we decided not to use these variables for the same reason described in footnote 3.

[4] We also run models with home values or home equity instead of home ownership to check the robustness of our findings. Results from these models are substantively identical to those reported in this paper in most analyses. A few exceptions are significant coefficients of the home equity variable in some analyses. Home equity has significantly positive association with a child's probability of high school graduation. However, home equity has a significantly negative association with college graduation, opposite to what we expect. This unexpected finding may indicate that the home equity variable suffers from measurement errors.

[5] The PSID does not collect information on the race of individual household members.

The PSID did not collect detailed information about child development until 1997, when it added the Child Development Supplement. Therefore, this study uses two proxy measures of cognitive skills. The first measure indicates whether the subject had ever attended gifted classes, and the second one indicates whether the subject had ever repeated a grade. These two measures were collected in 1995.

Analytical Model

This study employs linear regressions for the continuous measure of educational attainment (years of schooling) and probit regressions for dichotomous dependent variables (indicators of achieving a certain level of educational thresholds in formal education). As a small portion of sample families have more than one child aged between 15 and 17, this study adjusts standard errors by clustering them into the same family unit. This adjustment takes into account that children from the same family unit are not independent observations to each other (Greene 2003). In both descriptive and multivariate analyses, we weigh the data with the last observed weight variable (individual weight at age 26 or 27) as recommended by PSID manual (Hill 1992).

The first set of analyses on years of schooling estimates the overall effects of parents' economic resources on the final level of educational attainment. The second set of analyses, with dichotomous dependent variables, examines the impacts of parents' economic resources on children's transition to a high level of educational achievement. That is to say, we estimate the effects of parents' income and assets on one's probability of moving on to a higher grade level, on the condition that one has completed the previous level. These analyses test whether parents' economic resources have the same effect throughout children's educational attainment process or exert different influences at each distinct stage of the attainment process. We examine three stages of educational transition: high school graduation, college attendance, and college graduation. For these analyses, we include only those who have finished the previous stage. For example, we include only high school graduates in analyzing college enrollment rates. Conley (2001) restricted his samples in the same way when studying the effects of parents' resources on educational transition.

In multivariate analyses, we use the natural logarithm of continuous measures of parents' economic resource variables (income, net worth, and liquid assets) to address their skewed distribution as done in previous studies (Conley 2001; Yeung and Conley 2008). We assign a value of 1 to zero or negative values before we convert measures of these variables into natural logarithmic form in order to prevent missing values. In addition, we create a categorical measure of liquid assets: negative (household liquid assets are less than unsecured debt), zero, modest ($1-$10,000), and high (more than $10,000). Analyses with a categorical measure examine whether the association between parents' liquid assets and children's educational attainment is linear or not. These analyses also estimate distinct roles of negative liquid assets on children's education. Negative liquid assets indicate households' ability to borrow money at the time of economic difficulty, but also indicate future financial difficulties by constraining access to the credit market.

In order to check the robustness of our findings, we run logit regressions on dichotomous dependent variables in addition to probit regressions. We also analyze our models with an alternative measure of parents' education: We use higher level of education when a household has both head and spouse and their educational attainments are different to each other. Additional analyses produce similar results to those reported in this paper.

Results

Descriptive Statistics

Table 1 presents parents' economic resources and other characteristics of the sample. Descriptive statistics show that our sample is representative. Family income in our sample is close to what is reported by the Census Bureau using Current Population Study for 1994 (http://www.census.gov/hhes/www/income/histinc/f11ar.html). Mean family income as found in this study ($51,523) is slightly higher than the averages for households headed by adults 35-44 years old and 45-54 years old ($51,812 and $58,996, respectively). In our sample, eighty-seven percent of household heads belong to these two age groups. Net worth statistics are also comparable to those reported in a previous study based on the Survey of Income and Program Participation, collected in 1993 (Carney and Gale 2001). Median net worth in our sample ($56,050) lies between the median of households headed by adults 35-44 years old and 45-54 years old ($31,533 and $608,557).[6] The home ownership rate (72.75%) is also comparable to those reported by Census Bureau for 1994 (64.51% among households headed by adults 35-44 years old and 75.15% among those headed by 45-54 years old adults, calculated by authors based on information from http://www.census.gov/hhes/www/housing/hvs/historic/histt15.html).

Table 2 reports the relationship between parents' assets (net worth and liquid assets) and children's educational outcomes. As expected, children from families with zero or negative net worth (9.48 % of our sample) have achieved the least in terms of average years of schooling and higher education, while those from high-wealth families (with net worth more than $100,000, 34.82% of the sample) have achieved the most. The average years of schooling is 12.39 among the least wealthy group, 13.15 among the middle group, and 14.74 for the wealthiest group. The percentage receiving college education (those who attended or graduated college) is 24.14, 44.59, and 83.74 respectively. Differences in educational attainment by parents' net worth are statistically significant at the 0.01 level both for the continuous educational outcome measure (F-statistics=43.98, DF= 2) and categorical measure (Pearson's χ^2 =79.17, DF=6).

