THE EFFECTS OF PARENTAL ADVICE AND FINANCIAL LITERACY ON ASSET ACCUMULATION AMONG AMERICAN YOUTH

A Thesis
submitted to the Faculty of the
Graduate School of Arts and Sciences
of Georgetown University
in partial fulfillment of the requirements for the
Degree of
Master of Public Policy
in Public Policy

By

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Washington, D.C.
April 12th, 2017

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ABSTRACT

Financial literacy is an important body of knowledge and set of skills that consumers need to successfully navigate the 21st century economy. Prior research shows financial literacy bears a significant relationship, along with other factors, to the wealth outcomes of adults. While some of this research has examined how specific behaviors related to self-control affect wealth, few include the effects of parental socialization as measured through advice given from parents to children. This paper estimates an empirical relationship amongst wealth, literacy, and parental advice using data from the National Longitudinal Study of Youth's 1997 Cohort (NLSY 97). I find financial literacy and parental advice are strongly related to wealth. I also find that women on average have lower wealth than men, even after controlling for literacy, advice, and other demographics. The source of the parental advice also proves statistically important.

ACKNOWLEDGEMENTS

The author thanks his advisor Jeffrey P. Thompson for leading him through the stages of preparation of the thesis. He also thanks his wife, Jessica, who has supported him while he worked towards this degree.

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INTRODUCTION AND BACKGROUND

Policymakers have devoted a great deal of attention to improving the state of financial literacy in the United States since the Great Recession. Post hoc analyses, including the Financial Crisis Inquiry Commission's report, concluded that the build-up and eventual collapse of home prices tied to complex subprime and adjustable rate mortgages were a substantial contributor to the Recession (Angelides, 2011). Following large macroeconomic policy responses, policymakers promoted financial literacy and continued education as a bulwark against future unsustainable build-ups in household and consumer debt (Bernanke, 2012). Although many groups have endeavored to increase financial literacy and education in the United States in the public, non-profit, and private sectors, there is little uniformity in the design and implementation of these programs.

Prior literature has examined the effects of demographics on financial literacy itself (Lusardi et al., 2009), including its effects on the financial outcomes of adults and young adults. This body of literature shows that financial literacy has important implications for economic outcomes. I follow in the tradition of Tang et al., 2015 and Letkiewicz & Fox, 2014, who have examined the relationship of financial literacy and additional wealth-sustaining behaviors to wealth.

This paper explores financial literacy in the context of prior work on financial capacity, meaning that demonstrating knowledge of financial concepts alone is presumed insufficient for accruing savings and practicing responsible financial behavior. In particular, I empirically quantify the effect on wealth of parents providing advice to youth using the National Longitudinal Survey of Youth's 1997 Cohort. My findings show that parents influence their

children's financial behavior and outcomes, that women face particular obstacles to achieving sound financial futures holding all else equal, and that the source of the advice also matters.

REVIEW OF PRIOR LITERATURE

State of Financial Literacy in the United States

Financial literacy is relatively low in the United States. Researchers have assessed such knowledge through surveying respondents' understanding of compound interest, inflation, and basic diversification theory of financial portfolios (Lusardi & Mitchell, 2014). In a 2004 survey, only 34% of American adults were able to answer all three questions correctly, 10% of adults could not answer any of these three questions correctly.[1] These general results have been confirmed across a variety of demographic groups in different surveys, including when other financial topics have been tested (Lusardi & Mitchell, 2007b; Duca & Kumar, 2014; Breitbach & Walstad, 2013; Huston, Finke, & Smith, 2011). Additionally, American young adults perform quite poorly on financial literacy tests when compared to their international peers. American young adults fell below the Organization for Economic Co-operation and Development (OECD) average of a five-part financial literacy question battery measured in 2012 through the Programme for International Student Assessment (PISA) (Lusardi & Mitchell, 2014).

In the United States and internationally, these results differ substantially by demographic group. Lusardi, Mitchell, and Curto analyzed the number of correct responses to the three-question battery included in 2007 wave of the National Longitudinal Survey of Youth's 1997 Cohort (NLSY 97) (Lusardi et al., 2009). The authors found that only 27% of respondents could

[1] The compound interest question asks, "Suppose you had $100 in a savings account and the interest rate was 2-percent per year. After 5 years, how much do you think you would have if you left the money to grow? More than $102; exactly $102; less than $102; do not know; refuse to answer." The correct answer is "More than $102," as 2% interest would leave the account with a little more than $110 after 5 years. Thirty-two percent of American adults near retirement were unable to correctly answer this question (Lusardi & Mitchell, 2014).

correctly answer all three questions. The authors also found that women, racial minorities, less educated, and lower ability individuals scored worse than their male, white, well educated, or high ability peers. Additionally, parents' education and financial sophistication were associated with higher probability of a correct answer to the financial literacy questions.

Low financial literacy spans various age categories. Research shows that even Americans close to retirement had trouble answering the compound interest question correctly on the test (Lusardi & Mitchell, 2007a). Comparisons of cohorts in the Health and Retirement Study show that Americans lack of financial knowledge was evident across all age groups (Lusardi & Mitchell, 2007b). Financial literacy is also positively correlated with parental income, survey respondents' income, one's neighborhood growing up, and strongly influenced by gender (Tang et al., 2015; Lachance, 2014). Tang et al. show that there are strong interactive effects between financial knowledge and gender.

Financial Literacy's Effect on Economic Outcomes

Prior literature also establishes a link between financial literacy and economic outcomes early on and later in life. Lusardi, Michaud, & Mitchell show that between 30% and 40% of retiree wealth inequality can be explained by differences in financial knowledge (Lusardi et al., 2014). Investors with greater financial knowledge earn more in their retirement portfolios than those with less knowledge (Clark, Lusardi, & Mitchell, 2015). More financially knowledgeable consumers are more likely to develop a plan for retirement, save, and accumulate more wealth in both liquid and illiquid asset classes (van Rooij, Lusardi, Alessie, 2012; Behrman, Mitchell, Soo, Bravo, 2012; Letkiewicz & Fox, 2014). The less financial literate are more likely to misunderstand the expected value of certain retirement products, such as a private annuity, and accumulate less wealth (Brown, Kapteyn, Luttmer, & Mitchell, 2013; Stango & Zinman, 2007).

The less financially literate are also more likely to mismanage their own housing wealth through home-equity withdrawals (Duca & Kumar, 2014). Those with less financial literacy spend more for credit and banking services, are more likely to miss a mortgage payment, hold higher amounts of credit card debt, and use high-cost cash management services rather than traditional bank accounts compared to more literate individuals (Lusardi & Tufano, 2009; Tang et al., 2015; Breitbach & Walstad, 2013).

Researchers have encountered problems identifying causality in the relationship between literacy and wealth due to financial knowledge's endogeneity in modelling. While it may be that those who are more financially literate make smarter decisions and thereby accrue more assets, it may also be true that those *with a desire to accumulate wealth acquire more financial knowledge* in order to attain it. Therefore, estimating the relationship between literacy and wealth will not identify a pure effect of literacy on wealth, but may be biased by motivation to obtain wealth. Those with low literacy and wealth may simply be content not to acquire financial knowledge. Different instrumental variable approaches have been proposed to correct this issue, including instrumenting for consumers' level of economics education or information learned prior to acquiring assets (Lusardi & Mitchell, 2007; Behrman et al., 2012).

Policy Responses to Low Financial Literacy

In response to low levels of financial literacy schools, firms, and governments have attempted to improve the public's understanding of finance. However, the results of such efforts are mixed. Some evidence comes from prior estimations of the effects of changes in state education policy mandating financial education in several U.S. states. In 2004, Georgia, Texas, and Idaho changed their public high school curricula to mandate financial education. Researchers found that those graduating from high schools in these states after implementation of the policy

had lower rates of debt delinquency and higher FICO credit scores than comparable bordering states that did not adopt these policies (Brown, Collins, Schmeiser, & Urban, 2014). Yet other evidence suggests that broad-based state financial education mandates are not as effective at improving literacy as targeted personal finance coursework (Tennyson & Nguyen, 2001). Additionally, some research suggests that financial education is most effective in college, not high school, and that education is bolstered by personal financial experience (Peng, Bartholomae, Fox, & Cravener, 2007). Researchers have tested more specific and quantifiable interventions and found encouraging results. One randomized controlled experiment fielded in Ohio found that low to moderate income households (LMI) were less likely to be delinquent on their mortgages if they accepted free financial counseling and monitoring prior to the purchase of their first home (Moulton, Collins, Loibl, & Samek, 2015).

Establishing a Clear Relationship Between Wealth, Financial Education, and Literacy

While some studies have demonstrated linkages between financial literacy and wealth, the literature also identifies other capabilities, beyond pure knowledge of financial concepts, which empirically and logically correlate to positive wealth outcomes. Researchers theorize that such knowledge confers literate consumers an advantage over illiterate consumers, because it lowers the costs of financial information acquisition and evaluation (van Rooij et al., 2012). However, building wealth requires knowledge as well as "financial capability," or additional behaviors that allow an individual to manage his or her finances successfully (Johnson & Sherraden, 2007). The literature proposes that several traits correlate positively with wealth, including self-control (Gathergood, 2012), self-efficacy (Chatterjee, Finke, & Harness, 2011), thoroughness (Tang et al, 2015), conscientiousness (Letkiewicz & Fox, 2014), financial confidence (Robb & Woodyard, 2011), accurate perceptions of one's own financial literacy

(Allgood & Walstad, 2014), parental monitoring (Tang et al. 2015), locus of control (Perry & Morris, 2005), and time preference for the future over immediate consumption (Meier & Sprenger, 2013). Logically, the ability to plan, the discipline to save, and a well-diversified portfolio correlate with wealth preservation and accumulation.

Researchers have proposed that the development and exercise of these traits in young adults is heavily influenced through parental and environmental socialization factors. Young adults develop patterns of financial behavior through observation and reflection of parental behaviors (Tang et al., 2015; Jorgensen & Savla, 2010; Van Campenhout, 2015). Some measurements indicate that parental socialization is larger in its positive effect on financial capability than formal educational channels or peers (Shim & Sherido, 2011). The process of forming an identity and financial capability with respect to one's parents is discussed at length in other literature surveys (Danes & Yang, 2014; Gudmunson & Danes, 2011). In general, both theoretically and empirically researchers have attempted to identify the causal mechanism linking parental financial socialization with positive economic outcomes for young adults (Shim et al., 2013; van Rooij et al., 2012). A number of interventions have been investigated. Experimental evidence suggests parental involvement in high school financial literacy classes positively impacts savings rates as well as responsible financial behavior for both parents and students (Bruhn, de Souza Leao, Legovini, Marchetti, Zia, 2013). Tang et al. validate that self-reported parental monitoring correlates with more responsible financial behavior. Evidence also shows that direct engagement with money management exercises, such as budgeting and giving an allowance reduce teenagers' discretionary spending (Alhabeeb, 1996). Another study on college students' credit card debt indicated that the quality of that influence matters for financial outcomes as well (Norvilitis & MacLean, 2010). Hayhoe et al. demonstrated that pre-existing

relationship dynamics between parents and youth significantly affect the potential for helpful communication about credit card debt (Hayhoe, Leach, Allen, & Edwards, 2005).

Gendered Differences in Financial Literacy Considered

In the course of my analysis I will consider the possibility that the effects of advice and literacy on wealth may differ systematically by gender. There is already an extensive literature examining this question which I summarize below. Research has shown that levels of financial literacy among women are generally lower than those of similarly situated men, when controlled for risk tolerance (Yu, Wu, Chan, & Chou, 2015). These results have been generalized to adolescent girls as well as adults, showing that gaps by gender extend as early as 13-15 years of age (Driva, Lührmann, & Winter, 2016). These authors also contend that these differences in literacy are not fully explained by numeracy; risk attitudes; confidence; and stereotypes and biases are holding young girls back. Further research has shown that women have lower levels of stock market participation (Almenberg & Dreber, 2015). Accounting for numeracy lowers this disparity, but a gap still remains. Other research finds more nuanced results. Bannier and Neubert used data from a survey of adult German women and found that literacy, a person's self-perceptions about their literacy, and risk tolerance explained most of the discrepancy in participation (Bannier & Neubert, 2016). They found that gender gaps only materialize when investment decisions concern "sophisticated" assets. Finally, Fonseca et al. find evidence to suggest that gender gaps on financial literacy depend on the responsibilities women and men assume within a marriage relationship regarding financial decision-making (Fonseca, Mullen, Zamarro, & Zissimopoulos, 2012).

Contribution to the Literature

To my knowledge, the empirical literature has not clearly established causal linkages between financial literacy, parental socialization, and wealth accumulation in a longitudinal setting. Some cross-sectional studies identify important features of young adults' relationships with their parents (Norvilitis & MacLean, 2010; Hayhoe et al., 2005; Jorgensen & Savla, 2010). Shim et al. constructed their own longitudinal field study to follow college graduates, but lack the panel length and depth of the NLSY 97. Those who have used the NLSY 97 (Tang et al., 2015; Letkiewicz & Fox, 2014) have not examined the survey items concerning parental influence which the literature suggest would be most influential on wealth. Additionally, while Tang et al. do consider the potential for gender to influence the effects of literacy, no studies have measured gendered effects of parental advice and their effects on wealth.

There is a robust literature examining young adults' and families' responses to treatment in randomized controlled experiments. These include financial counseling and monitoring following the purchase of a family's first home (Moulton et al., 2015), interactive financial education interventions in a Brazilian public high school (Bruhn et al., 2013), and the priming effects of taking a survey about one's financial knowledge (Lusardi & Mitchell, 2015). While these experiments provide a scientifically valid and unique environment in which to examine the effectiveness of policy interventions, such projects take substantial time, organization, management, financial resources, and require care in randomized assignment (Remler & Van Ryzin, 2015).

This paper contributes to the literature by examining the link and interactive effects between financial literacy, direct parental communication and advice on financial and non-financial matters, and wealth accumulation among young adults. Additionally, I attempt to

validate the findings of prior longitudinal studies on the topic with respect to the importance of gendered differences in effect (Tang et al., 2015).

CONCEPTUAL MODEL AND HYPOTHESES

Prior research indicates that wealth outcomes for young adults are subject to many influences, including personal and familial characteristics, financial literacy, and parental socialization factors. The literature indicates that for young adults, simply knowing how financial products work is often insufficient for long term wealth accrual, and that personal discipline, and resiliency are also important but insufficient. Young adults learn from their peers, but are especially influenced by their parents.

