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Parental Income, Assets, and Borrowing Constraints and Children's Post-secondary Education

Jin Huang
Center for Social Development

Baorong Guo
School of Social Work, University of Missouri-St. Louis

Youngmi Kim
Center for Social Development

Michael Sherraden
Center for Social Development

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This study is a test of two theoretical models linking parental economic resources to children's post-secondary education, namely, short-term borrowing constraints and long-term family background. A series of structural equation models (SEM) are tested using data from a sample of young adults (N=650) in the Panel Study of Income Dynamics (PSID). To further understand the role of parental resources in children's education, analyses are conducted for both income and assets, with assets measured by liquid assets and net worth. Findings indicate that both income and assets have consistent long-term associations with children's college entry. When measures of household wealth are incorporated in the analysis, the hypothesis of short-term borrowing constraints is also supported. Implications for research and policy are discussed.

Key words: *income, assets, economic resources, educational attainment, college entry*

Parental economic resources in a child's adolescent years are strongly associated with her/his educational attainment (Haveman & Wolfe, 1995). A positive income-education connection (especially for college entry) has been consistently documented in multiple studies (Blossfeld & Shavit, 1993). However, the underlying mechanism of this connection remains unclear. Two theories developed in economics to explain this connection focus on short-term borrowing constraints and long-term family backgrounds. The first theory suggests that family borrowing constraints around the time of college entry are a deciding factor for children's post-secondary education (Ellwood & Kane, 2000; Kane, 1994, 1996). Low-income families with borrowing constraints have difficulties financing children's post-secondary education and need financial support for educational purposes. This theory is consistent with the current policy to help children from poor families obtain post-secondary education through grants and borrowing (Cameron & Heckman, 2001).

The second theory attributes the income-education connection to the long-term effects of family economic resources rather than short-run borrowing constraints (Cameron & Heckman, 1998, 2001; Cameron & Taber, 2004; Carneiro & Heckman, 2002). Given that parental income in a child's late adolescence is highly correlated with other household economic characteristics, particularly family income in the child's early childhood, it is not surprising that parental income in late adolescence is related to college entry. However, what underlies the income-education connection is the long-term effects of family economic resources (along with other family background factors) in early years of childhood, which largely shape children's development, academic ability, and preparedness for post-secondary education. This theoretical interpretation underpins various alternative policy approaches to post-secondary education, mainly emphasizing early interventions in family investment and child development.

Both theories are supported by empirical evidence from previous studies and no clear-cut conclusion can be drawn (Cameron & Heckman, 1998, 2001; Cameron & Taber, 2004; Carneiro & Heckman, 2002; Ellwood & Kane, 2000; Kane, 1994, 1996). It may be that the two theories focus

on different aspects of the income-education connection. However, few studies test both theories together. While children's cognitive development or academic ability is often controlled for in testing the hypothesis of borrowing constraints, this strategy does not necessarily provide direct evidence for the long-term effects of family backgrounds when family economic resources in early childhood are absent from the testing model. To fill in this gap, this study tests both mechanisms in the income-education connection.

It may be useful to consider parental assets in addition to parental income when attempting to understand the effects (long-term and/or short-term) of family economic resources on children's post-secondary education (Nam & Huang, 2009). Exclusive use of parental income as a measure of family economic resources in the existing literature has already been questioned for failing to consider other family economic resources (e.g., parental assets, see Haveman & Wolfe, 1995). Recent studies of household assets and child development lend support to the consideration of parental assets in explaining the mechanism underlying family economic resources and educational attainment (e.g., Conley, 2001; Destin & Oyserman, 2009; Nam & Huang, 2009; Orr, 2003; Williams Shanks, 2007; Yeung & Conley, 2008; Zhan & Sherraden, 2003). Similar to parental income, parental assets may also exhibit long-term and short-term effects on children's post-secondary education. In other words, asset effects on children's educational attainment can be examined in both frameworks: long-term family backgrounds and short-term borrowing constraints.

To provide additional evidence for this ongoing inquiry, the current study tests family borrowing constraints by including both children's academic ability and family income in early childhood. Different from previous studies that focus only on one of the two explanations, this study uses structural equation models (SEM), to test both theories (short-term borrowing constraints and long-term family backgrounds) in one single analysis. The same model is then revisited by replacing family income with family assets. Specifically, the effects of assets on children's post-secondary education are decomposed into long-term effects and short-term effects, parallel to those of income. These tests may produce additional evidence for an overall assessment of the mechanism underlying family economic resources and children's educational attainment. And it may help us understand whether it is borrowing constraints or a family's long-term economic situation, or both, that are associated with children's post-secondary education.

Background

Borrowing constraints or long-term effects?

The assumption of borrowing constraints has been used in various studies to explain the income-education connection (Ellwood & Kane, 2000; Hazarika, 2002; Kane 1994, 1996; Mulligan, 1997). In a perfect market, household income is not related to educational attainment because an individual could always borrow for his/her current education given the promise of future earnings. Unfortunately, the real market is not perfect. Lenders do not have good information and in many cases families cannot borrow against their children's future earnings to invest in children's education. Consequently, parents have to use their own economic resources for children's post-secondary education. Given borrowing constraints, family economic resources appear to have a direct relationship with educational attainment of the next generation (e.g., college entry). Specifically, parental income is found to be an influential factor in children's educational attainment (Becker & Tomes, 1986; Haveman & Wolfe, 1995), and low-income families generally lack economic resources

to finance their children's post-secondary education. Supporting evidence for the argument of borrowing constraints can be found in several studies. A study by Kane (1994) identifies borrowing constraints by using the Current Population Survey (CPS) and the in-state public tuition data. He also finds that households at different income levels show different sensitivities to tuition increases. The increase of college tuition does not affect the college enrollment rate for whites in the highest-income quartile, whereas every $1,000 increase reduces college enrollment for both whites and blacks in the lowest-income quartile by 4.6% and 8.5%, respectively. In a subsequent study, Kane (1996) further examines whether or not youth with borrowing constraints, in the presence of tuition increases, would enter college later than those without borrowing constraints. He finds that each $1,000 increase in tuition resulted in a ten percentage point decrease in the college entry rate for blacks aged 18-19, while the increases did not seem to affect whites' college entry.

While short-term borrowing constraints may help explain the effects of family income on schooling attainment, another body of scholarship argues that the long-term effects of family backgrounds should also be taken into account (Cameron & Heckman, 1998, 1999, 2002). Parental income in early childhood can affect school success in the long run because income is a crucial determinant of child development and home and school environment. This argument has promoted the inclusion of parental income in early childhood and children's academic ability to refine the interpretation of the income-education connection. Using five cohorts from 1908 to 1965, Cameron and Heckman (1998) examine short-term borrowing constraints, with the addition of academic ability, in a semiparametric ordered discrete-choice model. Results are that the effect of family income on schooling attainment is weakened with no statistical significance for all educational stages.[1] Based on this, they conclude that long-term factors may provide a better explanation of the income-education connection than short-term borrowing constraints.