Associations between liquid assets and children's educational attainment show a somewhat different picture, as reported in the right panel of Table 2. As in the case of net worth, the wealthiest group (owning liquid assets more than $10,000) has the best outcomes: this group's average years of schooling and rate of college education are higher than any other group's. Comparisons of the other three groups, however, show somewhat more complicated relations between liquid assets and children's education. Children from families whose debt exceeds their savings--negative liquid asset families--do better than their counterparts from zero liquid asset families. The former, on average, receive about one more year of schooling than the latter (13.32 versus 12.08). The percentage of those who attended or graduated college is about three times greater among the former (47.92% versus 15.58%). Educational attainment of those from negative liquid asset families is comparable to those from modest liquid asset families (those owning liquid assets between $1 and $10,000). As in the case of net worth, educational attainment is significantly different across different levels of liquid assets for years of schooling (F statistics=33.01, DF=3) and for a categorical measure (Pearson's χ^2

[6] These statistics are re-calculated into 1994 dollar by the authors because Carney and Gale report their findings in 1997 dollars.

=108.32, DF=9). These results suggest a non-linear relationship between liquid asset ownership and educational attainment.

The descriptive statistics reported above show an interesting relationship between parents' assets and children's educational achievement. By themselves, however, descriptive statistics have limitations in fully revealing the role of parents' assets in educational mobility, because the associations shown with bivariate analyses may be artifacts of correlated third factors, such as the parents' own education or income. Accordingly, this paper turns to multivariate analyses.

Multivariate Analysis Results

Parents' Economic Resources and Years of Schooling

Table 3 reports linear regression results on years of schooling. In these analyses, we use the continuous measures of parents' economic resources: a natural logarithm of family income, net worth, and liquid assets. The first model includes only family income as in most existing studies (Cameron and Heckman 1998; Carneiro and Heckman 2002; Ellwood and Kane 2000; Kane 1994 and 1996). The second model adds net worth and the third adds liquid assets and home ownership to family income. In addition to the basic model, we run models with cognitive indicators: one with gifted class attendance and the other one with experience of repeating the same grade. The coefficients of control variables have expected signs. Among these variables, the household head's education and age are significantly positive in every model. Being a stepchild has a significantly negative relationship with years of schooling in the basic model without a cognitive indictor.

Table 3 shows that family income has a significantly positive association with years of schooling, consistent with previous studies (Conley 2001; Ducan 1994; Taubman, 1989). Consistent with Conley (2001), the coefficient size of family income decreased after controlling for asset variables as shown in models 2 and 3, suggesting that the effect of family income on children's schooling is at least partially explained by the effects of assets. In addition, the two measures of assets, net worth and liquid assets, have significant associations with children's years of schooling, showing that parental assets have effects on children's education independent of family income. Home ownership does not have a significant association with the number of years of schooling.

Table 3 also presents analysis results of models with cognitive skill indicators. As expected, those who attended gifted class attained significantly more years of schooling and those who repeated a grade attained significantly fewer years of schooling than those who did not. Results of the first model show that the coefficient size of income variable decreases, but remains statistically significant, when controlling for gifted class attendance. In the model with the repeated grade variable, the coefficient of family income stays almost the same as in the basic model. Since none of previous studies that compare models with and without cognitive skills include a continuous measure of years of schooling, we are unable to evaluate our results against existing studies. These findings suggest that the effect of parents' income on the number of years of formal education may not be attributed completely to differences in cognitive skills between high-income and low-income children. It is, however, impossible to make a final verdict based solely on our study, because this study relies on somewhat crude measures of cognitive skills indicators.

Results on two measures of parents' assets show contrasting patterns. After controlling for a cognitive skills indicator, net worth loses its statistical significance. The coefficient of liquid assets reduces slightly but remains significant in the model with the gifted class attendance variable and it remains the same in the model after taking repeated grades into account. These findings suggest that the effect of parents' net worth may be explained mostly by its association with cognitive skills, while the level of parents' liquid assets has impact independent of children's cognitive skills.

Findings suggest that parents' assets, as alternative measures of parents' economic resources, have impacts on children's overall educational attainment independent from parents' income, a traditional measure commonly used in previous research. Two measures of parents' assets, net worth and liquid assets, have significant associations with years of schooling in the basic model. In addition, the coefficient of liquid assets remains stable after controlling for cognitive skills indicators. Results also show that the more liquid forms of parents' economic resources--income and liquid assets--show more salient effects on children's educational attainment than less liquid forms (net worth and home ownership), especially when we consider children's cognitive skills.