I propose several models which incorporate personal and familial characteristics, financial literacy, gender, and parental socialization factors as explanatory in wealth outcomes for young adults. I posit that the level of advice given by parents to children about the difficult issues young adults face as well as that measurement's interaction with financial literacy determine wealth outcomes. I hypothesize that advice-giving is positively correlated with wealth, and that the interaction between advice-giving and financial literacy is positive. This means that the advice-giving relationship between parent and child can amplify or mitigate the effect of the same level of financial literacy on wealth. I also expect that there will be differences in the effects of advice on wealth by gender, given that prior research shows differences between men and women in levels of literacy and risk tolerance. Furthermore, I expect that there will be differences in the effects of financial literacy on wealth given the disparity between mean men's and women's levels of financial literacy and risk tolerance.

Communication and advice between a parent and child on issues of importance to the child signify a healthy relationship between the parent and child. Communication and advice-

giving offer an indirect way to measure the potential that a child has for building and sustaining the financial behaviors that are important for wealth accrual. When a parent gives advice to a child, it is quite likely that they expect the child to listen to and follow the advice. When a later conversation between them occurs, it gives the parent a chance to check in with the child to assess performance. Through this channel positive financial behaviors can take root, such as saving, investing, and avoiding high-cost debt products. My model assumes that the quality of the advice given from parent to child is of high quality and that there are no differences in parental ability or knowledge outside those which can be captured regarding the parents' demographic characteristics.

Other research has attempted to measure parental socialization through less precise measurements. Tang et al., 2015 use a parental monitoring index from the NLSY 97 panel dataset. This measurement asked the youth respondents to answer four questions on a zero to four scale about how much their parents know about the youth's friends, the youth's friends' parents, who the youth spends time outside of the home, and whether in the youth's opinion the parent knows what the youth is doing in school. These measurements are flawed because they ask the youth to speculate and they do not address the most important aspect of the parent-child relationship as it relates to forming and reinforcing positive financial behavior. Through advice and direct communication, a parent can relate his or her own life experiences, financial practices, and the household's financial condition more broadly. This gives the child a chance to ask questions, probe for more information, and figure out how the information relates to their life now and in the future. Conversely, monitoring will only reveal the extent to which the child thinks that he or she is being watched and will offer little insight into the quality of the relationship.

Additionally, seeking parental advice can be seen as a leading indicator for the youth's willingness to seek advice from a financial professional in the future. Seeking parental advice might also signal low levels of egotism, a revealed attitude which signals appropriate estimation of one's own abilities. Research shows that those who seek advice from financial professionals are more likely to be wealthy and financially knowledgeable (Robb et al., 2012). Seeking a different opinion may also correlate positively with future comparison shopping behavior for financial products.

Finally, I note that my model claims that parental communication affects wealth outcomes directly and interacts multiplicatively with financial literacy. Measuring advice-giving offers the researcher a chance to explore how unreported behaviors have a better chance of developing, such as comparison shopping or seeking professional advice. However, I also suggest that these will have the effect of amplifying or mitigating the effect of whatever level of financial literacy the respondent possesses. A respondent with weak financial literacy, either because of low educational attainment or some other reason, may obtain a similar wealth outcome as someone more financially literate than the respondent if the two respondents' parental communication backgrounds offset.

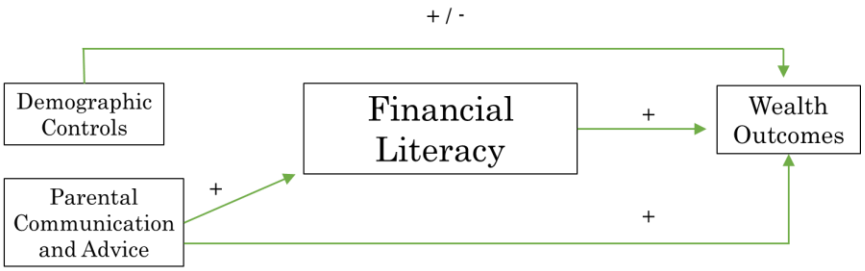
The following diagram illustrates this relationship. Parental advice and demographics will affect wealth outcomes directly, but financial literacy's effect will be both an independent variable and an interaction with advice. Therefore, parental communication could enhance or dampen the effects of financial literacy. My hypotheses regarding advice and literacy are that:

(1) Financial literacy is positively correlated with wealth outcomes.

(2) Parental communication and advice, measured quantitatively, is positively correlated with wealth outcomes.

(3) The multiplicative interaction between financial literacy and parental communication is positively correlated with wealth outcomes.

Figure 1. Determinants of Wealth Outcomes Through Parental Advice and Literacy



For example, consider two cases, the son of a wealthy businessman with high financial literacy and the son of a low-income wage earner with low financial literacy. In the first case the son attends a good school which teaches financial literacy, but his father rarely discusses money with him. He has a high level of financial literacy, but a low score on parental advice-giving. He graduates but has trouble controlling his expenses. Accustomed to a high standard of living in his youth, he takes on large levels of debt and his wealth may suffer for years thereafter. Compare that to the second case. This boy goes to a dilapidated school and is not taught financial literacy directly. However, he consistently observes his parents balancing tight household finances. He often discusses money with them and learns how to save and avoid debt at a young age. He graduates and steadily accrues a savings account balance. Although hypothetical, these examples describe situations in which the effect of financial literacy on youths' wealth outcomes may co-depend on the level of parental advice-giving.

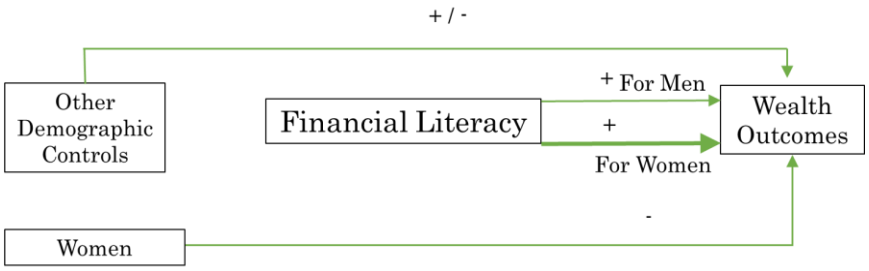
I also consider that gender may interact with literacy or advice and communication, such that the effects for boys and girls will be different. Regarding the former I expect that:

(1) Financial literacy will still correlate positively with wealth outcomes.

(2) Girls will have a lower mean level of wealth relative to boys.

(3) The differential return to financial literacy for girls will be higher than that for boys.

Figure 2. Determinants of Wealth Outcomes Differentially Affected Through Literacy by Gender



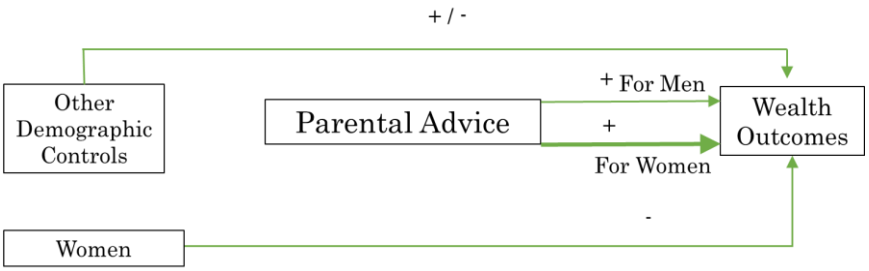
Regarding the latter I expect that:

(1) Parental advice and communication will correlate positively with wealth outcomes.

(2) Girls will have lower mean wealth than boys.

(3) The differential return to parental advice and communication for girls will be higher.

Figure 3. Determinants of Wealth Outcomes Differentially Affected Through Advice by Gender



I will also consider whether there is any differential effect of parental advice as it interacts with gender or literacy when split by biological parent instead of measured jointly.

DATA DESCRPTION

I use the National Longitudinal Study of Youth's 1997 Cohort (NLSY 97) to examine my questions empirically. The NLSY 97 began in 1997 through interviews of 8,984 teenagers born between 1980 and 1984. The survey is sponsored by the U.S. Bureau of Labor Statistics within

the U.S. Department of Commerce and it is administered by the Center for Human Resource Research at The Ohio State University.

The data are structured longitudinally, where each individual is identifiable within the survey and is observed across multiple survey items in multiple years. Data availability vary by question. The NLSY provides limited geographic information on respondents due to privacy concerns.

The NLSY 97's sample is not demographically representative of the United States general population. The NLSY 97 was sampled specifically to oversample Black and/or Hispanic or Latino respondents (BLS, 2016). The sample was drawn using two-stage stratified probability sampling technique. The data contain sample weights that allow the user to reweight observations in accordance with general U.S. population at both the survey level and panel level. These weights are recalculated each year to preserve fidelity to the U.S. Census Bureau's aggregates.

The data contain 16 rounds of information for all respondents, which begin in 1997 and continue through 2013. The data cover the employment, schooling, marital, family, income, education and training, and wealth outcomes of the respondents over this period. The data also contain certain items which were asked to the parents of the youths. In particular, I will be using the survey's assets and net-worth variables to measure wealth outcomes, which were collected from the youths in the round closest to when they reached 20, 25, and 30 years of age.[2] The

[2] NLSY screened the youth before asking the assets and wealth questions. The NLS staff determined whether a youth was "independent" prior to recording responses to the Assets 20, 25, or 30 section. The survey shows valid responses for the Assets 20 section from 7,766 respondents, for the Assets 25 section from 6,712 respondents, and for the Assets 30 section from 5,224 respondents. The staff deemed a youth independent if, "they have had a child, were enrolled in a 4-year college, were no longer enrolled in school, were not living with any parents or parent figures, or had ever been married or were in a marriage-like relationship (defined in rounds 18 as a sexual relationship in which partners of the opposite sex live together) at the time of the survey. All NLSY97 respondents are now considered independent." (BLS, 2016).

NLSY also has an extensive set of questions which concern the giving and receiving of advice between parents and children. Among a subset of roughly 230 respondents, the NLS staff asked very specific questions to the youths and parents regarding advice giving about jobs, education, finance, and personal relationships. But among a wider sample of 6,102 respondents the NLS staff asked a question regarding whether the youths sought the advice of their parent for an important decision. The financial literacy variables comprise three questions administered in the 2007 round of the survey, and contain valid responses from 7,414 respondents. For more detailed description and discussion of the coverage of the data please consult Tables 1 and 2 below.

EMPIRICAL STRATEGY

The dataset is a panel, which confers an advantage over cross-sectional analysis in that the same individuals are surveyed multiple times. This allows the researcher to observe changes over time, and remove the effects of fixed omitted variable bias in the dependent variable by taking the differences between periods over time.[3] My model uses median quantile regression in levels and a partial first differences approach to estimate changes in wealth over time. In addition, I will measure outcomes in levels at the various points in time when they occur. Ordinarily, an analysis with multiple points of observation would lend itself to a fixed-effects approach, however, I am unable to perform this analysis because while there is variance in the dependent variable across time there is no such time variation in the measurement of financial literacy or parental advice. Thus, the best differential estimation technique available is partial

[3] The NLS staff measure wealth for respondents at ages 20, 25, and 30; however, the staff require that the youths be "independent" of their parents in addition to reaching an age milestone before measuring assets. Application of these criteria prior to measurement introduces a systematic error which is likely to bias measurements upward. It could be that those individuals not yet married, in school, or living independently had lower motivation and asset levels. To test the extent of such error I counted the number of respondents who answered assets questions multiple rounds after the vast majority of their peers did. If an individual were eligible to answer the Assets 25 section on their 25th birthday but did not because they were not yet independent they would likely show up answering in a later round than the rest of their birth cohort. Upon review of the data for such systematic omission I found that at most this affects 7.7% of respondents. See Table 13 in the Appendix.

first differences. Given that the regression equation will be measuring differences in changes, some coefficients can more easily be interpreted as rates of asset accumulation.

My primary equation of estimation regresses wealth of an individual for each period of observation on a vector of demographic controls[4], a financial literacy score, a parental advice and communication score, and the interaction of the literacy and parental advice scores. The model in levels is specified below, followed by the partial first differences form.

$$Wealth_{it} = \beta_0 + \beta_1 FinancialLiteracy_i + \beta_2 ParentalAdvice_i + \beta_3 FinancialLiteracy_i ParentalAdvice_i + \beta_k Controls_{ik} + \mu_i$$

$$\Delta Wealth_{it_1t_2} = \beta_0 + \beta_1 FinancialLiteracy_i + \beta_2 ParentalAdvice_i + \beta_3 FinancialLiteracy_i ParentalAdvice_i + \beta_k Controls_{ik} + \mu_i$$

The relevant coefficients for testing my hypotheses are Beta 1, 2, and 3. Beta 1 shows the effect of financial literacy on asset accumulation assuming parental advice and communication were zero, and Beta 2 shows the effect of that advice and communication on wealth assuming no financial literacy. Beta 3 is of special importance because it describes the interactive relationship between advice and literacy. This coefficient is relevant for testing the third prediction of the first hypothesis, that parental communication can amplify the effect of a given amount of literacy. I predict that parental advice and communication amplifies the effect of financial literacy and therefore I expect this coefficient to be positive and statistically significant at standard levels. The partial first differences model differs from the levels model mainly in the interpretation of its coefficients. While the levels models express the change in wealth due to a one unit change in

[4] I will include controls for the youth's race, gender, educational attainment, annual income, marital status, risk tolerance, 5 years of criminal history, aptitude as measured by the ASVAB test, parental income and parental level of education. I omit several controls which were used in similar studies due to sample size restrictions. I discuss in the Discussion and Conclusion section below. Further, while including the ASVAB test presents sample size and selection bias constraints too, I have chosen to include it in order to mitigate ability bias issues with the financial literacy variable. I discuss in this section below.

the independent variable, the changes models express the change in the rate of wealth accumulation for a given change in the independent variable.