Similar findings are reported in Cameron and Heckman's (2001) study comparing simulation results of models with and without academic ability. When academic ability is taken into account, income effects on high school completion, college attendance, and college graduation decrease substantially (Cameron & Heckman, 2001).

Borrowing constraints and parental assets. Most of the above studies have used parental income exclusively to indicate family resources, although parental assets may also play a distinctive role in explaining children's educational attainment. As suggested by human capital theory, families constrained by borrowing capability have to rely on their own economic resources (i.e., income and assets) for children's education (Haveman & Wolfe, 1995). Suggestions have been made to consider asset effects on children's post-secondary education because family assets are important economic resources available for college financing (Conley, 1999, 2001; Nam & Huang, 2009). Churaman (1992) reports that 64% of parents who contributed to their children's higher education used combined sources of current earnings, savings, and borrowing, and 10% used only accumulated savings. In 1999, about 60% of parents who had children in grades 6 through 12 saved money for post-secondary education (National Center for Education Statistics, 2000). Home equity, cash, and savings were significant factors of the level of borrowing for educational purposes. Cha, Weagley, and Reynolds (2005) find that parents with higher values on home equity borrowed more, and those

[1] Stages include less than elementary, complete elementary, attend high school, graduate high school, attend college, graduate college, and attend more than 17 years.

with more cash and savings borrowed less. Asset effects for education financing appear similar to those of income proposed by the theory of short-term borrowing constraints.

In addition to the direct effects of assets in terms of financing post-secondary education, parental assets may have indirect effects through a number of factors, such as home environment, school quality, children's academic ability, and family educational expectations (Conley, 2001; Orr, 2003; Williams Shanks, 2007). Some scholars examine the associations of these factors with household assets and educational outcomes in the context of social and wealth inequalities. Asset effects on children's educational attainment, from this perspective, are part of the intergenerational mechanism of wealth transfer through household investment in human capital (Oliver & Shapiro, 1995; Shapiro, 2004). For example, Conley (1999) suggests that housing assets are highly related to neighborhood environment and school quality, and, therefore, have positive impacts on educational performance. Household asset holdings also change parents' and children's behaviors, such as parenting involvement and educational expectations, and increase the likelihood of school success (Conley, 1999).

Indirect effects of household assets have been documented in previous research. For example, Biddle and Berliner (2002) and Card and Payne (2002) find that there is an association between housing assets and school quality. Using data from the National Longitudinal Survey of Youth (NLSY), Orr (2003) suggests that household wealth has indirect effects on children's academic achievement through several factors, including cultural capital, educational resources in the home, social capital, child self-esteem, and school quality. To include these factors in analysis reduces asset effects on children's test scores by nearly 15%. Zhan and Sherraden (2003) find that the mother's savings has a positive relationship with the child's high school graduation, and this relationship is partially mediated through the mother's expectations. Using data from the NLSY, Zhan (2006) also finds that the mothers' expectations provide partial mediation between household assets and children's math scores. In two psychological studies manipulating mind-set about college among seventh graders, Destin and Oyserman (2009) show that children expect higher grades and plan to spend more time on homework when believing that post-secondary education can be paid for. The indirect effects of household assets through educational expectations are also supported in Elliott (2009) and Grinstein-Weiss, Yeo, Irish, and Zhan (2009).

Indirect effects of household assets, regardless of the mediating factor through which they operate, help children become academically and psychologically prepared for post-secondary education. These indirect effects are essentially consistent with the proposition of the long-term effects of family backgrounds. The direct and indirect effects of parental assets, therefore, parallel the short-term and long-term effects of income. Thus, asset effects should be considered in any attempt to understand the mechanisms underlying family economic resources and children's educational attainment. In this paper, we consider the role of parental assets in the borrowing constraints hypothesis.

Data and Method

Data and sample

We use data from the Panel Study of Income Dynamics (PSID), which collected demographic information and socioeconomic characteristics from a nationally representative sample of individuals

and their families annually from 1968-1997 and biennially thereafter. The PSID sample size increased from 4,800 families in 1968 to over 7,000 families in 2001. As a special component of the PSID, the 2005 Transition into Adulthood (TA) collected data on developmental pathways and outcomes for 745 young adults (18-21 years old in 2005).[2] These young adults were also interviewed in 1997 and 2002 in another PSID component—the Child Development Supplement (CDS), which collected information on developmental outcomes of 3,500 children who were 0-12 years old in 1997.

The sample of the current study—TA young adults aged from 18 to 21 in 2005—allows us to observe their post-high school transitions. The college entry information for these TA young adults is linked to their child assessment data in the CDS and their parental characteristics in the PSID main datasets. To ensure accurate measurement of parental economic resources and assessment of their effects on children, young adults who were household heads/wives in 2005 were excluded (N=95). The final sample has 650 individuals, whose characteristics are reported in Table 1.

Table 1. Summary of measurement year and children's age

Variables	Year(s) measured	Age of Children			
		Group A*	Group B*	Group C*	Group D*
College enrollment	2005	18	19	20	21
Early income	1992-1995	5-8	6-9	7-10	8-11
Late income	1999-2002	12-15	13-16	14-17	15-18
Early assets	1989, 1994	2, 7	3, 8	4, 9	5, 10
Late assets	2001, 2003	14, 16	15, 17	16, 18	17, 19
Head's education	1997	10	11	12	13
Child's academic ability	1997	10	11	12	13

* Each group includes children aged 18, 19, 20, and 21, respectively in 2005.

Measures

Following previous studies (i.e., Belley & Lochner, 2007; Conley, 2001; Nam & Huang, 2009), this study uses *children's college entry* as the dependent variable. Measured in TA, this dichotomous variable identifies whether the respondent ever attended college with "1" indicating yes and "0" otherwise. Although previous studies have used children's completed schooling years, this variable is not employed in this study because most individuals in the sample were still in school at the time of the interview.

The main independent variables include household head's education, child's academic ability, and parental income and assets during the child's early and late childhood. Several annual household income measures have been used to construct the parental income variable for this study. *Parental income in child's early childhood* ("*early income*") is the average of annual family income from 1992-1995 when the child was aged 5 to 11 (See Table 1). *Parental income in child's late childhood* ("*late income*") is the average of annual family income from 1999-2002 when the child was aged 12 to 18. Household assets were measured in the PSID every five years from 1984-1999 and biennially thereafter. The current study uses two measures of household assets—liquid assets and net worth. Liquid assets

[2] Although the TA component targets children who are high school graduates, some respondents still reported educational attainment lower than high school (see Table 2).

refer to the sum of savings in bank accounts and stocks/mutual funds/investment trusts, and net worth is defined as the sum of seven asset types net of debt value.[3] *Parental assets in child's early childhood* ("*early assets*") is the average value of assets (both net worth and liquid assets) in 1989 and 1994, while *parental assets in child's late childhood* ("*late assets*") is the average value of assets (both net worth and liquid assets) in 2001 and 2003. All the income and assets measures are inflation-adjusted to the 2005 value. Following previous studies (Conley, 2001; Nam & Huang, 2009), log transformation is applied to these measures to adjust for skewness of distribution, and to reflect the nonlinear relationship between family economic resources and child's educational attainment. *Head's education* is measured by the completed schooling years ranging from 1 to 17.