Parents' Economic Resources and Educational Transition

Table 4 summarizes the results of analysis results on educational transition, one's probability of moving up to higher level of education given successful completion of the previous level. Table 4 reports only the results of major variables: parents' economic resources and cognitive indicators. The coefficients of other unreported variables have expected signs [Full results are available from the first author upon request].

The first panel of Table 4 reports the effects of parents' economic resources on a child's chances of graduating high school. As in the case of analyses on years of schooling, we run a model with repeated grade variable in addition to the basic model. However, we could not run a regression with the indicator of gifted class attendance on high school graduation, because everyone who reported attendance in a gifted class graduated from high school. This result suggests that those with cognitive skills advanced enough to attend gifted classes are able to finish high school, regardless of their family background. [7]

The first panel of Table 4 summarizes the results on high school graduation. Among four measures of parents' economic resources, only the level of liquid assets has a significant association with high school graduation. The results are consistent with Zhan and Sherraden's (2003) finding that liquid assets have a significant effect on high school graduation while household income and home

[7] Not surprisingly, these children are from families in better economic positions than those who did not attend gifted classes. The descriptive studies show that average parents' income, net worth, and liquid assets are much higher among those who attended gifted classes in comparison with those who did not ($66,815 vs.$78,935; $123,093 vs. $213,155; $21,151 vs. 33,553, respectively). These results may be interpreted to show that by improving children's chances to attend gifted classes, parents' economic resources have improved high school graduation rates. However, the statistics also show that not all students in gifted classes were from well-to-do households. A small but non-negligible proportion of children from low-resource families attended gifted classes (7% among those whose parents' income is $40,000 or less, at the bottom 25% of income distribution; 13% among those from zero or negative net-worth families; 24% among those from negative liquid asset families; and 12% among those from zero liquid asset families). These results imply that children with higher levels of cognitive skills finish high school even when their parents' economic resources are meager, and that the chance of attending gifted class does not entirely depend on economic resources.

ownership do not. Table 4 also shows that the coefficient size of parents' liquid asset decreases but remains statistically significant at the 0.1 level after controlling for repeated grade experience. This result implies that the impacts of parents' liquid asset ownership on children's high school graduation can be attributed partially but not completely to its effects on children's cognitive skills.

. The second panel shows the relationship between parents' economic resources and a child's probability of attending college. As described in the method section, these analyses include only high school graduates. Results from the first model show that children from high-income families are significantly more likely to attend college than their low-income counterparts. The significantly positive impact of parents' income contrasts with the result on high school graduation, at which stage parents' income does not play a significant role. These findings suggest that similar types of economic resources may have distinct impacts at different stages of educational transition.

The coefficient size of parental income remains stable after controlling for cognitive skill indicators, which is different from previous studies (Ellwood and Kane 2000; Cameron and Heckman 1998). Differences between this study and Ellwood and Kane (2000) may explained partially by different model specifications. Ellwood and Kane (2000) do not include parents' education when comparing models with and without cognitive skills. When we run regressions without parents' education, the coefficient of parents' income changes from 0.83 in the basic model to 0.74 in the model with the gifted class indicator and to 0.81 in the model with the repeated class variable. These results are consistent with Ellwood and Kane, where the coefficient of parents' income is reduced but remains statistically significant when adding a cognitive skill indicator into analysis. These results are, however, different from Cameron and Heckman (1998), where parents' income loses its statistical significance after controlling for the cognitive skill indicator. Differences may come from different data sets (NLSY vs. PSID), measures of cognitive skills (AFQC score vs. gifted class or repeated grade experience), sample compositions (white males younger than 17 vs. 15-17 years old males and females), observation period (1979 vs. 1994), and model specifications (Cameron and Heckman include fewer control variables).

Table 4 also shows a significant effect of parents' assets on college enrollment independent from parents' income. The coefficient of parents' net worth is significant at the 0.1 level in the basic model, consistent with Conley (2001). However, net worth loses its statistical significance after controlling for cognitive skill indicators, as in case of years of schooling. At the same time, parents' liquid assets are significant at the 0.05 level and the statistical significance remains in the models with cognitive skills. The effect of home ownership is not significantly different from zero.