My second and third specifications explore the potential for gendered differences in effect for financial literacy and parental advice and communication. In these models the structure is the same as the specifications above, however I still include either financial literacy or parental advice and communication as a control variable despite interacting one or the other by gender. The second specification tests the predictions of hypothesis (2):

$$Wealth_{it} = \beta_0 + \beta_1 FinancialLiteracy_i + \beta_2 Female_i + \beta_3 FinancialLiteracy_i Female_i + \beta_k Controls_{ik} + \mu_i$$

$$\Delta Wealth_{it_1t_2} = \beta_0 + \beta_1 FinancialLiteracy_i + \beta_2 Female_i + \beta_3 FinancialLiteracy_i Female_i + \beta_k Controls_{ik} + \mu_i$$

The third specification tests the predictions of hypothesis (3):

$$Wealth_{it} = \beta_0 + \beta_1 ParentalAdvice_i + \beta_2 Female_i + \beta_3 ParentalAdvice_i Female_i + \beta_k Controls_{ik} + \mu_i$$

$$\Delta Wealth_{it_1t_2} = \beta_0 + \beta_1 ParentalAdvice_i + \beta_2 Female_i + \beta_3 ParentalAdvice_i Female_i + \beta_k Controls_{ik} + \mu_i$$

I expect that Beta 1 in both of these models will be positive, Beta 2 will be negative in both, and that Beta 3 will also be positive in both.

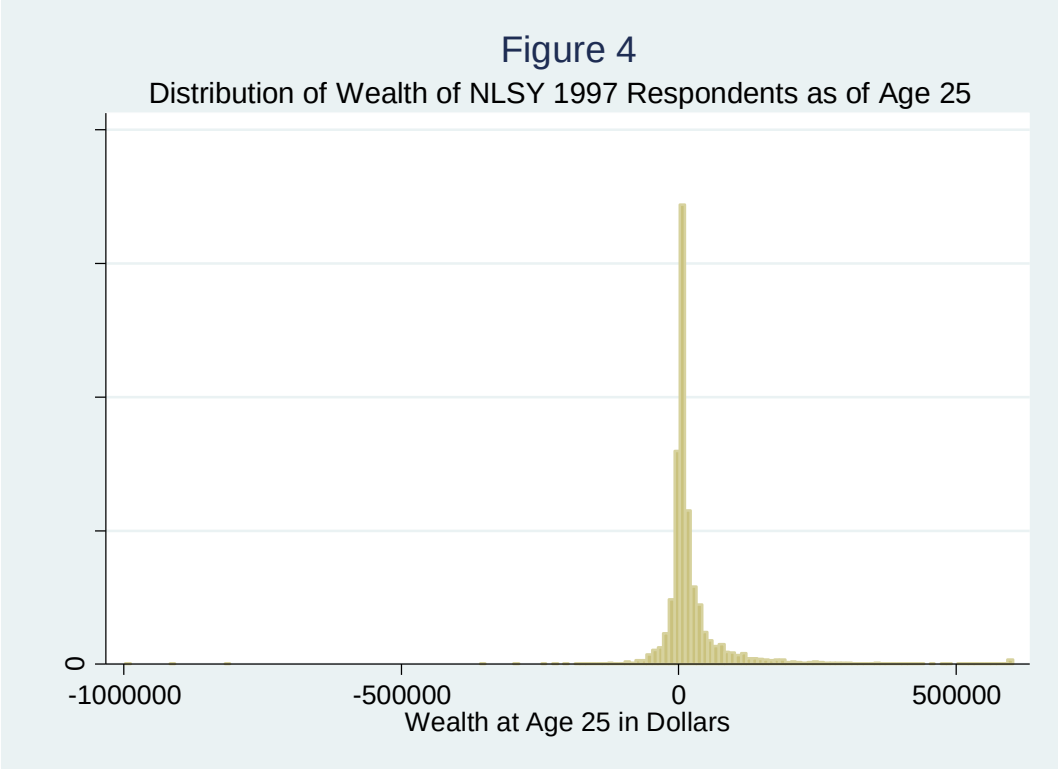
My specification constructs the financial literacy variable as the sum of correctly answered questions on the financial literacy battery portion of the NLSY, and the parental communication variable as a binary dummy which takes the positive value if a respondent says they asked their parents for advice “often” for an important decision. While more targeted advice

items in the NLSY 97 are available their sample sizes are too restricted to perform a meaningful analysis.

Variable Transformation, Measurement and Regression Technique

My data for individuals' wealth represent a range of both positive and negative currency values. Figure 4 below shows a histogram for the distribution, with a substantial fraction below zero and a wide dispersion.

Figure 4



Typically, economists transform variables measured in large dollar amounts into natural logarithms for ease of computation. Such transformations also simplify coefficient interpretation and account for starting position as well as relative change (Bailey, 2015). However, to make such a natural logarithmic transformation with my data I would have to discard negative values, because the natural logarithm function is undefined at and below zero. Discarding negative values would represent a large loss of information, and strongly introduces systematic bias in the

measurement of the results. It may be the case that the relationship between literacy and wealth or advice and wealth for those with negative wealth measurements – meaning those in net debt – differs systematically from those individuals with positive wealth amounts. The data include over 1,300 observations with negative values out of a non-missing population of 6,712.

To account for this mathematical feature of the data, while still preserving the ability to measure relative changes and take account of starting position I employ the inverse hyperbolic sine transformation of the dependent variable. The inverse hyperbolic sine function is defined as given below.

$$\theta^1 \sinh^{-1}(\theta\omega) = \theta^1 \ln(\theta\omega + \sqrt{\theta^2\omega^2 + 1}\ \ )$$

In this form theta, "θ", represents a scaling parameter that makes the function more closely approximate a linear function near the origin (Pence, 2006). For large values of wealth "ω" this function very closely approximates the natural logarithm. Most importantly, because wealth levels are squared the function is defined for all real values of wealth, including negative values. This function has many of the same properties as the natural logarithm, including that its first derivative is always positive and ever-decreasing. This allows the researcher to measure change relative starting positions of wealth.

I also use median regression techniques rather than ordinary least squares (OLS) to estimate the models put forward above. Traditionally, OLS assesses variance based on an observation's deviation from its mean. Because the data for wealth show large dispersion the mean is less informative than the median. In the wealth data for respondents at age 25, the weighted mean level of wealth is $28,411. The median level of wealth for the same is $7,351. Median regression is preferable to OLS when using highly skewed variables. It allows prediction at the median, rather than the mean, which because of the data's skewness is more relevant and

will capture the circumstances of more respondents. Below, I quote Pence, 2006 for a more nuanced discussion of the technique:

> Median regression minimizes the sum of absolute deviations and its coefficients express the marginal effect of one variable on the conditional median of another. Extreme values affect median regression less than mean regression because median regression coefficients are determined by the order of the data points rather than their magnitude.

The data for wealth are also top-coded according to the NLS staff. In most rounds these top codes do not permit reporting of wealth values above $600,000 and any value above this threshold is rounded down to the threshold level. There are also some bottom-coded values which vary by round of the survey. At age 30 the bottom code is negative $5 million. Because the data are truncated in this way I employ a Tobit model as a robustness check against the arbitrariness introduced through use of the wealth cutoffs. A Tobit model is a combination of both ordinary least squares regression and a probability model. The model first estimates the probability that an observation falls within the cutoffs specified by the researcher (Wooldridge, 2013). Next, the model estimates a vector of coefficients conditional on the probability that the observation falls within the cutoffs, which accounts for censoring and provides the appropriate conditional estimates. These estimates are discussed further in the Analysis and Regression Results section below. They should be interpreted cautiously given that they are estimated using OLS, which constructs variance as deviations from the mean rather than the median. They are also not strictly comparable to the other results which are estimated using median regression.

Coefficient Interpretation

Because I estimate the effects of my model in two different scales below, I provide the guidance for interpreting the models' outputs. Ordinarily, the coefficient in an OLS regression on levels represents the best linear estimate of the change in an outcome variable per a one unit change in the input variable, holding all else constant. However, in a first differences context the

output variable itself represents a change. Taking the change in the change means I am estimating the rate of asset accumulation for the models which measure wealth change from 25 to 30.

Accumulations of assets can occur in three ways, an increase in income given a constant rate of savings, an increase in the rate of savings given a constant income, or an increase in the yield on savings given a static or declining income and rate of savings. For example, consider a youth who begins his 25th year with zero wealth and an income of $20,000 per year. Assume that the youth's income is constant for five years, there are no taxes, the youth takes on no additional debt, and the youth saves 25% of his income. Under these conditions, after five years he will have accumulated $25,000 in savings. In my model this would be measured as a $25,000 increase in wealth. However, the youth could also have reported nearly same increase in wealth given a different combination of saving and investing choices. If instead of saving his income for the first four years in a no-yield asset he invested it in an asset earning 5% annual returns, he would have entered the fifth year with $21,000 in wealth. The youth would have then been in reach of achieving $25,000 in wealth by only saving 20% of his income in the fifth year. Compound returns and his early saving behavior could yield the same result, despite a lower average rate of saving than expected.

Therefore, readers must bear in mind that similar increases in assets are not unambiguously attributable to higher rates of savings. They could be influenced by better investment strategies. Unfortunately, the NLSY 97 survey does not contain data that could control for such heterogeneity. Moreover, it may also be a source of upward bias in the estimate of financial literacy's effect on wealth, such that those with better asset-picking abilities earn more than those with worse abilities, if we assume that such ability is positively correlated with

financial literacy. Later, I discuss how the introduction of certain controls might mitigate this ability bias.

Additionally, given the transformation using inverse hyperbolic sine (IHS) discussed above I briefly discuss interpretation of coefficients in this context. For those regressions done in levels after transforming to IHS the interpretation matches closely with the natural logarithm. Coefficients represents the percent response in wealth to a one unit change in the independent variable. These are scaled from zero to one, where 0.50 would represent a 50% change. In the case of two variables being measured in IHS form, such as an independent variable regarding income, the interpretation would more closely align to an elasticity measurement. A coefficient of 0.50 would then represent a 0.5% response in the dependent variable per 1% impulse in the independent variable. Finally, when measuring changes in IHS, much like natural logarithms the interpretation of the coefficients should be on a percentage basis. Yet, in this context they represent rates of change, not increases or decreases in absolute level.

Identification and Causality

There are obstacles to an unbiased estimate of financial literacy's effect on wealth outcomes. It may be the case that financial literacy is a biased estimator for wealth. Those who *desire* to become wealthy may obtain financial knowledge in order to exploit it and gain wealth. Therefore, the estimated effect of financial literacy on wealth may be upwardly biased by the desire to obtain wealth, or superior asset-picking ability. To correct for this I considered using an instrumental variable for financial literacy. Several instruments have been proposed in the literature. One of particular note is high school economics education (Van Roojie et al., 2012; Lusardi & Mitchell, 2007a). Economics education should have strong predictive power when it comes to financial literacy, because it touches on similar topics to those which are tested in the

core questions such as interest rate accumulation, purchasing power, and risk diversification. Since high school economics education is taught before youths enter the workforce and begin accumulating assets it should be uncorrelated with wealth.

While ideal in theory, the NLSY 97 does not have data available which cover economics education exposure in great enough depth to justify its use as an instrument. Unfortunately, the availability of economics education in the United States is rather irregular across the country. The U.S. has devolved authority to states and local governments to decide the features of their curricula, and economics is not mandated in all of them (Robinson, 2013). Further, even if this data were available in the NLSY 97 there would be difficulty matching respondents to the particular jurisdictions in which it is taught.

I searched further through the NLSY attempting to identify an instrument that would satisfy both conditions necessary for estimation. Valid instruments satisfy two criteria, first they must predict the endogenous variable well. Second, they must be theoretically uncorrelated with the dependent variable (Wooldridge, 2013). My search for a valid instrument was thorough but fruitless. While some studies have proposed numeracy, as measured through ability to handle numbers well, I reject this approach due to a lack of data or suitable proxy instruments for such a concept as measured through the NLSY 97.

Mitigating Omitted Variable Bias

The literature on biased financial literacy estimates falls into two main groups. Some authors argue that financial literacy is biased in much the way that schooling attainment is because it does not capture abilities, talents, and motivation (Behrman et al., 2012). Another group of scholars believe financial literacy is a biased estimator of wealth because it cannot distinguish the wealth enhancing aspect of the knowledge and the motivation to obtain wealth.

My estimate of financial literacy and parental communication and advice's effect on wealth does not instrument for financial literacy, but through controlling statistically for other sources of variation I reduce its impact. In the case of the first source of bias, such as ability, I include a measurement of ability captured through a standardized test score. The NLSY 97 has data for respondents on standardized test scores through achievement on the ASVAB (Armed Services Vocational Aptitude Battery) exam. The second source of bias is through motivation and desire to obtain wealth. Someone who desires wealth also be impatient and more likely to take risks. I control statistically for these tendencies as well by including a measurement of risk preference in my model. The NLSY 97 has direct questions about risk preference, which reveal how much risk an individual is willing to accept to attain a higher income. I use the respondents' maximum acceptable variance in income to control for risk preference. [5] Controlling for risk preference mitigates a key endogenous portion of financial literacy's relation to wealth ambition.

DESCRIPTIVE STATISTICS

Wealth is distributed highly unevenly among the youth respondents, including both positive and negative observations. Figures 6 – 8 in the appendix show these distributions, both in nominal dollars and after transformation using the inverse hyperbolic sine function. The advantage of this function in a modeling context is that it allows estimation and interpretation of

[5] The NLSY 97 asks two questions of respondents regarding risk. The first is a hypothetical about whether the individual would opt to stay in their current job if their current income were guaranteed for life, or take a second job where there is 50% chance of earning double their current income, but also a 50% chance that they would lose 33% of their income. If the respondent opts not to take a risk on the first question they are asked a second question which poses the same first option, but the risky option's down side is reduced to only 20% of current income. If the respondent initially opted for the riskier choice they are asked a second question which poses the same first option, but the risky option's down side is raised to a loss of 50% of current income. From these options I compute four different levels of variance in income. The variance is the sum of squared deviations from expected income, where expected income is the sum of probability weighted outcomes. For the first question: $E(I) = 0.5(2I) + 0.5\left(\frac{2}{3}I\right) = \frac{4}{3}I$. The variance is the sum of squared deviations of each potential outcome: $V(I) = \sum_i^N (E(I) - I_i)^2 = \left(2I - \frac{4}{3}I\right)^2 + \left(\frac{2}{3}I - \frac{4}{3}I\right)^2 = 2\left(\frac{2}{3}I\right)^2 = \frac{8}{9}I^2$. Because these questions were posed irrespective of the respondent's income level, I use the unscaled variance parameter $\left(\frac{8}{9}\right)$ or approximately 0.888.

natural-logarithm-like models, but for variables with negative values. The range of the inverse hyperbolic since function can be interpreted much the same way natural logarithm values are. The frequencies in these figures are probabilistically weighted using the weights provided by the NLS staff. The nominal dollar distributions are bucketed in these histograms in intervals of $10,000. The median level of wealth at 25 years old for a sample respondent is $7,351. The mean is far higher at $28,411, reflecting the wide dispersion and skewness of this variable.