Child's academic ability, a mediating factor, is influenced by parental characteristics (e.g., income, assets, and education) and influences educational attainment. Academic ability is constructed by a second-order confirmatory factor analysis (CFA) model, which has two subdimensions, reading ability and math ability. The CFA includes four test scores from the Woodcock-Johnson Revised Tests of Achievement (Hofferth, Davis-Kean, Davis & Finkelstein, 1998): letter-word and comprehension—indictors of reading ability—and calculation and applied problems—indicators of math ability. These four test scores are measured in the 1997 CDS. The goodness-of-fit statistics indicate that the hypothesized relationships among these four test scores fit the data well ($\chi^2(1)=.490$, p=.484; CFI=1.000; TLI=1.003; RMSEA=.000 with the 90%confidence interval bounded in .000 and .105). The high correlation (.843) between math and reading ability justifies a second-order "overall" academic measure. Therefore, a second-order factor, academic ability, is loaded with reading ability and math ability, and is allowed to take the same scale of the letter-word test (see Figure 1a for the measurement model).

Several child and household characteristics are controlled for in the analyses. Child's characteristics include age, gender (Male=1, Female=0), and race (Black=1, Otherwise=0); household characteristics are household head's gender (Male=1, Female=0) and marital status (Married=1, Otherwise=0), and the number of children in the household. Household head's race is not included in the model since it is highly correlated with the child's race.

Models

Three models are developed to examine the two explanations of the income-education connection and their combination. Model A (see Figure 1b) examines the short-term effects of parental income on college enrollment by controlling for children's academic ability. This can be considered, more or less, a simple replication of previous studies of the income-education connection. The path from late income to college entry (path *a*) indicates the effects of short-term borrowing constraints. Children's college entry is also influenced by household head's education, academic ability, and other control variables in the model. In addition, household head's education is assumed to have indirect effects on children's college entry mediated through academic ability. Given the fact that children's academic ability was measured in 1997, earlier than the measurement of late income (1999-2002), children's academic ability is allowed to have a correlation with late income, but no path is specified from late income to academic ability. Early income is not included in Model A. Our speculation is

[3] The eight asset types are farm or business, savings in bank accounts, real estate other than main home, stock (or mutual funds and investment trust), values on wheels (like cars, trucks, a motor home, a trailer, or a boat), and other savings or assets (such as bonds, rights in a trust or estate).

that, if the short-term effects explanation is sound, Model A will show an acceptable overall model fit and component model fit; the overall model fit is indicated by a series of indices (e.g., χ^2, CFI, TLI, RMSEA and WRMR),[4] and the component model fit is shown by specific path loadings. In particular, path *a* in Model A should be statistically significant.

Model B (see Figure 1c) tests the long-term effects of parental income on children's educational attainment. In this model, path *a,* which links late income and college entry in Model A, is removed. Children's academic ability is affected by early income (path *b*); early income is assumed to have not only indirect effects through academic ability but also direct effects (path *c*) on educational attainment. Early income may affect children's post-secondary education through household's social status, home environment, school quality, and family expectations for education; these un-modeled effects can be captured by path *c*. The rest of the model specifications are the same as Model A. If the explanation of the long-term effects is correct, Model B should be supported by the data and show a good model fit and significant path *b*.

Model C is a combination of Models A and B that adds back the path from late income to college entry (path *a*) into Model B. This model reflects both theoretical interpretations of the income-education connection. If both theories are sound, Model C should fit the data well, and the paths (*a* and *b*) representing the two interpretations should be statistically significant. Model C is then compared with the first two models (Models A and B), respectively, representing the short-term effects and the long-term effects of family economic resources.

[4] For the cutoff criteria for fit indices, please see Hu & Bentler (1998 & 1999). The current study uses RMSEA (<.05), CFI/TLI (>.95), and WRMR (<.9) to indicate close fit between the model and the sample.

Figure 1: Parental economic resources, child's ability, and educational attainment

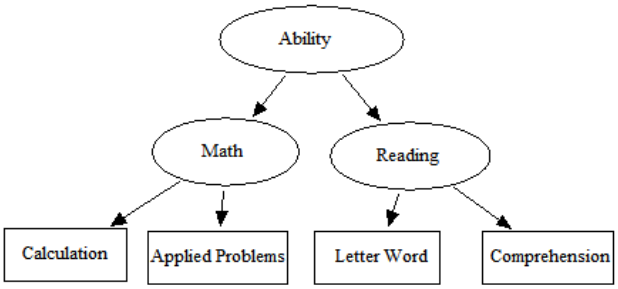

Figure 1a: Measurment Model for Ability

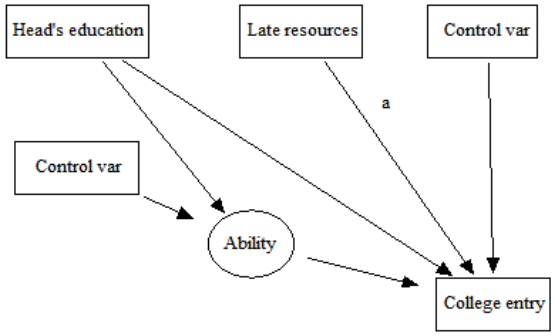

Figure 1b: Model A, Short-term effects of resources

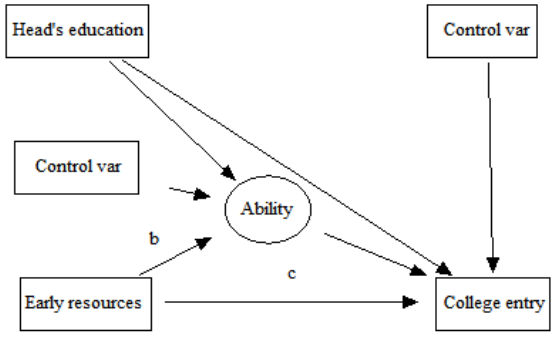

Figure 1c: Model B, Long-term effects of resources

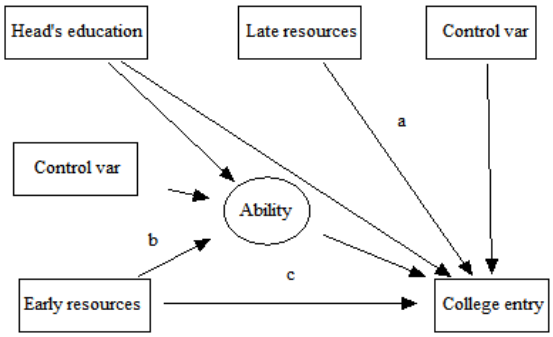

Figure 1d: Model C, Short-term and long-term effects of resources

As discussed above, parental assets may have significant effects on children's educational attainment, similar to those of parental income: short-term college financing and long-term child development. Therefore, the next step is to replace income variables with asset measures in Models A, B, and C, and assess the model fit. It is speculated that, as different forms of family economic resources, income and assets may exhibit consistent effects on children's college entry. Put differently, if income's effects on children's college entry are essentially long-term, then assets might also be associated with long-term effects. Likewise, if the way family economic resources affect children's college entry is essentially short-term, then this may be true for both income and assets. Hence, to substitute income with assets in testing would provide additional evidence for the current debate in this area of research.