The last panel summarizes analysis results on college graduation. We included only those who entered college in these analyses. Among four measures of economic resources, only parental income has a significantly positive association with college students' rates of graduation. The effect of parental income remains stable after controlling for cognitive skill indicators. This study's findings differ from those of Conley (2001), who finds a significant effect of net worth on college graduation. Different results between our study and his may be explained by different sample sizes and observation periods. We include only those who were between 15 and 17 years old at the base year (N=218) while Conley includes those who were 8-19 years old in 1984 (N=545). The education outcomes in this study are observed in the 2000s while Conley use outcome variables collected by 1995. The level of liquid assets is not statistically significant at the 0.1 level, although its p-value is very close to the conventional level (0.106 to 0.151) in all three models. Home ownership has a

negative coefficient and it is significant in the model with the gifted class variable. These results imply that children of renters are more likely to graduate college than children of home owners if they succeeded in entering college, their parents' economic resources and other family backgrounds are comparable, and their cognitive skills are equivalent.[8]

In summary, Table 4 demonstrates that different types of economic resources have distinct effects on children's transition to a higher level of education. Only the liquid assets variable has a significant association with high graduation. Both liquid assets and family income are significant in the analyses on college attendance, and family income is the only statistically significant variable among four measures of economic resources in predicting college graduation. While liquid assets show more salient effects at earlier stages of educational attainment, family income displays more a prominent role at later stages.

Categorical Measure of Liquid Assets and Educational Attainment

Table 5 summarizes analysis results based on a categorical measure of liquid assets. We pay special attention to households with negative liquid assets because of their dual impact on educational attainment. Negative liquid assets reflect a household's ability to borrow; this ability may enable a household to finance their children's education in a time of economic hardship, but it also indicates their vulnerability to future financial constraints (Gruber, 2001). We also differentiate households with modest and high levels of liquid assets from those with zero liquid assets, because the amount of liquid assets may have different effects on educational achievement. Analysis results using a different threshold ($5,000) for a high level of liquid assets are not substantially different from those reported in this paper.

Table 5 presents results on years of schooling, high graduation, college attendance, and college graduation. This paper reports results on variables of interests: three dummy variables of liquid assets, parents' income, home ownership, and cognitive skill indicators [Full results will be available upon request]. Three categories of liquid asset variables (negative, modest, and high) compare the effect of each level of liquid ownership against the reference category (zero-liquid assets).

The first three columns report the role of liquid assets on years of schooling. The results illustrate the advantage of having high levels of liquid assets. As shown in Table 5, children from high liquid asset families complete significantly more years of school than those from zero and negative liquid asset families, even after controlling for cognitive skill indicators. The difference between high and modest liquid asset families is not statistically significant. The results show the advantage of high liquid asset families in overall educational attainment over those at lower levels of liquid asset ownership.

More remarkable are the results on high school graduation. Interestingly, the coefficient of negative liquid assets is significantly positive at the 0.1 level, suggesting that those with parents whose debt

[8] These results do not suggest that the overall impact of home ownership on college graduation is negative. When we use a sample that is not restricted those who attended college, the coefficient of home ownership is not significantly different from zero in all three models. These results suggest that home ownership does not change children's overall chances of graduating college. In summary, children of renters are more successful in getting college degrees than children of home owners with comparable cognitive skills, if their parents' other economic resources are equivalent and they succeeded in entering college.

exceeded their savings are more likely to graduate high school than those whose parents do not (or cannot) borrow beyond the level of their savings. The negative liquid asset variable maintains its statistical significance when repeated grade experience is controlled for. As hypothesized above, the ability to borrow, as measured in negative liquid assets, has a positive effect on one stage of educational attainment: high school graduation. Not surprisingly and consistent with results on years of schooling, children from high liquid asset families are significantly more likely to graduate high school than other three groups (negative, zero, and modest liquid asset families).

Considering that high school education is free to those who attend public schools, it is somewhat puzzling that liquid asset ownership and the ability to borrow affect high school graduation. Previous studies suggest that economic resources may affect the possibility of high school graduation because of their effects on educational expectation and children's employment. High levels of liquid assets may promote children's and parents' expectation of higher education, which is likely to facilitate children's chances of high school graduation (Zhan and Sherraden 2003). It is also plausible that children are more likely to stay in high school when their parents have liquid assets and they can expect financial support for their college education. Access to the credit market and ability to borrow may help families to ease their consumption and reduce their children's need to work long hours. Existing studies demonstrate that children with low socio-economic status are more likely to be intensively employed (20 or more hours a week) during adolescence, which significantly increases one's chance of dropping out of high school (Warren and Lee 2003). Accordingly, parents' ability to borrow may fill a household's consumption needs in economically hard times, reducing children's needs for intensive employment, and helping them to stay in school. At the same time, the significant association between liquid assets and high graduation observed in this study may be artificial, simply reflecting unobserved characteristics of family backgrounds, such as future orientation or work ethic. However, these explanations have not been empirically tested and call for future investigation.

Results on college attendance also demonstrate the benefits of liquid assets ownership on children's educational attainment. Even after controlling for parents' income and family background, children from modest and high liquid asset families are more likely to attend college than those from zero liquid asset families. The difference between high and negative liquid asset families is also significant at the 0.05 level. Children from negative liquid asset households, however, are not significantly different from those from zero liquid asset households, implying that relaxed liquidity constraints through access to the credit market may have only short-term effects on children's education (high school graduation), but not long-term effects carrying over to college attendance.