The financial literacy score is distributed rather evenly. Table 1 shows, among its other summary statistics, that the mean number of correctly answered questions is between one and two and that this variable has wide coverage across the sample.[6] In Table 2 financial literacy is further cross-tabulated for various other demographic groups. It is higher among men, whites, those with a college or advanced degree, and those whose mothers went to college. In Figure 5, one can see the score breakdown for women and men separately. The histogram of financial literacy score by integer interval shows men are more heavily distributed near the higher scores and women near the lower ones. Nearly 42% of youths said that their parents gave them advice about an important decision often. Parental advice is further cross-tabulated for various other demographic groups. It is higher among women, blacks, and those with college or advanced degrees. Parental advice as summarized in this table is unconditional on all parents providing advice often, rather it indicates that 42% of youths had at least one parent, mother or father, biological or residential provide advice in this way. Below those results, in Table 2 are the results split by biological mother and father. These figures of 33% and 18% are lower individually than 42% because that figure is inclusive of those who receive advice often from both. This table also

[6] A breakdown of correct responses to each financial literacy question is available in the appendix. See Figure 9.

shows summary figures for the wealth, income, inheritance, ASVAB, and risk tolerance variables.[7]

Table 1
Summary Statistics of Categorical Variables in NLSY 97 Data Set

Variable	N	Proportion [1]	Mean Parental Advice Score [2]	Mean Financial Literacy Score	Mean Networth 25	Median Networth 25 [3]
Range	Integer	[0,1]	[0,1]	[0,3]	Integer	Integer
Sample Means	8,984					
Mean Networth at 25	6,712				$ 28,411	$ 7,351
Mean Financial Literacy	7,414			1.85		
Mean Parental Advice	7,640		41.7%			
Gender	8,984					
Male		51.2%	34.1%	2.01	$ 29,677	$ 7,700
Female		48.8%	49.9%	1.68	$ 27,016	$ 5,800
Race	8,984					
Black		15.4%	58.3%	1.58	$ 11,514	$ 3,250
White		66.8%	36.9%	2.13	$ 31,751	$ 9,500
Hispanic		12.9%	48.7%	1.94	$ 25,874	$ 7,500
Asian		2.3%	40.9%	1.94	$ 31,298	$ 8,850
Native American		0.6%	45.3%	1.60	$ 15,507	$ 7,900
Mult or Other		2.0%	41.3%	1.66	$ 29,372	$ 9,000
Inheritance at 25	8,984					
Inherited		5.5%	38.6%	1.95	$ 62,107	$ 14,000
Did Not Inherit		94.5%	41.9%	1.84	$ 26,604	$ 7,000
Arrested at 25	8,984					
Arrested		14.1%	37.1%	1.71	$ 18,554	$ 3,500
Not Arrested		85.9%	42.3%	1.92	$ 30,079	$ 7,500
Youth's Education at 25	6,791					
No HS		10.3%	33.6%	1.33	$ 15,566	$ 3,250
HS or GED		50.6%	40.0%	1.67	$ 27,502	$ 7,500
Associates Degree		9.0%	42.9%	1.90	$ 34,242	$ 9,950
College or Advanced		30.1%	47.2%	2.32	$ 32,849	$ 10,050
Marital Status at 25	8,984					
Married		27.0%	42.6%	1.85	$ 49,740	$ 18,000
Unmarried		73.0%	41.5%	1.84	$ 20,658	$ 5,038
Parent's Education						
Mom College	8,296	22.7%	46.3%	2.21	$ 35,364	$ 9,400
Dad College	7,128	25.7%	46.2%	2.19	$ 34,531	$ 10,100

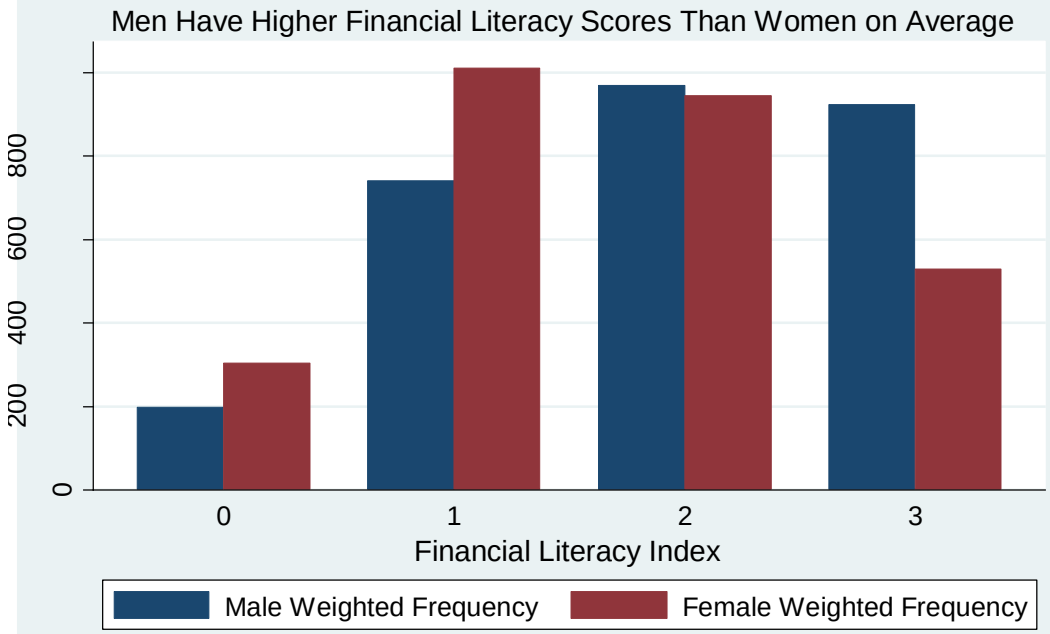
Note:
[1] All estimates are weighted using the probability sampling weights provided by the NLS staff for 2005.
[2] Proportion of group receiving advice from parent "often".
[3] Medians are unweighted estimates.

Among the numeric variables one can see that, in general, wealth rises with age. Mean wealth for 20 year olds is $16,248. This figure rises to $28,200 for 25 year olds and $56,700 for

[7] In Figure 6, one can see estimates for parental advice disaggregated for all levels of response to the question and by biological parent.

30 year olds. Family income also follows an increasing age profile between 25 and 30 years old. Below these variables one notices the inheritance indicator variable is summarized. Relatively few individuals in the sample receive an inheritance, but the figure is nearly 8% by age 30. Further below I summarize the results of the ASVAB. The nature of the ASVAB variable's scaling by percentile implies its mean is close to 50, which is confirmed in Table 2.[8] Finally, one can see the description of the risk tolerance variable. This variable is semi-continuous, taking on four values for the implied maximum variance in income the respondent was willing to tolerate. The mean for this variable is 44% maximum tolerated variance in income.

Figure 5



[8] Unfortunately, observations for ASVAB are not present for all respondents, because the NLS staff were unable to obtain scores for all respondents. Respondents were offered, but not required, to take the exam. This introduces some estimation bias. See appendix for more discussion.

Table 2
Summary Statistics of Numerical Variables in NLSY 97 Data Set

Variable	N	Mean [1]	SD	Min	Max
Financial Literacy Index	7,414	1.85	0.93	0	3
Parental Advice					
Given on Imp Decision					
Often	7,640	41.7%	49.0%	0	1
Biological Father	6,741	17.8%	38.0%	0	1
Biological Mother	7,453	32.8%	47.0%	0	1
Networth					
Age 20	5,510	$16,248	$47,100	-$198,000	$600,000
Age 25	4,911	$28,200	$81,500	-$998,000	$600,000
Age 30	3,822	$55,700	$152,000	-$5,000,000	$600,000
Age 20 Inverse Hyp. Sine	5,510	7.96	5.34	-12.89	13.99
Age 25 Inverse Hyp. Sine	4,911	5.73	8.48	-14.42	13.99
Age 30 Inverse Hyp. Sine	3,822	6.85	8.49	-16.12	13.99
Family Income					
Age 20	4,788	$64,000	$79,900	$0	$421,000
Age 25	4,909	$61,700	$58,700	$0	$344,000
Age 30	3,852	$73,600	$60,600	$0	$325,000
Parental Income 1997	4,975	$50,500	$45,500	$0	$357,000
Inheritance					
Age 20	8,984	2.1%	12.4%	0	1
Age 25	8,984	5.5%	19.5%	0	1
Age 30	8,984	7.9%	23.8%	0	1
Arrested Past 5 Years					
Age 20	8,984	21.1%	40.8%	0	1
Age 25	8,984	14.1%	34.8%	0	1
Age 30	8,984	8.1%	27.2%	0	1
ASVAB	7,073	52.90	29.12	0.11	100
Max Tol Variance in Income	7,274	43.5%	46.0%	0	1.13

Note:
[1] All estimates are weighted using the probability sampling weights provided by the NLS staff for 2005.

Below, I describe the methods I use to construct the variables in the table above, from the raw data provided by the NLS staff. Dollar figure variables such as wealth, respondent's family income, and parental income are transformed using the inverse hyperbolic sine function prior to inclusion in the regression. This allows the researcher to interpret the results similarly to a natural logarithm function where a percent change in one indicates a percent change in the other, or an elasticity as is commonly used in measuring other economic variables.

Table 3. Variable Construction Details and Definitions

Variable Name	Description
Networth at Age 20, 25, 30 [9]	A continuous variable representing the sum of financial and non-financial assets and debts in dollars. Includes retirement wealth, real property, stocks, bonds, mortgage, credit card, and other debts. Models estimated in levels use this variable after transformation through the inverse hyperbolic sine function and those estimated in changes take the first difference of the transformed variable. NLS top-coded and bottom-coded data at point of collection to eliminate extremes.
Financial Literacy	Sum of correct answers provided by respondent to three financial literacy questions. Refusal to answer or a response of "Do Not Know" is included and coded as incorrect answers. Left missing if question not fielded to respondent.
Parental Advice	A [0,1] indicator variable coded 1 for those responding that they had received advice from a parent "often" regarding an important decision. Captured when respondents were age 21, irrespective of whether advice came from biological or residential mother or father.
Parental Advice Biological Parent	Captured when respondents were age 21. Conditioned on advice coming from either a biological mother or father only.
Biological Mother	Biological mother gave advice "often" regarding important decision.
Biological Father	Biological father gave advice "often" regarding important decision.
Female	Gender indicator variable coded 1 for females, 0 for males.
Risk Tolerance	A semi-continuous variable describing the maximum variance in income the respondent was willing to accept when posed a hypothetical choice between two income prospects. Each respondent was posed two hypotheticals, creating four outcomes and an associated variance of income. Variance is calculated as the sum of squared deviations from expected income.
Arrested	A [0,1] indicator variable coded 1 for those who have been arrested on any charge in the five years prior to and inclusive of the interview.
Income at Age 20, 25, 30	Strictly positive and continuous level of income in dollars transformed using inverse hyperbolic sine function. Represents family's income from all sources, including interest and dividend payments. For 25 and 30 year olds measurements are consistent with actual age, but at 20 all measurements derive from 2004, regardless of participant's actual age.
Inheritance at Age 20, 25, 30	A [0,1] indicator variable coded 1 for those responding that they have *ever* benefited from a trust or inheritance up to and inclusive of that age bracket.

[9] See Data Description section for a more detailed account of when the NLS staff interviews youths and conditions for independence.

Variable Name	Description
Married at Age 20, 25, 30	A [0,1] indicator variable coded 1 for those married at the time of interview when either 20, 25, or 30 years old. Includes those married and living with or without their spouse. Does not include those formerly married and either, widowed, separated or divorced.
Race Variables	A [0,1] indicator variable for a respondents identification with a particular racial category.
White	Identified as White, non-Hispanic.
Black	Identified as Black, non-Hispanic.
Hispanic	Identified as Hispanic.
Asian	Identified as Asian, non-Hispanic.
Native American	Identified as Native-American, non-Hispanic.
Other Race	All others in the sample who identified as none of the above.
ASVAB	A continuous variable representing the smoothed percentile achievement of youths who took the Armed Services Vocational Aptitude Battery exam at 17 years of age. Test is adaptive to the test-taker based on correct responses to certain items. To create comparable scores, NLS staff compared correct responses per item of the test fielded. The NLS staff further weighted the responses and created a smoothed percentile distribution. Exam participation was not mandatory.
High School or GED at 20, 25, 30	A [0,1] indicator variable for a respondent if their highest level of educational attainment by that age was a high school diploma or general education development certification. Those with educational attainment below this level are treated as the reference category.
Associate's Degree at 20, 25, 30	A [0,1] indicator variable for a respondent if their highest level of educational attainment by that age was an Associate's Degree.
College at 20, 25, 30	A [0,1] indicator variable for a respondent if their highest level of educational attainment by that age was either a Bachelor's, Master's, Ph.D., or other advanced degree.
Mom College	A [0,1] indicator variable for a respondent if their *biological* mother had graduated from a college or university with either a Bachelor's, Master's, Ph.D., or other advanced degree.
Dad College	A [0,1] indicator variable for a respondent if their *biological* father had graduated from a college or university with either a Bachelor's, Master's, Ph.D., or other advanced degree.

ANALYSIS AND REGRESSION RESULTS

The results of preliminary quantile regressions show that financial literacy is strongly predictive of wealth levels at 25, 30, and changes in wealth between 25 and 30. Table 4 below shows these results, among others. Without any other controls, the ability to answer an additional

financial literacy question correctly correlates to 28.9% higher wealth levels for 25 year olds, and 55.6% higher wealth levels for 30 year olds, as shown in models (1) and (4) respectively. The change in wealth between 25 and 30 is 28.2% higher for those with greater financial literacy, as shown in model (7). In the tables which follow a single star next to a coefficient estimate implies a p-value less than or equal to 10%. This means that one can reject the null hypothesis that the coefficient estimate were equal to 0 with the stated level of confidence, according to a two-tailed test. Two stars implies a confidence level of 5% and three stars implies confidence at the 1% level. All of the regression results are computed using linear quantile regression at the median and weighted using the sampling probability weights computed by the NLS staff for the appropriate panel year. Please caveat any other information provided in the tables' notes.