The above models are tested in the statistical software *Mplus*, which uses probit links between the dichotomous dependent variable of college entry and independent variables. The estimator used in the study is the Robust Weighted Least Squares (WLSMV). According to previous studies (Beauducel & Herzberg, 2006; Flora & Curran, 2004; Muthén & Muthén, 2007; Nussbeck, Eid, & Lischetzke, 2006), this estimator shows good properties on data even with a relatively small sample that has missing values. All models are adjusted to the individual weight variable in the PSID-TA (Gouskova & Heeringa, 2008).

Finally, four strategies are utilized to test the robustness of the findings. First, hypothesis tests based on bootstrapped standard errors with 999 iterations are reported, which do not rely on the

theoretical sampling distribution (Efron & Tibshirani, 1993), and can be compared with the results of standard hypothesis tests. Second, the above models are retested on a sample of high school graduates only. Third, the child's educational expectations variable is controlled for to further test the effects of family economic resources on children's educational attainment, as several studies suggest that family economic resources are positively associated with children's educational expectations (i.e., Conley, 1999; Zhan & Sherraden, 2003). Fourth, the dependent variable, college entry, is replaced by several variables, including college drop-out (1=no, 0=yes), student status (1=full time, 0=part time), and college type (1=four-year college, 0=otherwise). Since all these alternative dependent variables are related to post-secondary education experience, the sample in this analysis is limited to those who enrolled in college.

Results and Discussion

Descriptive statistics

Table 2 provides descriptive statistics of the study sample. More than 90% of these young adults finished high school, and nearly three-fourths entered college, similar to the national statistics, 90.72% and 71.71%, respectively (US Census Bureau, 2006). About half of the sample is male, and nearly 18% is black. The mean age is 18.81 years (SD=1.08 years). The mean scores of the four achievement tests are 110.16 (SD=18.27) for letter-word, 106.92 (SD=14.38) for comprehension, 105.21 (SD=17.00) for calculation, and 111.41 (SD=15.57) for applied problems. Most children live in married families (78%) headed by males (81%). Household heads have completed an average of about 13 years of schooling.

Household income has a mean of $73,201 and a median of $63,027 in early childhood, and has a mean of $86,481 and a median of $68,314 in late childhood. As the mean age of household heads in this sample is 48 in 2005, we compare the mean and median of the late income to the national income statistics ($81,000 and $62,000) for households headed by those aged 44-54 (US Census Bureau, 2008). Thus, the sample statistics of late income are slightly higher than the national income statistics.

Median net worth increased from $20,179 in early childhood to $29,913 in late childhood. The median level of liquid assets is higher in early childhood, perhaps in part due to the continuous decreases of the personal savings rate in recent years (US Bureau of Economic Analysis, 2008). Mean early liquid assets is higher than that of early net worth, which may be explained by extreme values in early liquid assets, and the fact that net worth includes debt but liquid assets do not.

Table 2. Descriptive statistics (weighted)

Variables		Mean/Freq (%)	SD	Median
Young Adult's Characteristics				
High school graduation (Yes)		589.00 (90.61)		
College entry (Yes)		476.70 (73.74)		
Gender (Male)		329.31 (50.66)		
Race (Black)		114.36 (17.60)		
Age in 2005		18.81	1.08	19
Woodcock-Johnson Tests in 1997				
Letter-word		110.16	18.27	108.00
Comprehension		106.92	14.38	107.00
Calculation		105.21	17.00	105.00
Applied problem		111.41	15.57	111.00
Household Characteristics				
Head's Characteristics				
Age (in 2005)		48.89	7.08	48
Gender (Male)		526.17 (80.95)		
Race (Black)		110.52 (17.00)		
Marital status (Married)		503.91 (77.52)		
Completed schooling years		12.98	3.11	13.00
Number of children		2.56	1.06	2
Household Economic Resources				
Early economic resources				
Income	($[a])	73,200.83	65,543.81	63,026.91
	(log-transformed)	10.91	.82	11.05
Net worth	($)	108,763.80	333,776.70	20,178.92
	(log-transformed)	8.79	4.04	9.91
Liquid assets	($)	141,491.20	641,817.00	11,197.29
	(log-transformed)	8.17	4.00	9.32
Late economic resources				
Income	($)	86,480.62	97,873.02	68,314.06
	(log-transformed)	11.05	.79	11.13
Net worth	($)	279,753.7	2003,659.00	29,912.55
	(log-transformed)	9.18	4.07	10.30
Liquid assets	($)	156,141.10	2,008,699	8,693.94
	(log-transformed)	8.24	3.74	9.07

a. All family economic resources are inflation adjusted to the 2005 dollar.

The correlation matrix (see Table 3) shows that children's test scores are positively associated with one another and with most of the parental characteristics. Correlations between test scores and economic resource variables are moderate, ranging from .10 to .43. As expected, all economic resource variables are highly correlated with each other (.44 to .78).

Table 3. Correlation matrix of variables used in all models (weighted) [a]

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Letter-word score										
2. Comprehension score	.69									
3. Calculation score	.58	.61								
4. Applied problem score	.57	.62	.77							
5. Head's education in 1997	.29	.30	.27	.36						
6. Late income†	.33	.31	.33	.43	.57					
7. Early income†	.34	.30	.26	.39	.65	.78				
8. Late net worth†	.21	.10	.17	.29	.42	.52	.59			
9. Early net worth†	.21	.19	.19	.26	.46	.44	.58	.53		
10. Late liquid assets†	.29	.27	.29	.41	.55	.72	.69	.60	.53	
11. Early liquid assets†	.32	.31	.29	.41	.61	.67	.77	.57	.65	.75

a. All correlation coefficients are significant at the .001 level.
† Log-transformed.

Multivariate results

Appendix A reports the testing results of three models using different measures of economic resources (income, liquid assets, and net worth). Children's academic ability and household heads' education show consistent results across all models. Indicated by better test scores, higher levels of academic ability are related to a greater probability of college entry. Household heads' education is positively associated with children's academic ability. However, after controlling for indirect effects mediated through children's academic ability, heads' education does not have significant direct impacts on children's college entry.

Income, ability, and college entry. The first three columns of Appendix A summarize the results of Models A, B, and C using the income measures. Model A tests the income-education connection assuming short-term borrowing constraints; late income is positively related to children's college entry at the .05 level with academic ability controlled for. For a typical case that takes mean values on all continuous covariates and value "1" on all categorical covariates in the structural equation of college entry,[5] the increase of late income from the first quartile ($33,390) to the third quartile ($95,517) raises the predicted probability of college entry by 4%. This finding is consistent with the estimate of Ellwood and Kane (2000), but different from that of Cameron and Heckman (1998). The latter does not find significantly positive effects of household income on college attendance after controlling for academic ability. However, it is noted that the overall model fit indices of Model A all fall outside the acceptable ranges, indicating a poor match of covariance matrices of the sample with the hypothetical population. In other words, while late income has expected performance in the equation of college entry, the proposition of short-term borrowing constraints alone cannot explain the observed data.