The last three columns report the results on college graduation. Contrary to the results on high school graduation, negative liquid assets have a significantly negative coefficient in the analyses of college graduation. Children from negative liquid asset families are significantly less likely to graduate college than those from zero liquid asset households, if they succeed in entering college and their family characteristics are equivalent. Differences are also statistically significant when compared with those from modest or high liquid asset families. These findings imply that family debt may help children's short-term educational achievement (high school graduation) but may deter long-term accomplishment (college graduation) by imposing financial constraints, because a household with unsecured debt may have difficulty borrowing to finance their children's college education.

The results from categorical measures of liquid assets are consistent with Gruber's (2001) hypothesis of dual impacts of negative liquid assets: families with negative liquid assets may be able to help their children stay in high school by smoothing current consumption through their access to the credit market, but may impede their children's college graduation because they have difficulty in securing loans to finance college education. Distinct effects of negative assets on different levels of educational attainment also support the liquidity constraint hypothesis. If parents' economic resources affect children's educational attainment only through long-term effects of college readiness, negative liquid assets should have similar effects on high school and college graduation.

Conclusion

This study examines the relationship between parents' economic resources and children's educational attainment. Paying special attention to parents' assets, especially liquid assets, this study provides an alternative approach to testing the liquidity constraint hypothesis. Asset ownership is expected to affect a household's need to borrow money for education as well as its access to the credit market. Accordingly, this study expands our understanding of liquidity constraints by adding parental asset measures in analyses. Furthermore, this study's focus on parental assets contributes to social stratification literature. As recent theoretical and empirical studies have demonstrated, assets may capture aspects of economic inequality that cannot be detected with income, a commonly used measure in intergenerational educational mobility.

This study finds that parental assets play an important role in children's educational attainment, independent of family income. After family income and other related correlates are controlled for, parents' assets, especially liquid assets, have positive effects on children's educational attainment. Results also show that liquid forms of assets show more salient effects than illiquid forms (home ownership and net worth). Home ownership does not have a significantly positive effect in any of analyses. Net worth has significant coefficients on two outcome measures (years of schooling and college attendance) but loses its statistical significance after controlling for cognitive skill indicators. The liquid assets measure is significant on most outcome measures (3 out of 4) in models including cognitive skill indicators.

This study also shows that different types of economic resources have distinct impacts at discrete stages of educational transition. Among two economic measures significant in models with cognitive skills indicators, liquid assets show a prominent impact in earlier stages of educational attainment process while income gains in impact in the later stages. These results demonstrate that we need to include various measures of economic resources—different measures of parental assets as well as income--in studying educational mobility.

Of particular interest is the nonlinear relationship between liquid assets and educational attainment as shown in the analyses of categorical measures. As expected, a high level of liquid asset ownership significantly increased years of schooling, high school graduation, and college attendance. However, negative liquid assets have distinct impacts on different stages of educational attainment. Although negative liquid assets increased the likelihood of high school graduation, they decreased the likelihood of college graduation. These findings suggest that negative liquid assets, an indicator of a household's ability to borrow, may have positive effects in the short term but negative effects in the long term.

Findings of this study support the liquidity constraint hypothesis. Even after controlling for cognitive skill indicators, two measures of economic resources, income and liquid assets, remain significant. Contrasting effects of negative liquid assets on high school and college graduation provide additional evidence. The effect of negative liquid assets should remain the same across different stages of educational attainment if it affects children's educational attainment only through its long-term effects on cognitive skills.

This study is not free from limitations. First, cognitive skill indicators in this study are weaker measures than the AFQT used in existing studies (Cameron and Heckman 1998; Carneiro and Heckman 2002). Accordingly, it is plausible that these two indicators in our analyses do not fully capture the roles of cognitive skills. Second, this study is unable to rule out the possibility that effects of parental assets found in this study may be explained by other compounding factors. For example, parents' attitudes, such as future orientation, are likely to increase households' asset holding and children's educational attainment at the same time. Further investigation is warranted to expand our knowledge of the relationship between parental economic resources and children's education.

This study has the following policy implication. We should encourage parents, especially low-income parents, to save for their children's education. Considering that parental assets, especially liquid assets, have a positive relationship with children's educational attainment, saving incentives would be a means to improve access to all levels of education. As current public policies focus on middle- or upper-income parents' college savings through tax incentives (e.g., 529 college savings plans and Educational IRAs), policy development should focus on means to promote saving in low-income households. A matched savings program for low-income children is a worthwhile option because their parents are not likely to benefit from tax incentives, and existing research shows that matched saving programs encourage low-income households to save. Findings on Individual Development Accounts and SEED (Saving for Education, Entrepreneurship and Downpayment) demonstrations show that matched saving programs have been effective in promoting asset-building among economically disadvantaged populations (Mason, et al., 2007, Schreiner and Sherraden, 2007). The federal government should consider introducing policies that encourage states to provide matching funds to low-income savers in state 529 college saving plans, as several states already have done without federal support (Clancy and Parrish, 2006).