Table 4 – Quantile Regression Results with No Controls

Variable	Inverse Hyperbolic Sine of Wealth in Levels						in Changes		
	Age 25 in Levels			Age 30 in Levels			30 - 25		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Financial Literacy	0.289***		0.298***	0.556***		0.564***	0.282***		0.281***
Parental Advice		0.125	0.218**		0.178	0.257**		-0.0387	0.0104
Constant	9.154***	9.616***	9.038***	9.571***	10.49***	9.435***	0.0486	0.588***	0.0479
N	4,738	4,894	4,723	3,561	3,553	3,551	2,991	2,983	2,981

Note:
These models are estimated using least squares quantile regression evaluated at the median (50th percentile). Financial literacy is measured as the sum of correctly answered questions from amongst the three fielded in 2007. Parental advice is a 0/1 indicator for whether either biological parent gave advice to the child "often" regarding an important decision.
All results are weighted using the inverse sampling probability weights provided by the NLS staff. For results estimated for 25 year olds the 2005 weights are used, and for 30 year olds and 25 to 30 changes 2010 weights are used.

Preliminary results for parental advice, however, show little impact on their own. Models (2), (5), and (8) show receiving advice often is not associated with a statistically significant increase in wealth levels or change in wealth. Yet, when both are included in the model the impact of financial literacy strengthens slightly and parental advice becomes a positive and statistically significant determinant of wealth levels at both 25 and 30 years old.[10] Receiving

[10] See models (3) and (6).

advice often increases wealth levels by 21.8% at 25 years old, and by 25.7% at 30 years old. In each of these models the effect of correctly answering an additional financial literacy question increases modestly. However, there is little to no effect on the rate of change in wealth accumulation between 25 and 30 years of age, as shown in model (9).

[Table 5 follows in its entirety on the next page.]

Table 5 – Quantile Regression Results with Controls

Variable	Inverse Hyperbolic Sine of Wealth in Levels				in Changes	
	Age 25 in Levels		Age 30 in Levels		30 - 25	
	(10)	(11)	(12)	(13)	(14)	(15)
Financial Literacy	0.308***	0.102**	0.484***	0.298***	0.261***	0.195***
Parental Advice	0.328***	0.151*	0.233**	0.128	0.0404	-0.305**
Female	-0.211**	-0.425***	-0.137	-0.0171	-0.187*	-0.292**
Risk Tolerance	0.0993	0.101	0.286***	0.250	0.0914	-0.252
Arrested		-0.439***		-0.837***		-0.224
Income		0.234***		0.797***		0.456***
Inheritance		0.621***		0.191		0.00659
Parent's Income in 1997		0.0222		0.0244		-0.0431
Year Dummies						
2006		0.280*				
2007		0.245*				
2008		0.119				
2009		-0.164				
2010						
2011				-0.0733		-0.468***
2013						
Married		1.236***		0.933***		0.156
Race						
Hispanic		-0.238**		0.0114		-0.110
Black		-0.501***		-0.0312		-0.195
Asian		-1.180		0.193		-0.472*
Native American		-0.190		0.446		1.077
Other Race		-0.789		-1.092		0.340*
ASVAB		-0.00634**		0.00115		-0.00254
Collapsed Education Levels						
HS or GED		0.140		0.162		-0.0957
Associate's		0.235		-0.318		0.0165
College		0.203		0.192		0.0176
Mom College		0.324***		0.284		-0.206
Dad College		0.172		-0.130		0.383*
N	4,452	2,344	3,469	845	2,913	704
Constant	9.008***	6.532***	9.549***	-0.247	0.134	-3.938***

Note:
Models are estimated using least squares quantile regression evaluated at the median (50th percentile). See Table 3 for definitions and notes regarding variable construction. All results are weighted using the inverse sampling probability weights provided by the NLS staff. For results estimated in levels at 25 the 2005 weights are used. For 30 year olds and changes between 30 and 25, 2010 weights are used.

Following the introduction of controls to these models the effect of literacy and parental advice decline, in some cases substantially. The results are displayed above in Table 5. Model (11) shows the case of wealth modeled in levels with the full suite of controls. The control variables' construction is defined by Table 3 in the Descriptive Statistics section above. In this

model literacy only conveys a 10.2% effect on wealth per additional correct answer, and parental advice only contributes to 15.1% higher levels of wealth. Demographics play a strong role in wealth levels, despite controlling for literacy, advice, income, and risk tolerance. Unmarried women have 42.5% lower levels of wealth at 25. Having a criminal history within the past 5 years is strongly negatively correlated with wealth levels, lowering wealth by 43.9% on average. Conversely, having received any amount of inheritance correlates with 62.1% higher wealth on average. Blacks and Hispanics are also disadvantaged relative to Whites (the reference category). Educational attainment of the respondent and that of the respondent's biological mother are strong and positively correlated with wealth levels. Strangely, cognitive ability as measured by the ASVAB is negatively correlated with wealth.[11] The respondent's income is positively correlated with wealth. Because income was measured using the same functional transformation as wealth, I interpret the coefficient as an elasticity implying a 0.23% increase in wealth per 1% increase in income. Parental income in 1997, however, is not predictive. Finally, the year fixed effects show the macroeconomic effects of wealth measurement in a particular year, relative to 2005.

However, by 30 years of age many of these demographic effects subside and the effects of literacy re-emerge as a stronger predictor of wealth. By age 30, when measuring wealth in levels, model (13) shows that an additional correct financial literacy response is associated with 29.8% higher wealth. Income elasticity becomes much stronger, its estimate of 0.797 implies a 1% increase in income is associated with an approximately 0.80% increase in wealth at age 30. Further, many of the demographic controls that are statistically significant at age 25 are no longer significant at age 30, with the exception of criminal history which becomes stronger. The

[11] I investigate and discuss this result further in the Appendix.

inheritance indicator and ASVAB score lose most of their predictive value. The results of model (13) show that although ability, expressed through the ASVAB, and inherited wealth help at age 25 they help less at age 30. This shift in strength and importance of wealth prediction in levels maps onto the model of changes in wealth from age 25 to 30, as shown in model (15). For levels and changes in wealth measured at 30 years old, the fixed effects for years use 2010 as the excluded category.

Regression Results for Interaction Models

When I model my main hypothesized relationship, where literacy is interacted with advice, the results do not show a statistically significant effect in the absence of controls. The results are displayed below in Table 6. For those who do not receive parental advice often the effect of literacy is still strong and positive, improving wealth levels at age 25 by 30.4%, as shown in model (16). Parental advice's effect, now only accounting for those with no financial literacy is positive, but not statistically significant. However, the coefficient fitted to the interaction term is negative, and not statistically different from zero. Model (20) shows the result for levels of wealth at 30 without controls is insignificant, and model (24) shows the same for the change in wealth between the two ages. Thus, I must reject the second and third predictions in hypothesis (1) which concerned advice and literacy.

Table 6 – Quantile Regressions with Interactions and No Controls

Variable	Inverse Hyperbolic Sine of Wealth in Levels								in Changes			
	Age 25 in Levels				Age 30 in Levels				30 - 25			
	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
Financial Literacy	0.304***	0.292***	0.326***	0.282***	0.474***	0.549***	0.522***	0.564***	0.233***	0.283***	0.283***	0.277***
Parental Advice	0.234		0.275***	0.365***	-0.0383		0.273***	0.148	-0.180		0.00928	-0.0202
Female		-0.0117	-0.00305	-0.0818		-0.145	-0.233	-0.274*		-0.128	-0.127	-0.184*
Female x Advice Interaction				-0.189				0.255				0.0598
Advice x Literacy	-0.00556				0.149				0.108			
Female x Literacy		-0.0684	-0.0943			0.0126	0.0361			-0.0244	-0.0258	
N	4,723	4,738	4,723	4,723	3,551	3,561	3,551	3,551	2,981	2,991	2,981	2,981
Constant	9.021***	9.181***	9.028***	9.105***	9.613***	9.617***	9.579***	9.563***	0.128	0.128	0.127	0.145

Note:
Models are estimated using least squares quantile regression evaluated at the median (50th percentile). See Table 3 for definitions and notes regarding variable construction. All results are weighted using the inverse sampling probability weights provided by the NLS staff. For results estimated in levels at 25 the 2005 weights are used. For 30 year olds and changes between 30 and 25, 2010 weights are used.

I then test the assumptions presented in Tang et al. regarding the influence of gender on literacy. I construct a gender and financial literacy interaction term, where the term is turned on for women, and men receive the un-interacted coefficient. In this model I omit the effect of parental advice. Table 6 shows the results in model (17) for wealth levels at 25, in model (21) for levels at 30, and in model (25) for changes. The results show a strong positive correlation between literacy and wealth for men. In all of these models the female indicator variable, which describes the average level of wealth difference for women relative to men, is not statistically different from zero. Further, the interaction term between gender and literacy is negative, but not statistically different from zero, indicating no separate effect of literacy ability for women relative to men. When I include the effect of parental advice in the same model literacy's estimated effect on men's levels and changes only move slightly. Yet, both the female mean indicator and female literacy interaction term remain statistically indistinguishable from zero. These results, shown in models (18), (22), and (26), imply that the third prediction of hypothesis (2) regarding the effect of financial literacy as differentiated by gender must be rejected. The data show that men benefit substantially from increases in financial literacy, but that women do not benefit differentially from men.

Having shown that literacy does not interact with advice, and gender does not interact with literacy, I explore whether gender interacted with advice. The results show this does not occur absent controls. I found the ability to answer an additional literacy question correctly improves wealth outcomes for men in both time periods when measured in levels and changes. However, the gender advice interaction term is not statistically distinguishable from zero in any of the models. In wealth measured in levels at 25, the effect of parental advice on men is strongly positive and statistically significant. When measured in levels and changes the female indicator

variable is negative and insignificant implying women have lower wealth on average than men. These results are shown in Table 6, models (19), (23), and (27). This leads me to reject the third prediction of hypothesis (3).

Following the introduction of controls, shown in Table 7, most of the interaction term results remain consistent. Notably, the effect of financial literacy for men declines when wealth is measured in levels, as shown in models (29) – (31) and (33) – (35). The literacy interaction terms for women and financial literacy still remain statistically insignificant. However, the effect of literacy and advice does return a positive and significant estimate for wealth measured in levels at 30 years old, as shown in model (32). For many other models the interaction terms are not significant. Strangely, parental advice for those with no financial literacy and for men only is statistically significant and associated with a *decrease* in wealth accumulation between 25 and 30 years old.[12] However, most demographic variables retain their sign and magnitudes from earlier estimations without the interaction terms.

[Table 7 follows on the next page in its entirety.]

[12] See models (36) and (38), respectively.

Table 7 – Quantile Regressions with Interactions and Controls

Variable	Inverse Hyperbolic Sine of Wealth in Levels								in Changes			
	Age 25 in Levels				Age 30 in Levels				30 - 25			
	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)
Financial Literacy	0.0732	0.144***	0.129**	0.119**	0.0594	0.225**	0.244***	0.286***	0.0881	0.254**	0.262***	0.163**
Parental Advice	-0.0188		0.146*	0.223**	-0.564		0.109	0.167	-0.558**		-0.261*	-0.263
Female	-0.407***	-0.277	-0.324	-0.307**	-0.113	-0.226	-0.229	0.0396	-0.347**	-0.0590	-0.00316	-0.281
Female x Advice Interaction				-0.205				-0.114				-0.0543
Advice x Literacy	0.0830				0.346**				0.156			
Female x Literacy		-0.0586	-0.0646			0.0994	0.101			-0.145	-0.144	
Risk Tolerance	0.133	0.126	0.101	0.147	0.276*	0.219	0.215	0.238	-0.346**	-0.301*	-0.316**	-0.274*
Arrested	-0.431***	-0.348***	-0.425***	-0.407***	-0.893***	-0.863***	-0.832***	-0.811***	-0.297	-0.411	-0.278	-0.240
Income	0.235***	0.236***	0.235***	0.237***	0.792***	0.797***	0.801***	0.802***	0.443***	0.417***	0.475***	0.429***
Inheritance	0.547**	0.705***	0.654***	0.680***	0.321	0.200	0.155	0.158	0.0362	0.0294	0.0618	-0.0124
Parent's Income in 1997	0.0177	0.0229	0.0194	0.0136	0.0294	0.0280	0.0254	0.0230	-0.0259	-0.0538	-0.0412	-0.0426
Year Dummies												
2006	0.298**	0.306**	0.269*	0.299**								
2007	0.287**	0.275*	0.242	0.252*								
2008	0.163	0.152	0.124	0.170								
2009	-0.0969	-0.161	-0.157	-0.0941								
2010												
2011					-0.0270	-0.0459	-0.0704	-0.0786	-0.470***	-0.409***	-0.443***	-0.465***
2013												
Married	1.210***	1.255***	1.237***	1.206***	0.904***	0.882***	0.915***	0.916***	0.134	0.0824	0.140	0.161
Race												
Hispanic	-0.209**	-0.268***	-0.219**	-0.238**	-0.0405	-0.0415	0.00293	-0.0351	-0.143	-0.140	-0.137	-0.145
Black	-0.474***	-0.458***	-0.474***	-0.482***	-0.0557	-0.0504	0.00188	-0.0382	-0.234	-0.221	-0.170	-0.176
Asian	-1.080	-1.204	-1.205	-1.122	-0.0558	0.369	0.269	0.181	-0.466***	-0.426	-0.396*	-0.444
Native American	-0.153	-0.264*	-0.161	-0.174	0.576	0.376	0.385	0.384	0.942	1.067	0.952	1.019
Other Race	-0.739	-0.670	-0.761	-0.815	-0.991	-0.970	-1.021	-0.994	0.290	0.254	0.450*	0.319
ASVAB	-0.00640***	-0.00682***	-0.00627***	-0.00591***	0.00170	0.000317	0.00134	0.00144	-0.00151	-0.00143	-0.00136	-0.00153
Collapsed Education Levels												
HS or GED	0.169	0.207**	0.160*	0.166*	0.105	0.236	0.179	0.185	-0.248	-0.127	-0.0923	-0.112
Associate's	0.238	0.347*	0.276	0.235	-0.256	-0.273	-0.281	-0.344	-0.114	-0.253	-0.0653	-0.0363
College	0.260	0.327*	0.233	0.227	0.173	0.368	0.242	0.239	-0.157	-0.171	-0.0275	-0.0303
Mom College	0.322***	0.274**	0.314***	0.286**	0.299	0.248	0.263	0.257	-0.172	-0.125	-0.235	-0.191
Dad College	0.175	0.150	0.162	0.177	-0.0886	-0.205	-0.149	-0.144	0.385*	0.276	0.269	0.365
N	2,344	2,345	2,344	2,344	845	846	845	845	704	705	704	704
Constant	6.529***	6.365***	6.461***	6.448***	0.256	-0.0660	-0.191	-0.284	-3.604***	-3.514***	-4.343***	-3.590***

Note:
Models are estimated using least squares quantile regression evaluated at the median (50th percentile). See Table 3 for definitions and notes regarding variable construction. All results are weighted using the inverse sampling probability weights provided by the NLS staff. For results estimated in levels at 25 the 2005 weights are used. For 30 year olds and changes between 30 and 25, 2010 weights are used.