To examine long-term effects of early income alone, late income is then replaced by early income in Model B (see Figure 1c). The path loading of early income is, respectively, significant at the .001

[5] The calculation of predicted probability of college entry takes the same scenario as this one in the article.

level on college entry and at the .10 level[6] on children's academic ability. For a typical case (as described in the above), the change of early income from the first quartile ($30,390) to the third quartile ($74,621) increases the chance of college attendance by 15%. When early income is doubled, children's academic ability increases by nearly 3 units, holding other variables constant. Additionally, Model B shows an improvement in the overall model fit indices (e.g., χ^2, CFI, TLI, RMSEA and WRMR), compared to those of Model A. With these findings, the hypothesis is supported regarding the long-term effects of parental income on college entry through child development. This makes intuitive sense in that early income, an important indicator of parental investment in child development, is a critical determinant of children's academic ability and readiness for college. Furthermore, indicated by its significant direct effects on college entry, this model suggests that early income has direct and positive effects on children's educational attainment in addition to those mediated through academic ability. Nonetheless, direct effects of early income should be interpreted with caution. Without late income in the analysis, these direct effects could be merely a proxy of short-term borrowing constraints given the high correlation between early and late income. Next, we test for this.

Model C includes both income measures (early income and late income) to simultaneously examine the two explanations. As the results indicate, contrary to the proposition of short-term borrowing constraints, late income does not have significant effects in the structural equation of college entry. The overall model fit indices of Model C are out of acceptable ranges, even worse than those of Model B. According to the criteria discussed above, these results do not support the hypothesis regarding the effects of both short-term borrowing constraints and long-term family background on children's college entry in the current model specification. Notwithstanding, the results of early income in Model C seem consistent with those in Model B, supporting the proposition regarding the long-term effects of family income. Perhaps the most interesting finding of Model C is that, with late income controlled for, the significance of early income in the structural equation of college entry remains. This provides further evidence that early income has direct effects on college entry; the direct association between early income and college entry in Model B, therefore, may not be a proxy of short-term borrowing constraints.

A comparison of the three models shows that, overall, Model B provides a better explanation of the income-education connection, as suggested by the fit indices and significant path loadings. Without fully denying the importance of short-term effects of parental income in children's late adolescent years (path *a* in Model A), the findings indicate that, when it comes to educational attainment, the long-term effects of parental income are more important than short-term borrowing constraints.

Assets, ability, and college entry. Models A, B, and C are further assessed by replacing income measures with assets measures. Results are summarized in the "liquid assets" and "net worth" columns of Appendix A. As anticipated, results from models using liquid assets are mostly consistent with the corresponding models using income measures. Model A still has a significant path from late liquid assets to college entry, despite a poor overall model fit.

With the best model fit statistics among the three models, Model B supports both direct and indirect effects of early liquid assets on children's educational attainment. Similar to the effects of early

[6] This path loading, however, is statistically significant at the .05 level (the conventional level) by using bootstrapped standard errors (see Table 5).

income, the increase of early assets from the first quartile ($98) up to the third quartile ($35,461) increases the likelihood of college attendance by 15% for a typical case (defined in the above). In Model B, a 100% increase of liquid assets raises children's academic ability by about a half unit with other variables held constant; this marginal effect is smaller than that of early income in the corresponding model using the income measure (three units). However, liquid assets are more important for children living in poor households, given the fact that these households have extremely few liquid assets. Children's academic ability increases by 1.5 units if household early income increases from the tenth percentile ($17,451) to the 25th percentile ($30,390) and by 3.5 units when liquid assets of poor households grow from the tenth percentile ($0) to the 25th percentile ($472). Early liquid assets may enable parents to invest in early human capital development in the form of lessons, educational materials, and educational experiences.

A notable difference between Model C using liquid assets and the one using income measures is that late liquid assets have significant effects on college entry. Despite the poor model fit of Model C, this implies that the hypothesis of short-term borrowing constraints at least obtains some support when this asset measure is used. This suggests that, as indicators of family economic resources, assets are more important than income in financing children's education.

Results of the models using the net worth measures are mostly similar to those using the measures of liquid assets. Overall, Model B, which explores long-term effects of family economic resources, shows the best model fit. The effects of early net worth on children' academic ability, however, are not different from zero in Models B and C. Compared with the effects of early liquid assets on academic ability, this result suggests that the indirect effects of assets mediated through child development may vary depending on asset types. Household assets of high liquidity can be easily invested in children, and therefore may be more likely to have a correlation with children's academic performance. Other types of assets counted in the net worth measure, such as business ownership and car ownership, may be less likely to have an association with child development.

Among the control variables, children's race is statistically significant in the structural equation of academic ability across all models with similar path loadings; the standardized path loading[7] shows that the academic performance of black children is about a quarter of a standard deviation lower than that of other children. In the structural equation of college entry, only two control variables are statistically significant at the .05 level. Children's age is positively related to college attendance, which is not surprising given that older young adults are more likely to enter college. Females in the sample also have a higher probability of going to college, which echoes previous studies (e.g., Buchmann, DiPrete, & McDaniel, 2008).

To sum up, across the three models with various measures of family economic resources, Model B consistently shows best and acceptable overall model fit indices, indicating the long-term effects of family economic resources on children's educational attainment. Model B also shows a significant association between family economic resources in early childhood and children's academic ability when using the measures of income and liquid assets. In addition to the indirect effects on educational attainment through academic ability, all three measures of early family economic resources (income, liquid assets, and net worth) have direct influences on children's college entry. It is important to note that the absence of supporting evidence for Model A does not denote rejection

[7] Standardized path loadings are not reported in Table 4, and can be requested from the corresponding author.

of the hypothesis of short-term borrowing constraints, but rather it suggests that short-term effects alone do not match the observed data.

Robustness tests

Appendix B reports the results of robustness tests. Tests of Model C with both income measures (early and late income) hardly converge (therefore, no information is provided) with the exception of one test. Overall, these tests further confirm the findings in Appendix A. The first three panels still use children's college entry as the dependent variable. As shown in the first panel, hypothesis tests based on bootstrapped standard errors show minor differences. For example, in Models B and C, the significance level of early income (in the equation of children's academic ability) improves from .10 to .05, which provides stronger support for the long-term effects of family backgrounds. When the sample is limited to high school graduates (see Panel 2), the effects of economic resources in the structural equation of college entry (indicated by the magnitude of path loadings) are generally smaller than those in Appendix A. The decreased path loadings might be explained by the fact that the sample of high school graduates, compared with the original sample (Appendix A), has smaller variance on academic ability. Again, it reflects that family economic resources may have indirect effects (through children's academic ability) on educational attainment. In Panel 3, children's educational expectation is also controlled for in the structural equation of college entry. Educational expectation is highly significant in all models. To include this new variable does not fundamentally change but reduces the direct effects of family economic resources on children's academic ability. In other words, consistent with the finding of Destin and Oyserman (2009), family economic resources and children's educational expectations have confounding effects on children's academic ability.