Appendix

Table 1. Sample Characteristics (N=408)

Economic Resource Variables		
Family Income ($)		
Mean (without top & bottom 5%) (SD)	51,523.21	(23,701.07)
Median	48,418.33	
Net Worth ($)		
Mean (without top & bottom 5%) (SD)	97,398.55	(111,123.00)
Median	56,050.00	
Liquid Assets ($)		
Mean (without top & bottom 5%) (SD)	13,910.40	(25,200.42)
Median	2,000.00	
Home Owner, % (SD)	72.75%	(44.58)
Demographic and Household Characteristics		
Black, % (SD)	13.85%	(34.59)
Female, % (SD)	46.99%	(49.97)
Birth Order to Mother, mean (SD)	1.93	(1.13)
Stepchild, % (SD)	7.51%	(26.39)
Parent's Education, mean (SD)	13.26	(2.36)
Parent's Age, mean (SD)	43.55	(6.05)
Family Size, mean (SD)	4.22	(1.10)
Number of Children, mean (SD)	2.13	(1.01)
Female-Headed Household, % (SD)	24.58%	(43.11)
Environmental Variables		
Southern Origin, % (SD)	33.01%	(47.08)
State Unemployment Rate, mean (SD)	6.78	(1.25)
Cognitive Skills		
Gifted Class, % (SD)	28.02%	(44.97)
Repeated Grade, % (SD)	13.93%	(34.67)

Table 2. Parents' Assets and Educational Achievement

	Net Worth (N=408)				Liquid Assets (N=402)				
	Negative or Zero	Modest ($1-$10,000)	High (>$10,000)	Total	Negative	Zero	Modest ($1-$10,000)	High (>$10,000)	Total
% in the sample	9.48	55.7	34.82	100	28.13	13.82	21.8	36.25	100
Continuous measure of Educational Outcome: Years of schooling									
Mean	12.39	13.15	14.74	13.63	13.32	12.08	13.36	14.68	13.65
Categorical measure of Educational Outcome (%)									
Less than High School	14.57	10.68	0.71	7.58	6.6	23.06	8.2	0.69	7.08
High School Degree	61.28	44.74	15.55	36.14	45.48	61.37	41.68	16.63	36.39
Some College	19.22	24.91	40.08	29.65	34.46	9.01	25.9	36.34	29.76
BA or More	4.92	19.68	43.66	26.63	13.46	6.57	24.22	46.33	26.77

Table 3: Multivariate Analysis Results on Years of Schooling with Continuous Measures of Assets

	Model I: Income			Model II: Net Worth			Model III: Liquid Assets		
	Basic	Gifted	Repeated	Basic	Gifted	Repeated	Basic	Gifted	Repeated
Family Income	0.50***	0.45***	0.49***	0.39**	0.36**	0.42***	0.35*	0.33*	0.36**
	(0.16)	(0.16)	(0.16)	(0.16)	(0.17)	(0.16)	(0.18)	(0.17)	(0.18)
Net Worth (Continuous)				0.05*	0.04	0.03			
				(0.03)	(0.03)	(0.03)			
Liquid Assets (Continuous)							0.06***	0.05**	0.06**
							(0.02)	(0.02)	(0.02)
Home Ownership							-0.00	-0.10	-0.07
							(0.27)	(0.27)	(0.27)
Black	-0.19	-0.23	-0.22	-0.08	-0.14	-0.16	-0.10	-0.14	-0.12
	(0.31)	(0.30)	(0.30)	(0.33)	(0.33)	(0.32)	(0.31)	(0.31)	(0.30)
Female	0.33*	0.22	0.22	0.32*	0.21	0.22	0.30	0.19	0.2
	(0.19)	(0.18)	(0.19)	(0.19)	(0.18)	(0.19)	(0.19)	(0.18)	(0.19)
Birth Order=2	-0.03	-0.11	0.01	-0.05	-0.13	-0.01	-0.03	-0.12	0.01
	(0.24)	(0.24)	(0.24)	(0.24)	(0.24)	(0.25)	(0.25)	(0.24)	(0.25)
Birth Order =3	-0.47	-0.54*	-0.39	-0.41	-0.49	-0.36	-0.45	-0.52*	-0.36
	(0.32)	(0.31)	(0.32)	(0.32)	(0.31)	(0.33)	(0.31)	(0.30)	(0.31)
Birth Order =>4	-0.43	-0.71*	-0.43	-0.44	-0.71*	-0.43	-0.37	-0.66*	-0.37
	(0.34)	(0.37)	(0.35)	(0.34)	(0.36)	(0.35)	(0.36)	(0.38)	(0.38)
Child's Age =16	-0.30	-0.35	-0.25	-0.27	-0.33	-0.24	-0.27	-0.33	-0.23
	(0.23)	(0.22)	(0.22)	(0.23)	(0.22)	(0.22)	(0.23)	(0.22)	(0.22)
Child's Age=17	-0.06	-0.16	-0.05	-0.04	-0.15	-0.04	-0.04	-0.13	-0.03
	(0.22)	(0.22)	(0.22)	(0.23)	(0.22)	(0.22)	(0.23)	(0.22)	(0.23)
Stepchildren	-0.82*	-0.72	-0.70	-0.81*	-0.70	-0.69	-0.82*	-0.74*	-0.73
	(0.48)	(0.46)	(0.52)	(0.48)	(0.46)	(0.52)	(0.49)	(0.45)	(0.51)