Splitting the Effects of Advice by Biological Parent

Because there is an effect of parental advice on wealth in some of the models above, and I consider the gender of respondents, I also test whether there is a gendered effect of the *biological parent* from which a youth receives advice. These results are displayed in Table 8 below. Splitting the effect by parent shows that there is stronger effect for parental advice coming from biological fathers than from biological mothers. Model (40) shows the ability to answer an additional literacy question correctly improves wealth by 29.1% when measured in levels at age 25. The effect of receiving advice often from a biological father improves wealth by 35.1%. These results also strongly carry over into wealth when measured at 30 years old, as shown in model (43), but model (46) shows the effect does not follow when the outcome is measured in changes in wealth. When I interact advice and literacy by biological parent there is a large effect on levels of wealth at age 30 when the advice is given by biological fathers, as shown in model (44). Though, this result is only significant at the 10% level. However, the interaction terms when split by parent are not significant. When gender and advice are interacted, as in model (42), there is also a large effect on levels of wealth at age 25 when biological fathers give advice often to their male children. Biological fathers' advice shows a 39.6% increase when given to male children, but there is no effect for female children. This result is not robust enough to be found at age 30 or in the changes between 25 and 30, given the results presented in models (45) and (48).

Table 8 – Quantile Regressions by Biological Parent and No Controls

Variable	Inverse Hyperbolic Sine of Wealth in Levels						in Changes		
	Age 25 in Levels			Age 30 in Levels			30 - 25		
	(40)	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)
Financial Literacy	0.291***	0.287***	0.274***	0.569***	0.530***	0.560***	0.270***	0.257***	0.286***
Parental Advice									
Biological Mom	0.0984	-0.00111	0.138	0.132	-0.0332	0.143	-0.0250	-0.0855	0.0288
Biological Dad	0.351***	0.367	0.396**	0.441***	0.510*	0.267	0.145	-0.0493	0.0119
Female			-0.101			-0.169			-0.149
Female x Advice Interaction									
Biological Mom			-0.0125			0.0447			-0.0420
Biological Dad			-0.140			0.275			0.327
Advice x Literacy									
Biological Mom		0.0594			0.112			0.0416	
Biological Dad		-0.0192			-0.0546			0.0683	
Female x Literacy									
N	4,097	4,097	4,097	3,084	3,084	3,084	2,592	2,592	2,592
Constant	9.099***	9.106***	9.169***	9.505***	9.566***	9.573***	0.121	0.145	0.150

Note:
Models are estimated using least squares quantile regression evaluated at the median (50th percentile). See Table 3 for definitions and notes regarding variable construction. All results are weighted using the inverse sampling probability weights provided by the NLS staff. For results estimated in levels at 25 the 2005 weights are used. For 30 year olds and changes between 30 and 25, 2010 weights are used.

When I add the same suite of controls to this model as before, the effect of parental advice split by biological parent is no longer statistically different from zero. These results can be seen below in Table 9. The ability to answer an additional literacy question correctly increases wealth when measured in levels and changes, as shown in models (49) – (57). These magnitudes vary between 13.2% and 34.5%. There is a gender penalty for unmarried women in all of the models of wealth measured in levels at 25, but such a penalty is no longer statistically significant by age 30. Some of the control variables change in magnitude including the marriage bonus, racial differences in means, and the youth's educational attainment.

Of particular interest are the results from model (54) in Table 9. This model shows that the effect men receive from parental advice from either parent is not statistically distinguishable from zero, however, that women receive a statistically significant increase from advice given by biological fathers. Biological fathers' advice to women increases wealth levels at 30, all else equal, by 62.8%. However, there is a near equal and opposite effect from advice given by biological mothers, which corresponds to a decrease of 58.5%. Though, both effects are only significant at the 10% level. A young woman who received advice often from both biological parents would experience the sum of these two effects, a net 4.3% increase.

Table 9 – Quantile Regressions by Biological Parent with Controls

Variable	Inverse Hyperbolic Sine of Wealth in Levels						in Changes		
	Age 25 in Levels			Age 30 in Levels			30 - 25		
	(49)	(50)	(51)	(52)	(53)	(54)	(55)	(56)	(57)
Financial Literacy	0.163***	0.132**	0.159***	0.345***	0.306***	0.313***	0.265***	0.223**	0.263***
Parental Advice									
Biological Mom	0.0915	0.0602	0.121	-0.0603	-0.308	0.246	0.0665	-0.393	0.0658
Biological Dad	-0.00118	-0.193	-0.0164	0.214	0.392	-0.00221	-0.176	0.0412	-0.281
Female	-0.395***	-0.427***	-0.392***	-0.0225	-0.0483	0.0762	-0.424***	-0.443***	-0.437**
Female x Advice Interaction									
Biological Mom			-0.0506			-0.585*			-0.0373
Biological Dad			-0.0100			0.628*			0.501
Advice x Literacy									
Biological Mom		0.0198			0.133			0.227	
Biological Dad		0.0673			-0.118			-0.125	
Female x Literacy									
Risk Tolerance	0.0714	0.0353	0.0657	0.236	0.258*	0.334**	-0.127	-0.214	-0.173
Arrested	-0.262***	-0.309***	-0.267**	-0.899***	-0.887***	-0.899**	-0.788***	-0.815***	-0.725***
Income	0.250***	0.242***	0.251***	0.830***	0.824***	0.834***	0.344***	0.358***	0.353***
Inheritance	0.526***	0.591***	0.549**	0.327	0.355	0.113	0.0445	0.0910	0.0210
Parent's Income in 1997	0.00790	0.0130	0.00458	0.0205	0.0223	0.0277	-0.0674	-0.0569*	-0.0658*
Year Dummies									
2006	0.260*	0.296*	0.254*						
2007	0.314**	0.285*	0.337**						
2008	0.213	0.160	0.211						
2009	-0.172	-0.173	-0.159						
2010									
2011				0.0121	-0.0153	0.00848	-0.358**	-0.349***	-0.333**
2013									
Married	1.272***	1.259***	1.284***	0.836***	0.878***	0.907***	0.196	0.260*	0.205
Race									
Hispanic	-0.336***	-0.306***	-0.345***	0.0733	0.0142	-0.0783	-0.0736	-0.116	-0.0292
Black	-0.553***	-0.542***	-0.546***	-0.0599	-0.0886	0.0327	-0.0340	-0.0627	-0.106
Asian	-1.209	-1.240	-1.207	0.0941	0.103	-0.0852	-0.457	-0.350*	-0.500
Native American	-0.220	-0.242	-0.242	0.556	0.665	0.354	1.367	1.207	1.374
Other Race	-0.732	-0.821	-0.754	-1.698	-1.710	-1.723	0.178	0.213	0.206
ASVAB	-0.00754**	-0.00737**	-0.00757**	0.000733	0.000375	0.00244	-0.00268	-0.00429	-0.00262
Collapsed Education Levels									
HS or GED	0.187*	0.194	0.196**	0.303	0.281	0.176	0.110	-0.00226	0.0496
Associate's	0.281	0.355*	0.300*	-0.250	-0.221	-0.487	0.198	0.164	0.152
College	0.341*	0.336*	0.337*	0.329	0.358	0.112	-0.0541	-0.121	-0.112
Mom College	0.288***	0.271**	0.276**	0.305*	0.361	0.380	0.0869	0.0895	0.128
Dad College	0.151	0.166	0.181	-0.179	-0.193	-0.244	0.363	0.384*	0.337
N	2,142	2,142	2,142	776	776	776	648	648	648
Constant	6.396***	6.526***	6.417***	-0.689	-0.556	-0.793	-2.798***	-2.823***	-2.869***

Note:
Models are estimated using least squares quantile regression evaluated at the median (50th percentile). See Table 3 for definitions and notes regarding variable construction. All results are weighted using the inverse sampling probability weights provided by the NLS staff. For results estimated in levels at 25 the 2005 weights are used. For 30 year olds and changes between 30 and 25, 2010 weights are used.

Additional Specifications and Robustness Considerations

I have chosen to empirically model the relationships in my data using the inverse hyperbolic sine function and a median regression technique for reasons on which I elaborate above. However, given the truncation of the wealth data at upper and lower points, I examine whether this censoring affects the reliability of my estimates. Traditionally, estimating a general

linearized model with a censoring constraint calls for a Tobit model (Wooldridge, 2013). The Tobit model estimates an ordinary least squares regression conditional on a predicted probability of an observation being below the upper and above the lower bound of the domain of the dependent variable. I present these estimates in the appendix's Table 10. Additionally, since the Tobit estimates the objective equation using OLS, I also show OLS results in the appendix's Table 11 for comparison purposes. Table 11 shows the OLS estimates in models (70) – (81) have very few statistically significant correlations between financial literacy and wealth, except for model (77). Nor do any of these models show statistically significant correlation between parental advice and wealth. Further comparing the results from Table 10 to those in Table 11 shows very little difference in the coefficient estimates. I observe that very few observations near the censoring points of the depending variable, which confirms the empirical findings of the Tobit procedure.

I have also chosen to omit several control variables which were used in related studies of financial literacy and wealth. Letkeiwicz and Fox included an indicator for whether the respondent had a student loan or not. I found that introducing this control narrowed the sample size far too much to justify its inclusion. The dataset also contain information regarding the number of children a family had. Like the student loan variable, I find this variable narrowed the sample size and its effect is likely already captured by the marriage indicator.

DISCUSSION AND CONCLUSION

Policymakers, corporations and nonprofits are interested in increasing the public's financial knowledge and capability, such that they can build wealth and avoid excess debt. Some research has concluded that greater financial literacy and certain behavioral factors correlate with better wealth outcomes, but less is known specifically how this knowledge is transmitted to

young adults. I put forward three hypotheses. First, I posit that financial literacy and parental communication directly and interactively affected wealth outcomes. Second, I suggest that financial literacy may have a different effect for men than women. Third, I suggest that parental advice may have a different effect for men than women. I attempt to answer these questions empirically using data from the National Longitudinal Survey of Youth's 1997 Cohort. I use the NLSY 97's data on assets and debts, a three question financial literacy battery, a measurement of the frequency of communication between parents and children, and various demographic controls to establish this relationship using median quantile regression.

The results indicate no empirical support for the main (third) prediction of all three hypotheses. Specifically, I find no statistically significant differential effect on wealth for those who received advice from a parent often (hypothesis 1), nor a differential effect on wealth for women relative to men regarding their financial literacy (2), nor a differential effect on wealth for women relative to men for those who received advice from a parent often (3). However, I did find support for the second prediction of hypotheses (2) and (3), that women would have a lower average level of wealth than men to be true with near regularity. This is an astonishing finding, which implies that even after controlling for educational background, parents' education, income, inheritance, risk tolerance, marital status, ability, criminal history, and macroeconomic fixed effects women *still* have nearly 40% lower wealth than comparable young men.

Further testing reveals that the differential effects implied by the third prong of the hypotheses are masked based on which parent gives the advice to the respondent. When these results are split into their components from biological fathers and mothers separately some results change. Specifically, when I model advice differentially for men and women at age 30 men experience no gain regardless of who provides them advice, while women show a positive

effect from advice delivered often by a biological father and a negative effect when delivered by a biological mother. If a young woman receives advice often from both biological parents on an important decision the effects sum to a small net positive one.

These findings have several implications for policy and the way in which financial literacy programs should target youth. First, there is an unambiguous effect of having higher financial literacy on wealth outcomes. This effect persists across all of the models, and at its minimum does not fall below a 10% positive wealth effect for being able to answer an additional financial literacy question correctly. While the financial literacy questions available for measurement in the NLSY 97 may themselves not be very detailed or prescriptive of the type of content which should be emphasized, the fact remains that what is measureable signals a large impact on wealth outcomes. Researchers should continue to experiment to find which types of interventions and educational methods produce the best results. Second, unmarried women clearly have it worse than men regardless of their station in life. While it is beyond the scope of my inquiry or expertise to suggest social or political remedies, it is clear that young women need more attention than men when they are being taught financial literacy concepts. While the data show that knowledge of these concepts provided no *additional* boost to women, some additional policy support is required given the disparity these results reveal. Perhaps the most glaring warning of my results show that in some contexts fathers' advice to sons increases wealth outcomes and in others mothers' advice to daughters *decreases* wealth outcomes, suggesting that the failure to tackle this disparity in one generation may lead to its magnification in the next.[13]

In light of these results, and those above regarding the third prediction of the various advice-related hypotheses it is worth considering whether the advice of certain parents is of value

[13] See models (42) and (54), respectively.

to youth. This conclusion follows in the tradition of Norvilitis & MacLean and Hayhoe et al., who showed that the quality of parental communication matters. In further research I might focus on dissecting the quality of the parental advice signal further to indicate whether or not the parent is financially educated enough to offer sound advice to the child. Although in the current research context I proxy for these effects through measurement of parental income and education, they are crude measurements which likely omit a great deal of heterogeneity in financial knowledge and capabilities. In further research I would hope the data could reveal a more detailed picture of the financial literacy and capability of both the parents and their children, that these capabilities are measured in a panel fashion, and a broad sample are available measuring parental advice as it concerns the transfer of financial knowledge. These innovations would allow for more precise empirical estimation of the effects my hypotheses suggest.