Using a smaller sample including only respondents with college experience, panels 4-6 examine family economic resources in relation to the other three dependent variables, including college dropout, student status (full-time vs. part-time), and four-year college enrollment. It is assumed that students without borrowing constraints are more likely to stay in college, to be full-time students, and to enroll in four-year college. Most of the analyses do not seem to support the hypothesis of short-term borrowing constraints because no direct or indirect effects of economic resources are identified. The associations between family economic resources and these outcomes need to be examined in more detail in the future.

Conclusions

This study contributes to the literature by testing both long-term family effects and short-term borrowing constraints using the SEM approach. In addition to household income, household assets (liquid assets and net worth) are utilized as measures of family economic resources. Models assuming long-term effects of family backgrounds obtain best model fit, showing that parental income and assets in early years of their children's lives play an important role in their children's educational attainment (paths *b* and *c* in Model B). The results also show that, in comparison to household income, household assets can better reflect the short-term effects of family economic resources in financing post-secondary education (path *a* in Model C using asset measures). This suggests that assets should be included in future studies of family economic resources and children's educational attainment.

Limitations of this study should be noted. First, while the association between family economic resources and children's educational attainment is complicated, the models tested in this study are relatively simple. For instance, policy interventions (such as federal financial aid programs), school quality, and parents' educational expectations, may be added to the model for a more accurate estimation. Second, specific mechanisms through which household assets influence child development are not evaluated in this study. While asset effects on children's educational attainment seem parallel to income effects, their operating mechanisms might be different. In addition, asset effects and income effects may differ for different populations (i.e., race); the heterogeneity of these effects should be examined in the future. Third, children included in the study were between 18 and 21 years of age in 2005, and their completed schooling information was not available at that time for this study. In other words, the distribution of completed schooling years of these children is not fully known. Some of these young adults might enter college later. In addition, as discussed in the descriptive statistics, the variables of family economic resources are highly correlated in the sample, which might cause multicollinearity in Model C.

The findings regarding the long-term effects of family backgrounds imply that children from families with better socioeconomic status are more likely to achieve higher levels of education, and that educational inequality as a result of family economic resources is less likely to change in late adolescence. Given the importance of family economic resources in the early years of childhood, policy approaches facilitating early interventions in family investment and child development should be emphasized. For example, some employment-based dependent care account programs allow parents to take tax credits for their investment in children (e.g., expenditures on day care and healthcare).

The findings also show a clear pattern of asset effects, in which parental assets are important for both early child development and financing post-secondary education. Therefore, it is important for parents to save for their children's education using various asset accumulation programs, such as 529 College Savings Plans and Child Development Accounts (CDAs). Perhaps less well-known than 529 plans, CDAs are incentivized child savings accounts encouraging households to save for specific developmental purposes. An experimental test of progressive 529 plans (SEED OK experiment) is underway in the state of Oklahoma with random assignment of newborn children and examines impacts of universal CDAs on savings for child college education, parenting practices, parental educational expectations, and various child development outcomes (Sherraden & Clancy, 2008; Kim & Nam, 2009). Family savings in these programs can be critical economic resources for children's post-secondary education (see Loke & Sherraden, 2009; Williams Shanks, Kim, Loke, & Destin, 2009).

The findings also suggest that asset-building programs can be utilized to support child development in early childhood as well. Depending on the specific interpretation of how parental assets affect child development and academic ability, policy objectives may be different. For instance, according to the family investment model (Haveman & Wolfe, 1995), the more economic resources that families invest in their children, the more children will achieve academically. This model suggests that as equally important as asset accumulation per se is how and when to invest economic resources in children. Investment includes but is not limited to learning materials, parents' time, home environment, and the family's standard of living (Conger & Donnellan, 2007). Therefore, policies should not only encourage savings for children, but also define the dimensions of investment in children. The latter can be reflected by designated uses of the savings in these asset-building

programs. In this regard, as a policy approach to facilitate child development, CDAs demonstrate more flexibility than 529 plans, because the latter often exclusively targets the potential borrowing constraints families experience when their children are in late adolescence.

The family stress model provides a different perspective that suggests that asset holdings by themselves may lead to positive psychological effects in parents and children (Conger & Donnellan, 2007; Haveman & Wolfe, 1995). For example, there is evidence to show that household assets can boost parents' and children's expectations for educational attainment (Orr, 2003; Zhan, 2006; Zhan & Sherraden, 2003). That is, asset holdings, apart from asset use, may positively affect children's educational attainment. This argument supports programs emphasizing a single goal of savings for college education, such as the 529 plan that exclusively targets children's post-secondary education. In the long run, savings with a targeted goal can shape both parents' and children's expectations and goal-seeking behaviors, which may eventually lead to desired educational outcomes. In order to take advantage of the psychological effects of asset holdings, families should enroll in educational savings programs as early as possible.

The current study cannot say which of these two arguments on asset building and educational attainment may be operative—perhaps both short-term liquidity constraint and long-term family background are to some extent. Therefore, it is necessary to have flexible asset-building options targeting different asset mechanisms. For instance, the *I Can Save* program, a pilot study of CDAs matching parents' savings for children, reveals that financial education together with financial services not only improved children's financial skills and educational expectations, but also raised their academic performance (Sherraden, Johnson, Elliott, Porterfield, & Rainford, 2007). The savings accumulated by participants in this program was rolled over to 529 plans at program end. Multiple options in asset-building programs might be able to maximize asset effects for children.

Finally, because the long-term effects of family backgrounds may result in educational inequality, inclusive and progressive asset-building programs are called for. About 60% of parents save for children's education, but only 30% of low-income parents do so (Sallie Mae, 2009). Various policy options should be provided to encourage low-income households to participate in asset-building programs and to save for their children's future education. Several strategies have been used by state-sponsored 529s in the US to reach out to the low-income population, including matching deposits in 529 savings accounts, excluding 529 savings from state tuition grant calculation, and enrolling participants in the workplace (Clancy & Sherraden, 2003). Aiming to advance progressive 529s, the College Savings Initiate, a collaboration of the New American Foundation and the Center for Social Development at Washington University, evaluates existing policy options regarding 529s and promotes the inclusion of the low-income population (Clancy, Sherraden, Huelsman, Newville, & Boshara, 2009). Undoubtedly, it is vital to consider household assets in research of family economic resources and children's educational attainment, and these programs provide important opportunities to further evaluate asset effects for children.

References

Beauducel, A., & Herzberg, P. (2006). On the performance of Maximum likelihood versus Means and Variance Adjusted Weighted Least Squares estimation in CFA. *Structural Equation Modeling*, *13*(2), 186-203.

Becker, G., & Tomes, N. (1986). Human capital and the rise and fall of families. *Journal of Labor Economics*, *4*(3), 1-39.

Belley, P., & Lochner, L. (2007). The changing role of family income and ability in determining educational achievement. *Journal of Human Capital, 1*(1), 37-89.

Blossfeld, H., & Shavit, Y. (1993). *Persistent inequality: Changing education attainment in thirteen countries.* Boulder, CO: Westview Press.