Table 3: Multivariate Analysis Results on Years of Schooling with Continuous Measures of Assets (cont.)

	Model I: Income			Model II: Net Worth			Model III: Liquid Assets		
	Basic	Gifted	Repeated	Basic	Gifted	Repeated	Basic	Gifted	Repeated
Parent's Education	0.29***	0.23***	0.26***	0.29***	0.23***	0.26***	0.28***	0.22***	0.25***
	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Number of Children	0.29	0.13	0.24	0.29	0.13	0.24	0.29	0.14	0.25
	(0.26)	(0.26)	(0.27)	(0.26)	(0.26)	(0.27)	(0.26)	(0.26)	(0.26)
Family Size	-0.12	-0.01	-0.05	-0.11	-0.01	-0.05	-0.07	0.02	-0.03
	(0.24)	(0.23)	(0.24)	(0.24)	(0.23)	(0.24)	(0.24)	(0.23)	(0.24)
Female-Headed Household	-0.52	-0.40	-0.36	-0.48	-0.38	-0.35	-0.50	-0.41	-0.38
	(0.32)	(0.32)	(0.32)	(0.32)	(0.32)	(0.32)	(0.34)	(0.34)	(0.33)
Head's Age	0.05***	0.05***	0.04**	0.04**	0.05***	0.04**	0.04**	0.04**	0.04**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
State Unemployment Rate	0.01	0.01	0.02	-0.00	0.00	0.01	0.01	0.01	0.02
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.07)	(0.08)	(0.07)
Southern Origin	0.08	-0.01	0.14	0.07	-0.01	0.13	0.11	0.03	0.17
	(0.21)	(0.20)	(0.21)	(0.21)	(0.20)	(0.21)	(0.21)	(0.21)	(0.21)
Gifted Class		0.92***			0.90***			0.90***	
		(0.23)			(0.23)			(0.24)	
Repeated Grade			-0.90***			-0.84***			-0.83***
			(0.28)			(0.29)			(0.29)
Constant	2.53	3.55*	3.13*	3.34*	4.20**	3.56*	3.93**	4.73**	4.34**
	(1.85)	(1.91)	(1.80)	(1.86)	(1.92)	(1.81)	(1.93)	(1.94)	(1.90)
R-Squared	0.39	0.41	0.40	0.39	0.41	0.40	0.40	0.43	0.41
N	408	403	403	408	403	403	402	398	398

* P < 0.1, ** P < 0.05, *** P < 0.01

Table 4: Parents' Economic Resources and Children's Educational Outcomes: Transitions to Higher Levels

	Model I: Income			Model II: Net Worth			Model III: Liquid Assets		
	Basic	Gifted	Repeated	Basic	Gifted	Repeated	Basic	Gifted	Repeated
High School Graduation									
Family Income	-0.02	NA	-0.05	-0.11	NA	-0.06	-0.19	NA	-0.14
	(0.21)		(0.22)	(0.20)		(0.22)	(0.23)		(0.24)
Net Worth				0.04		0.00			
				(0.04)		(0.04)			
Liquid Assets							0.06**		0.05*
							(0.03)		(0.03)
Home Ownership							0.08		-0.02
							(0.32)		(0.30)
Repeated Grade			-1.19***			-1.18***			-1.12***
			(0.32)			(0.33)			(0.32)
Pseudo R-squared	0.20		0.27	0.21		0.27	0.21		0.27
N	408		403	408		403	402		398
College Attendance									
Family Income	0.56***	0.53***	0.56***	0.45**	0.44**	0.46**	0.38**	0.36*	0.39**
	(0.18)	(0.18)	(0.18)	(0.18)	(0.18)	(0.18)	(0.19)	(0.19)	(0.19)
Net Worth				0.05*	0.04	0.04			
				(0.03)	(0.03)	(0.03)			
Liquid Assets							0.05**	0.05**	0.05**
							(0.02)	(0.02)	(0.02)
Home Ownership							0.30	0.21	0.29
							(0.24)	(0.25)	(0.24)
Gifted Class		0.72***			0.70***			0.67***	
		(0.22)			(0.22)			(0.23)	
Repeated Grade			-0.28			-0.19			-0.16
			(0.30)			(0.32)			(0.32)
Pseudo R-squared	0.27	0.30	0.28	0.28	0.31	0.28	0.29	0.32	0.29
N	370	368	368	370	368	368	367	365	365

* P < 0.1, ** P < 0.05, *** P < 0.01

Table 4: Parents' Economic Resources and Children's Educational Outcomes: Transitions to Higher Levels (cont.)