APPENDIX

This section presents additional tables, figures, further technical discussion and analysis for which space did not permit in the main text.

Table 10 – Tobit Regressions with Interactions and Controls

Variable	Inverse Hyperbolic Sine of Wealth in Levels								in Changes			
	Age 25 in Levels				Age 30 in Levels				30 - 25			
	(58)	(59)	(60)	(61)	(62)	(63)	(64)	(65)	(66)	(67)	(68)	(69)
Financial Literacy	0.0921	0.507	0.495	0.208	0.589	0.700	0.672	0.932**	1.058*	0.275	0.226	0.640
Parental Advice	-0.793		-0.268	0.0408	-1.887		-0.365	0.126	1.312		-0.670	-1.249
Female	-1.428***	-0.277	-0.243	-1.134**	-0.712	-1.698	-1.664	-0.297	0.0608	-1.747	-1.715	-0.483
Female x Advice Interaction				-0.654				-0.903				1.221
Advice x Literacy	0.261				0.784				-0.987			
Female x Literacy		-0.617	-0.605			0.475	0.501			0.834	0.860	
Risk Tolerance	0.374	0.386	0.373	0.377	-0.266	-0.207	-0.246	-0.224	-1.447	-1.440	-1.458*	-1.500*
Arrested	-0.499	-0.466	-0.464	-0.486	-1.051	-0.938	-0.953	-0.933	-1.363	-1.545	-1.596	-1.514
Income	0.383***	0.391***	0.394***	0.384***	1.177***	1.175***	1.175***	1.181***	0.898***	0.882***	0.882***	0.904***
Inheritance	1.327	1.359	1.333	1.302	2.018*	1.968	1.971	1.958	1.143	1.240	1.259	1.211
Parent's Income in 1997	0.0823	0.0826	0.0824	0.0807	0.0903	0.0969	0.0897	0.0832	-0.171	-0.167	-0.161	-0.167
Year Dummies												
2006	0.778	0.750	0.790	0.772								
2007	0.724	0.725	0.739	0.727								
2008	0.336	0.342	0.344	0.349								
2009	-0.365	-0.394	-0.378	-0.356								
2010												
2011					0.429	0.407	0.455	0.451	-1.006	-1.024	-0.997	-1.005
2013												
Married	2.504***	2.505***	2.487***	2.499***	1.364**	1.328*	1.386**	1.387**	0.00944	-0.0557	-0.000469	-0.0439
Race												
Hispanic	-0.268	-0.247	-0.253	-0.277	0.263	0.251	0.260	0.246	-0.210	-0.314	-0.253	-0.198
Black	-0.811	-0.743	-0.754	-0.831	-1.126	-1.052	-1.103	-1.071	-0.137	-0.339	-0.357	-0.244
Asian	-1.391	-1.385	-1.423	-1.387	-0.600	-0.533	-0.543	-0.472	-2.594	-2.770*	-2.745*	-2.729*
Native American	-0.789	-0.843	-0.848	-0.831	3.465***	3.631***	3.560***	3.294***	4.649	4.626	4.595	4.869
Other Race	-2.145	-2.158	-2.143	-2.144	-2.920	-2.887	-2.841	-2.786	0.762	0.247	0.389	0.495
ASVAB	-0.0348***	-0.0345***	-0.0350***	-0.0348***	-0.0125	-0.0108	-0.0121	-0.0120	0.00615	0.00650	0.00506	0.00527
Collapsed Education Levels												
HS or GED	-0.0480	-0.0769	-0.0480	-0.0517	-1.242	-1.224	-1.168	-1.163	0.537	0.251	0.279	0.422
Associate's	-0.586	-0.595	-0.552	-0.588	-2.593	-2.646*	-2.531	-2.573	1.544	1.119	1.284	1.427
College	-2.713***	-2.761***	-2.681***	-2.713***	-3.570**	-3.715**	-3.489**	-3.504**	1.211	0.750	0.943	1.083
Mom College	0.803	0.759	0.767	0.811	-0.134	-0.119	-0.131	-0.167	-0.788	-0.734	-0.696	-0.750
Dad College	0.879	0.887	0.872	0.871	-0.637	-0.634	-0.693	-0.658	0.626	0.706	0.646	0.648
N	2,344	2,345	2,344	2,344	845	846	845	845	704	705	704	704
Constant	2.424	1.377	1.444	2.077	-6.008	-6.454*	-6.261*	-6.996*	-9.162**	-7.154*	-6.945*	-7.974**

Note:
Models are estimated using Tobit regression. This method combines ordinary least squares and logistic probability. See Table 3 for definitions and notes regarding variable construction. All results are weighted using the inverse sampling probability weights provided by the NLS staff. For results estimated in levels at 25 the 2005 weights are used. For 30 year olds and changes between 30 and 25, 2010 weights are used.

Table 11 – OLS Regressions with Interactions and Controls

Variable	Inverse Hyperbolic Sine of Wealth in Levels								in Changes			
	Age 25 in Levels				Age 30 in Levels				30 - 25			
	(70)	(71)	(72)	(73)	(74)	(75)	(76)	(77)	(78)	(79)	(80)	(81)
Financial Literacy	0.0874	0.498	0.486	0.205	0.568	0.700	0.672	0.914**	1.065*	0.282	0.234	0.640
Parental Advice	-0.805		-0.275	0.0346	-1.907		-0.372	0.158	1.362		-0.655	-1.238
Female	-1.433***	-0.305	-0.271	-1.138**	-0.757	-1.670	-1.636	-0.310	0.0766	-1.697	-1.666	-0.470
Female x Advice Interaction				-0.655				-0.980				1.227
Advice x Literacy	0.264				0.790				-1.005			
Female x Literacy		-0.606	-0.593			0.438	0.465			0.817	0.843	
Risk Tolerance	0.341	0.354	0.340	0.345	-0.280	-0.222	-0.260	-0.234	-1.430	-1.423	-1.440	-1.483*
Arrested	-0.476	-0.444	-0.441	-0.463	-1.044	-0.928	-0.943	-0.925	-1.353	-1.537	-1.587	-1.507
Income	0.379***	0.387***	0.390***	0.380***	1.154***	1.152***	1.153***	1.158***	0.894***	0.879***	0.879***	0.901***
Inheritance	1.305	1.338	1.311	1.280	1.760	1.705	1.707	1.698	1.137	1.235	1.254	1.206
Parent's Income in 1997	0.0810	0.0812	0.0811	0.0794	0.0826	0.0886	0.0815	0.0753	-0.170	-0.166	-0.160	-0.165
Year Dummies												
2006	0.771	0.742	0.783	0.765								
2007	0.696	0.697	0.711	0.699								
2008	0.334	0.340	0.342	0.348								
2009	-0.394	-0.423	-0.406	-0.385								
2010												
2011					0.431	0.409	0.457	0.455	-1.006	-1.025	-0.998	-1.005
2013												
Married	2.520***	2.521***	2.503***	2.514***	1.264*	1.226*	1.285*	1.289*	0.0265	-0.0380	0.0163	-0.0272
Race												
Hispanic	-0.280	-0.259	-0.265	-0.289	0.244	0.232	0.242	0.225	-0.199	-0.301	-0.241	-0.188
Black	-0.796	-0.729	-0.740	-0.817	-1.150	-1.073	-1.123	-1.096	-0.126	-0.328	-0.346	-0.235
Asian	-1.371	-1.364	-1.402	-1.366	-0.570	-0.500	-0.510	-0.438	-2.588	-2.764*	-2.739*	-2.725
Native American	-0.781	-0.834	-0.838	-0.822	3.451***	3.616***	3.544***	3.261***	4.662	4.636	4.605	4.882
Other Race	-2.125	-2.138	-2.123	-2.123	-2.892	-2.857	-2.810	-2.755	0.775	0.262	0.400	0.504
ASVAB	-0.0345***	-0.0341***	-0.0346***	-0.0345***	-0.0135	-0.0118	-0.0132	-0.0129	0.00633	0.00664	0.00524	0.00544
Collapsed Education Levels												
HS or GED	-0.0582	-0.0881	-0.0585	-0.0620	-1.246	-1.225	-1.168	-1.171	0.538	0.251	0.279	0.421
Associate's	-0.585	-0.594	-0.551	-0.587	-2.479	-2.529	-2.412	-2.465	1.536	1.112	1.274	1.415
College	-2.707***	-2.756***	-2.675***	-2.707***	-3.513**	-3.656**	-3.428**	-3.451**	1.201	0.742	0.931	1.070
Mom College	0.767	0.723	0.732	0.776	-0.0874	-0.0748	-0.0862	-0.120	-0.790	-0.735	-0.699	-0.752
Dad College	0.876	0.884	0.869	0.868	-0.650	-0.647	-0.706	-0.671	0.626	0.706	0.647	0.649
N	2,344	2,345	2,344	2,344	845	846	845	845	704	705	704	704
Constant	2.495	1.459	1.527	2.145	-5.548	-6.045	-5.852	-6.558*	-9.192**	-7.182*	-6.978	-7.984*

Note:
Models are estimated using ordinary least squares regression. See Table 3 for definitions and notes regarding variable construction. All results are weighted using the inverse sampling probability weights provided by the NLS staff. For results estimated in levels at 25 the 2005 weights are used. For 30 year olds and changes between 30 and 25, 2010 weights are used.

Table 12 – Quantile Regressions with Interactions and Controls Excluding Effect of ASVAB

Variable	Inverse Hyperbolic Sine of Wealth in Levels								in Changes			
	Age 25 in Levels				Age 30 in Levels				30 - 25			
	(82)	(83)	(84)	(85)	(86)	(87)	(88)	(89)	(90)	(91)	(92)	(93)
Financial Literacy	0.0880*	0.149**	0.157***	0.106**	0.116	0.184**	0.170**	0.260***	0.0321	0.279***	0.298***	0.132*
Parental Advice	0.137		0.203**	0.259**	-0.460		-0.0247	0.0165	-0.665***		-0.259**	-0.421**
Female	-0.394***	0.00440	-0.0847	-0.303***	-0.0791	-0.376	-0.395	-0.0470	-0.193	0.170	0.303	-0.309
Female x Advice Interaction				-0.151				-0.0599				0.249
Advice x Literacy	0.0241				0.272*				0.197			
Female x Literacy		-0.180*	-0.167*			0.150	0.155			-0.224*	-0.253**	
Risk Tolerance	0.0482	0.0562	0.0458	0.0288	0.242	0.146	0.127	0.193	-0.287**	-0.235*	-0.334**	-0.320**
Arrested	-0.354***	-0.253*	-0.380***	-0.382***	-0.856***	-0.859***	-0.898***	-0.726***	-0.346	-0.374	-0.326	-0.331
Income	0.248***	0.242***	0.249***	0.247***	0.798***	0.804***	0.799***	0.797***	0.330***	0.352***	0.385***	0.306***
Inheritance	0.594**	0.553***	0.617***	0.601***	0.196	0.0700	0.0576	0.120	-0.169	-0.330	-0.300	-0.306
Parent's Income in 1997	0.00230	0.0117	0.00731	0.00450	0.0265	0.0276	0.0280	0.0256	-0.0312	-0.0292	-0.0441	-0.0400
Year Dummies												
2006	0.209	0.207	0.166	0.205								
2007	0.167	0.158	0.129	0.161								
2008	0.0998	0.0868	0.0547	0.0840								
2009	-0.0430	-0.0619	-0.0678	-0.0445								
2010												
2011					-0.0332	0.00267	0.00462	-0.0380	-0.313**	-0.296**	-0.284**	-0.262**
2013												
Married	1.166***	1.243***	1.172***	1.198***	0.954***	0.928***	0.929***	0.972***	0.308**	0.208	0.227	0.320**
Race												
Hispanic	-0.112	-0.150	-0.164	-0.128	-0.0960	-0.0799	-0.108	-0.0905	-0.0153	-0.0405	-0.128	-0.0972
Black	-0.274***	-0.242**	-0.329***	-0.305***	-0.0266	-0.0316	-0.0493	-0.00892	-0.0667	-0.0709	-0.0796	-0.0859
Asian	-0.983	-1.064	-1.034	-0.979	-0.0165	0.320	0.343	0.288	-0.371**	-0.278	-0.442***	-0.132
Native American	0.0435	-0.317	-0.185	-0.0274	0.563	0.339	0.327	0.469	0.914	1.178	0.949	1.155
Other Race	0.290	0.271	0.304	0.240	-0.663	-0.644	-0.673	-0.506	0.772***	0.520**	0.658**	0.839***
ASVAB												
Collapsed Education Levels												
HS or GED	0.178	0.262**	0.156	0.130	0.00746	0.0343	0.0309	-0.0360	-0.512*	-0.633***	-0.534**	-0.494*
Associate's	0.314*	0.422**	0.235	0.247	-0.422	-0.415	-0.415	-0.512	-0.322	-0.646*	-0.463	-0.333
College	0.180	0.296	0.155	0.124	0.0850	0.163	0.175	0.121	-0.447	-0.610**	-0.467	-0.441
Mom College	0.266***	0.332***	0.260**	0.301***	0.302	0.284	0.294	0.259	-0.0233	0.0179	-0.0645	-0.0318
Dad College	0.163	0.107	0.131	0.139	-0.0358	-0.174	-0.189	-0.189	0.231	0.197	0.190	0.219
N	2,661	2,663	2,661	2,661	944	945	944	944	776	777	776	776
Constant	6.259***	6.032***	6.128***	6.244***	0.286	0.152	0.258	0.102	-2.309**	-2.991***	-3.243***	-2.105**

Note:
Models are estimated using least squares quantile regression evaluated at the median (50th percentile). See Table 3 for definitions and notes regarding variable construction. All results are weighted using the inverse sampling probability weights provided by the NLS staff. For results estimated in levels at 25 the 2005 weights are used. For 30 year olds and changes between 30 and 25, 2010 weights are used.