Buchmann, C., DiPrete, T., & McDaniel, A. (2008). Gender inequalities in education. *Annual Review of Sociology, 34*, 319-337.

Cameron, S., & Heckman, J. (1998). Life cycle schooling and dynamic selection bias: Models and evidence for five cohorts of American males. *Journal of Political Economy, 106*(2), 262-333.

Cameron, S., & Heckman, J. (2001). The dynamics of educational attainment for Black, Hispanic, and White males. *Journal of Political Economy, 109*(3), 455-499.

Cameron, S., & Taber, C. (2004). Estimation of educational borrowing constraints using returns to schooling. *Journal of Political Economy, 112*(1), 132-182.

Carneiro, P., & Heckman, J. (2002). The evidence on credit constraints in post-secondary schooling. *Economic Journal*, *112*, 705-734.

Cha, K., Weagley, R., & Reynolds, L. (2005). Parental borrowing for dependent children's higher education. *Journal of Family and Economic Issues, 26*(3), 299-321.

Churaman, C. (1992). How families finance college education. *Journal of Student Financial Aid, 22*(2), 7-21.

Clancy, M., & Sherraden, M. (2003). *The potential for inclusion in 529 savings plans: Report on a survey of states* (CSD Report 03-25). St. Louis, MO: Washington University, Center for Social Development.

Clancy, M., Sherraden, M., Huelsman, M., Newville, D., & Boshara, R. (2009). *Toward progressive 529 plans: Key points*. St. Louis, MO : Washington University, Center for Social Development; Washington, DC: New America Foundation.

Conger, R., & Donnellan, M. B. (2007). An interactionist perspective on the socioeconomic context of human development. *Annual Review of Psychology*, *58*, 175-199.

Conley, D. (1999). *Being black, living in the red: Race, wealth, and social policy in America.* Berkeley, CA: University of California Press.

Conley, D. (2001). Capital for college: Parental assets and post-secondary schooling. *Sociology of Education*, *74*(1), 59-72.

Destin, M., & Oyserman, D. (2009). From assets to school outcomes: How finances shape children's perceived possibilities and intentions. *Psychological Science, 20*, 414-418.

Duncan, G., & Brooks-Gunn, J. (1997). Income effects across the life span: Integration and interpretation. In G. J. Duncan & J. Brooks-Gunn (Eds.), *Consequences of growing up poor*, (pp.596-610). New York: Russell Sage Foundation.

Efron, B., & Tibshirani, R. (1993). *An introduction to the bootstrap.* New York, NY: Chapman and Hall.

Elliott III, William. (2009). Children's college aspirations and expectations: The potential role of children's development accounts (CDAs). *Children and Youth Services Review, 31*, 274-283.

Ellwood, D., & Kane, T. (2000). Who is getting a college education? Family backgrounds and the growing gaps in enrollment. In S. Danziger & J. Waldfogel (Eds.), *Securing the future: Investing in children from birth to college* (pp. 283-324). New York: Russell Sage Foundation.

Flora, D., & Curran, P. (2004). An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychological Methods, 9,* 466-491.

Grinstein-Weiss, M., Yeo, Y. H., Irish, K., & Zhan, M. (2009). Parental assets: A pathway to positive child educational outcomes. *Journal of Sociology & Social Welfare*, *36*(1), 61-85.

Gouskova, E., & Heeringa, S. (2008). *PSID technical report: The 2005 PSID Transition to Adulthood Supplement (TA) weights*. Retrieved October 9, 2008, from http://psidonline.isr.umich.edu/data/weights/

Guo, G. (1998). The timing of the influences of cumulative poverty on children's cognitive ability and achievement. *Social Forces, 77*(1), 257-287.

Haveman, R., & Wolfe, B. (1995). The determinants of children's attainments: A review of methods and findings. *Journal of Economic Literature, 33*, 1829-1978.

Hazarika, G. (2002). The role of credit constraints in the cyclicality of college enrollments. *Education Economics, 10*(2), 133-143.

Hofferth, S., Davis-Kean, P. E., Davis, J., & Finkelstein, J. (1998). *The child development supplement to the Panel Study of Income Dynamics: 1997 user guide.* Ann Arbor, MI: Survey Research Center, Institute for Social Research, the University of Michigan.

Hu, L., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods, 3,* 424-453.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1-55.

Kane, T. (1994). College entry by Blacks since 1970: The role of college costs, family backgrounds, and the returns to education. *Journal of Political Economy*, *102*(5), 878-911.

Kane, T. (1996). College cost, borrowing constraints and the timing of college entry. *Eastern Economic Journal*, *22*(2), 181-194.

Kim, Y., & Nam, Y. (2009). *The SEED for Oklahoma Kids experiment: Comparison of treatment and control groups* (CSD Research Brief 09-59). St. Louis, MO: Washington University, Center for Social Development.

Mulligan, C. (1997). Two models of opportunity and intergenerational mobility. In *Parental priorities and economic inequality* (pp. 23-71). Chicago: University of Chicago Press.

Muthén, L., & Muthén, B. (2006). How to use a Monte Carlo study to decide on sample size and determine power. *Structural Equation Modeling*, *9*(4), 599-620.

Muthén, L., & Muthén, B. (2007). *Mplus Statistical Analysis with Latent Variables: User's Guide*. Los Angeles, CA: Muthén & Muthén.

Nam, Y., & Huang, J. (2009). Equal opportunity for all?: Parental economic resources and children's educational achievement. *Children and Youth Services Review, 31*, 625-634.

National Center for Education Statistics (2000). *The condition of education*. Washington, DC: Office of Education Research and Improvement, U.S. Department of Education.

Nussbeck, F., Eid, M., & Lischetzke, T. (2006). Analysing multitrait-multimethod data with structural equation models for ordinal variables applying the WLSMV estimator: What sample size is needed for valid results? *British Journal of Mathematical and Statistical Psychology*, *59*, 195-213.

Oliver, M., & Shapiro, T. (1995). *Black wealth/white wealth: A new perspective on racial inequality*. New York: Routledge.

Orr, A. (2003). Black-White difference in achievement: The importance of wealth. *Sociology of Education*, *76*, 281-304.

Sallie Mae. (2009). *How America saves for college: Sallie Mae's national study of parents with children under 18 survey*. Retrieved June 25, 2008, from http://www.salliemae.com/NR/rdonlyres/93CCB661-7A79-40D5-B449-E6E098FC94C1/11008/HowAmericaSaveReport52909FINAL2.pdf

Williams Shanks, T. (2007). The impacts of household wealth on child development. *Journal of Poverty, 11*(2), 93-116.

Williams Shanks, T., Kim, Y., Loke, V., & Destin, M. (2009). *Assets and child well-being in developed countries* (CSD Working Paper 09-66). St. Louis, MO: Washington University, Center for Social Development.

Shapiro, T. (2004). *The hidden cost of being African American: How wealth perpetuates inequality*. New York: Oxford University Press.