	Model I: Income			Model II: Net Worth			Model III: Liquid Assets		
	Basic	Gifted	Repeated	Basic	Gifted	Repeated	Basic	Gifted	Repeated
College Graduation									
Family Income	0.73***	0.72***	0.71***	0.67**	0.71***	0.67**	0.62**	0.65**	0.61**
	(0.25)	(0.24)	(0.25)	(0.27)	(0.27)	(0.27)	(0.27)	(0.26)	(0.27)
Net Worth				0.03	0.01	0.02			
				(0.05)	(0.05)	(0.05)			
Liquid Assets							0.04	0.04	0.04
							(0.03)	(0.03)	(0.03)
Home Ownership							-0.45	-0.64**	-0.50
							(0.31)	(0.32)	(0.32)
Gifted Class (Yes/No)		0.47**			0.47**			0.57**	
		(0.24)			(0.24)			(0.24)	
Repeated Grade (Yes/No)			-0.69			-0.66			-0.78*
			(0.44)			(0.44)			(0.41)
Pseudo R-squared	0.19	0.21	0.20	0.19	0.21	0.20	0.22	0.24	0.22
N	218	217	217	218	217	217	216	215	215

* P < 0.1, ** P < 0.05, *** P < 0.01

Table 5: Multivariate Analysis Results on Children's Educational Outcomes with the Categorical Measure of Liquid Assets

	Years of Schooling			High School Graduation			College Attendance			College Graduation		
	Basic	Gifted	Repeated	Basic	Gifted	Repeated	Basic	Gifted	Repeated	Basic	Gifted	Repeated
Family Income	0.32*	0.30*	0.33*	-0.37	NA	-0.36	0.33*	0.30	0.34*	0.76***	0.78***	0.73***
	(0.17)	(0.17)	(0.17)	(0.25)		(0.26)	(0.19)	(0.19)	(0.19)	(0.27)	(0.27)	(0.27)
Negative Liquid Assets	0.29 [b]	0.28 [b]	0.27 [b]	0.72*[b]		0.70*[b]	0.44 [b]	0.43 [b]	0.42[b]	-0.88*[a,b]	-0.84*[a]	-0.94**[a]
(<0)	(0.32)	(0.32)	(0.32)	(0.38)		(0.40)	(0.30)	(0.32)	(0.30)	(0.45)	(0.47)	(0.46)
Modest Liquid	0.47	0.41	0.45	0.63*[c]		0.56 [c]	0.64**	0.62*	0.64**	-0.24	-0.27	-0.37
Assets ($l~$10,000)	(0.34)	(0.34)	(0.34)	(0.35)		(0.36)	(0.32)	(0.33)	(0.32)	(0.48)	(0.49)	(0.49)
High Liquid Assets	0.92**	0.85**	0.87**	1.76***		1.56***	0.95***	0.94***	0.93***	-0.39	-0.41	-0.46
(>$10,000)	(0.37)	(0.37)	(0.38)	(0.47)		(0.48)	(0.35)	(0.36)	(0.35)	(0.48)	(0.50)	(0.48)
Home Ownership	0.01	-0.08	-0.05	0.13		0.04	0.30	0.22	0.29	-0.48	-0.66**	-0.52*
	(0.27)	(0.27)	(0.27)	(0.33)		(0.31)	(0.24)	(0.25)	(0.24)	(0.31)	(0.32)	(0.32)
Gifted Class		0.90***						0.67***			0.57**	
		(0.24)						(0.23)			(0.24)	
Repeated Grade			-0.82***			-1.16***			-0.14			-0.80**
			(0.29)			(0.33)			(0.32)			(0.40)
R-squared/Pseudo R-squared	0.41	0.43	0.41	0.25		0.30	0.30	0.32	0.30	0.23	0.25	0.23
N	402	398	398	402		398	367	365	365	216	215	215

* P < 0.1, ** P < 0.05, *** P < 0.01

[a] Difference between negative and modest liquid asset families is significant at the 0.1 level

[b] Difference between negative and high liquid asset families is significant at the 0.1 level

[c] Difference between modest and high liquid asset families is significant at the 0.1 level

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