Sherraden, M., & Clancy, M. (2008). *SEED for Oklahoma Kids: Demonstrating Child Development Accounts for all newborns*. St. Louis, MO: Washington University, Center for Social Development.

Sherraden, M. S., Johnson, L., Elliott, W., Porterfield, S. L., & Rainford, W. (2007). The *I Can Save* program: School-based children's savings accounts for college. *Children and Youth Services Review*, *29*(3), 294-312.

U.S. Bureau of Economic Analysis (2008). Personal income and outlays. Retrieved October 9, 2008, from http://www.bea.gov/national/nipaweb/Nipa-Frb.asp.

U.S. Census Bureau. (2006). Educational attainment in the United States: 2005. Retrieved October 9, 2008, from http://www.census.gov/population/www/socdemo/education/cps2005.html.

U.S. Census Bureau. (2008). Historical income tables: Households. Retrieved October 9, 2008, from http://www.census.gov/hhes/www/income/histinc/h10AR.html.

Yeung, W., & Conley, D. (2008). Black-white achievement gap and family wealth. *Child Development, 79*(2), 303-324.

Zhan, M. (2006). Assets, parental expectations and involvement, and children's educational performance. *Child and Youth Services Review, 28*, 961-975.

Zhan, M., & Sherraden, M. (2003). Assets, expectations, and children's educational achievement in female-headed households. *Social Service Review, 77*(2), 191-211.

Appendix A: Economic resources, ability, and college entry (Weighted)

	Income			Liquid Assets			Net Worth		
Variables	**A**	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**
Structural equation of college entry									
Child's academic ability	.039***	.043***	.038***	.044*	.042***	.042***	.042***	.043***	.043***
Head's education	.033	.013	.016	.030	.035	.036	.027	.059†	.057
Early economic resources		.508***	.524***		.071**	.071**		.044*	.032*
Late economic resources	.254*		.768	.065**		.050*	.049**		.036**
Control Variables									
Child's age	.239***	.218***	.216**	.240***	.229***	.229***	.240***	.227***	.227***
Child's race (Black)	-.28	.037	-.020	-.264	.111	.104	-.239	-.004	.004
Child's gender (Male)	-.342*	-.353*	-.351*	-.342*	-.346*	-.347*	-.340*	-.307*	-.305*
Head's gender (Male)	.063	-.691†	-.691†	.063	-.424	-.424	.063	-.426	-.426
Head's marital status (Married)	-.138	.077	.076	-.138	.101	.101	-.138	.198	.198
Number of children	.015	-.075	-.074	.015	-.048	-.048	.015	-.073	-.073
Pseudo R-squared	.375	.452	.467	.371	.437	.445	.384	.428	.442
Structural equation of ability									
Head's education	1.352***	.994*	.946**	1.370***	1.072***	1.057**	1.420 ***	1.388***	1.407***
Early economic resources		2.600†	2.507†		.577*	.571*		.147	.175
Control Variables									
Child's age	-.373	-.410	-.408	-.372	-.335	-.338	-.366	-.373	-.369
Child's race (Black)	-8.952***	-8.301***	-7.926***	-9.088***	-7.992***	-7.885***	-9.444***	-.9256***	-9.396***
Child's gender (Male)	1.099	1.047	1.123	1.069	.942	.974	.993	1.013	.964
R-squared	.225	.252	.249	.226	.251	.250	.229	.225	.225
Early economic resources→ college entry									
Indirect effect		.111†	.095†		.024†	.024†		.006	.007
Total effects		.619***	.619***		.095***	.095***		.051**	.040*
Model Fit Indices									
df	12	7	12	12	8	10	12	8	13
χ^2	77.396	13.934	146.859	11.964	14.963	154.635	48.665	16.465	77.246
(p)	0	.052	0.000	0	.06	0	0	.036	0
CFI	.829	.975	.661	.763	.974	.631	.894	.973	.823
TLI	.729	.946	.435	.605	.952	.432	.833	.945	.714
RMSEA	.093	.041	.139	.115	.039	.137	.07	.043	.092
WRMR	1.583	.807	2.179	1.890	.783	2.146	1.252	.818	1.515
N	626	584	584	616	584	584	626	584	584

* p<.05, ** p<.01, *** p<.001, † p<.1

Appendix B: Economic resources, ability, and college entry (Robustness Tests)

	Income			Liquid Assets			Net Worth		
Variables	**A**	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**
Panel 1: Bootstrapped SE									
Structural equation of college entry									
Early economic resources		.508***	.524***		.071***	.071***		.044**	.032†
Late economic resources	.254**		.768	.065*		.050*	.049**		.036†
Structural equation of ability									
Early economic resources		2.600*	2.507*		.577**	.571**		.147	.175
Early economic resources → college entry									
Indirect effect		.111*	.096*		.024**	.024**		.006	.007
Total effects		.619***	.619***		.095***	.095***		.051***	.040*
Panel 2: Sample=high school graduates			NA						
Structural equation of college entry									
Early economic resources		.477***			.062*	.062*		.030	.030
Late economic resources	.214†			.036†		.044†	.030		.025
Structural equation of ability									
Early economic resources		2.671*			.574*	.576*		.072	.070
Early economic resources → college entry									
Indirect effect		.102†			.022†	.022†		.003	.003
Total effects		.579***			.084**	.084**		.033	.033
Panel 3: Education expectation			NA						
Structural equation of college entry									
Early economic resources		.552***			.069*	.069*		.057*	.057*
Late economic resources	.199					.045†	.059**		.060**
Educational expectation	.876***	.901***			.878***	.878***	.878***	.914***	.914***
Structural equation of ability									
Early economic resources		1.505			.324	.319		.070	.070
Early economic resources → college entry									
Indirect effect		.046			.010	.010		.002	.002
Total effects		.598***			.079**	.079**		.059*	.059*
Panel 4: College drop-off (never dropped out=1)			NA						
Structural equation of college drop-out									
Early economic resources		.168			.008	.008		.032	.032
Late economic resources	.147			.027		.001	.040		.019
Structural equation of ability									
Early economic resources		1.474			.730*	.300		-.066	-.081

Early economic resources → college entry									
Indirect effect		.064			.013	.013		-.003	-.003
Total effects		.232			.022	.022		.029	.029
Panel 5: Student Status (full time student=1)			NA						
Structural equation of student status									
Early economic resources		-.364			-.018	-.018		-.063	-.061
Late economic resources	-.130			-.012		.050	-.018		.030
Structural equation of ability									
Early economic resources		1.669			.320	.322		-.073	-.097
Early economic resources → college entry									
Indirect effect		.096			.018	.018		-.004	-.005
Total effects		-.269			.000	.000		-.066	-.066
Panel 6: College type (four-year college=1)			NA						
Structural equation of college types									
Early economic resources		.159			-.003	-.003		-.002	-.001
Late economic resources	.091			.002		-.056	-.029		-.077
Structural equation of ability									
Early economic resources		1.665			.323	.324		-.081	-.099
Early economic resources → college entry									
Indirect effect		.076			.015	.014		-.004	-.004
Total effects		.235			.011	.011		-.005	-.005

* p<.05, ** p<.01, *** p<.001, † p<.1