Figure 6

Distribution of Wealth of NLSY 1997 Respondents as of Age 30

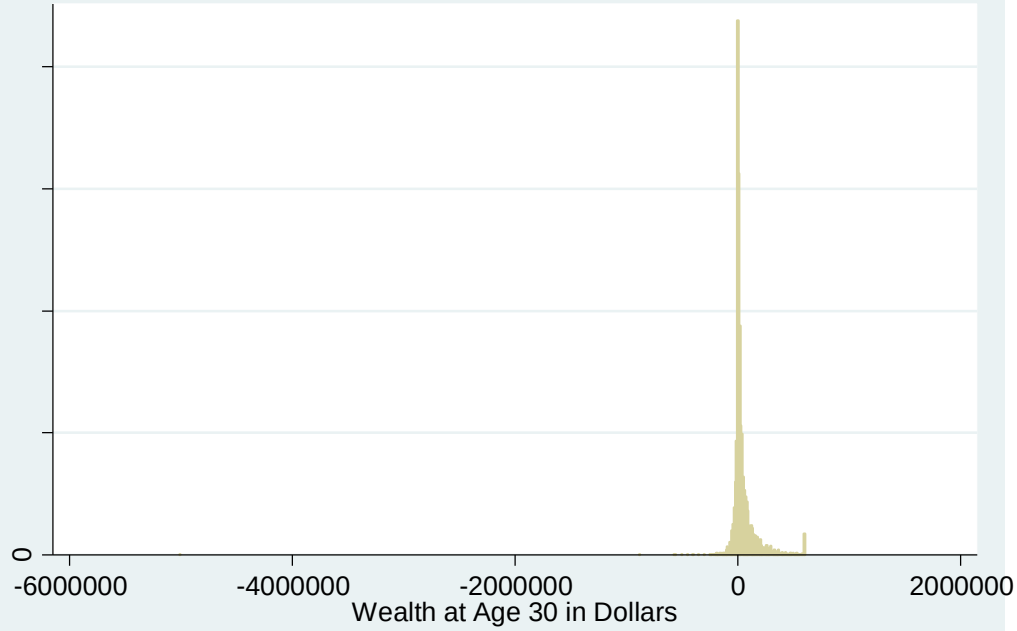


Figure 7

Distribution of Wealth of NLSY 1997 Respondents as of Age 25

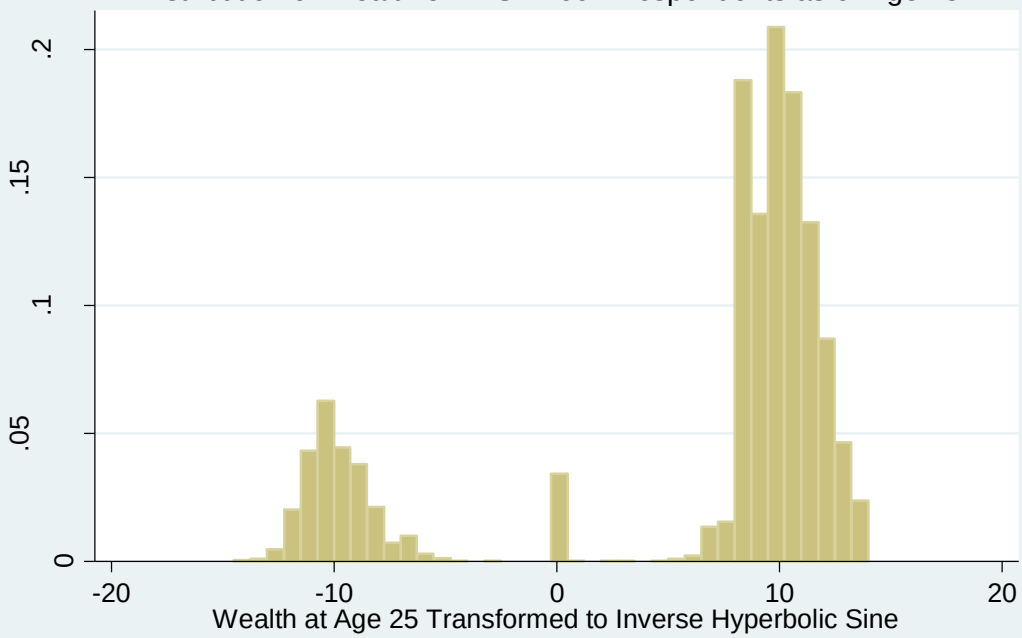


Figure 8

Distribution of Wealth of NLSY 1997 Respondents as of Age 30

Table 13 – Cross-Tabulation of Responses to Assets Questionnaire by Year of Birth

Round of Interview for Assets at 25			Count by Year of Birth					Total
Calendar Year	Implied Age	Round	1980	1981	1982	1983	1984	
2005	25	9	1,331					1,331
2006	26	10	119	1,538				1,657
2007	27	11	34	65	1,532			1,631
2008	28	12	23	42	88	1,538		1,691
2009	29	13	17	27	42	59	1,519	1,664
2010	30	14		16	17	30	51	114
2011	31	15			13	10	21	44
2012	32	16					18	18
Never Interviewed			167	186	149	170	162	834
Total			1,691	1,874	1,841	1,807	1,771	**8,984**

Round of Interview for Assets at 25			Cell Frequencies by Year of Birth					Total
Calendar Year	Implied Age	Round	1980	1981	1982	1983	1984	
2005	25	9	14.8%					
2006	26	10	1.3%	17.1%				
2007	27	11	0.4%	0.7%	17.1%			
2008	28	12	0.3%	0.5%	1.0%	17.1%		
2009	29	13	0.2%	0.3%	0.5%	0.7%	16.9%	
2010	30	14		0.2%	0.2%	0.3%	0.6%	
2011	31	15			0.1%	0.1%	0.2%	
2012	32	16					0.2%	
Never Interviewed			1.9%	2.1%	1.7%	1.9%	1.8%	9.3%
Total			18.8%	20.9%	20.5%	20.1%	19.7%	**100.0%**

Note:

NLS staff attempted to interview all "independent" repondents regarding their assets and debts in the year in which they turned 25 years old. Those interviewed after that year are assumed not indepdendent, meaning they were unmarried, or still financially dependent on their parents. This presents a systematic measurement error which leads to bias if unaddressed. This table shows that 83% of the sample were independent by age 25 and interviewed for the assets section. A total of 7.7% of the sample were not independent and thus interviewed later, and that 9.3% of the sample were never interviewed. Amounts may not sum perfectly due to rounding.

Figure 9
NLSY 97 Financial Literacy Score by Item

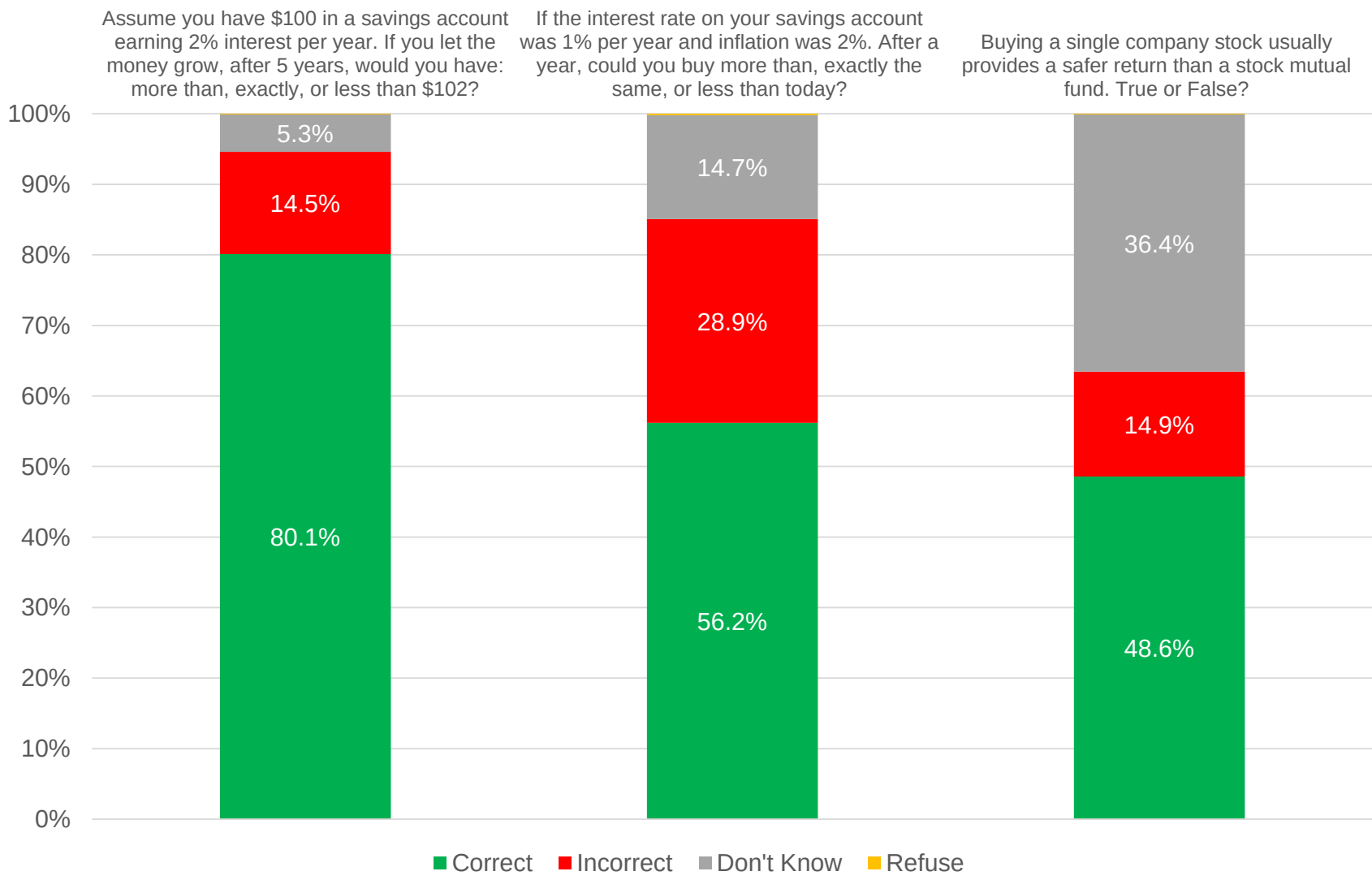


Figure 10
NLSY 97 Parental Advice for an Important Decision

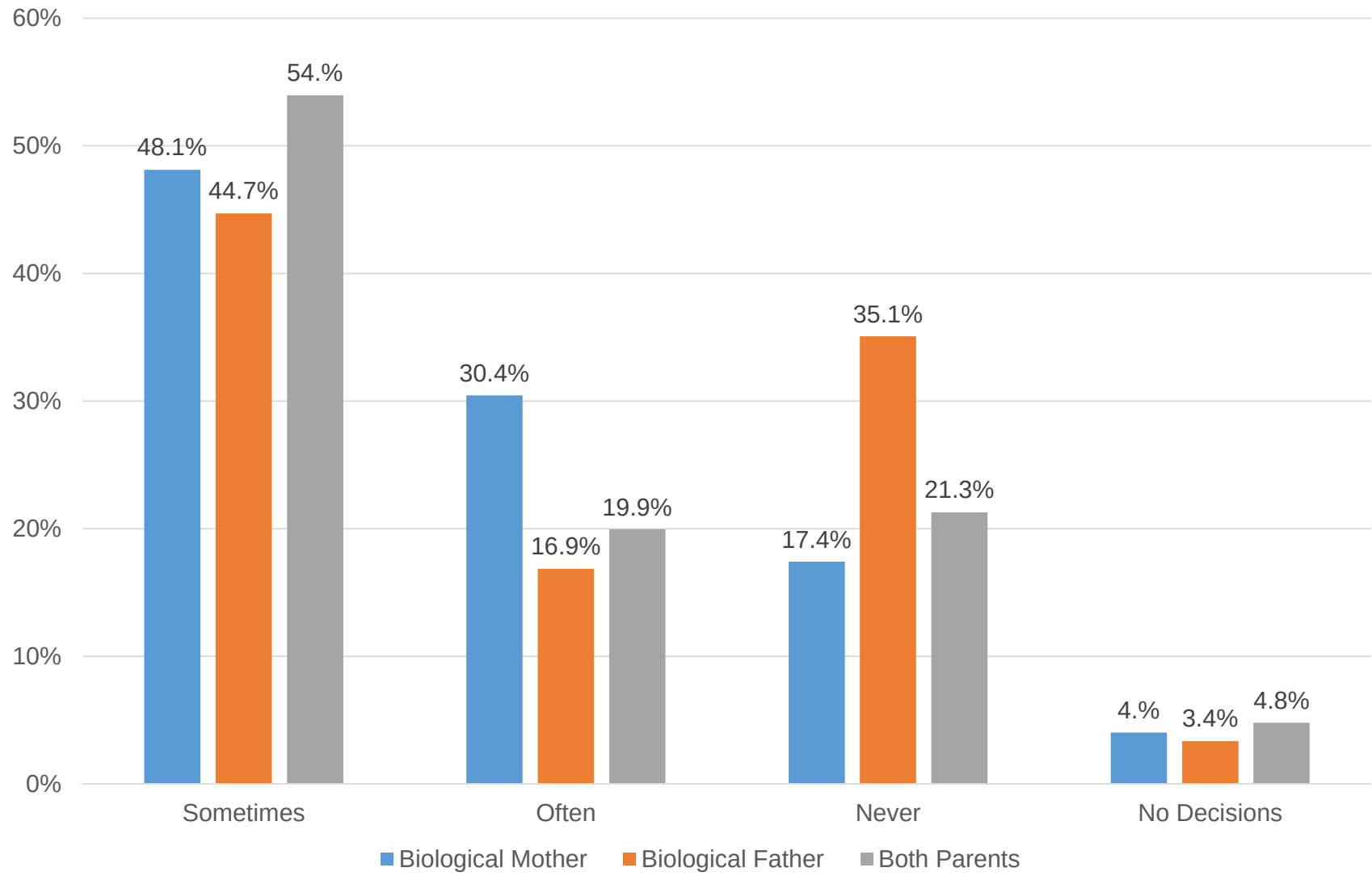


Table 14 – OLS Regressions on ASVAB Score

Variable	ASVAB Percentile					Wealth Levels at 25
	(94)	(95)	(96)	(97)	(98)	(99)
Financial Literacy	13.70***		13.71***	11.62***	8.512***	
Parental Advice		0.288	1.177	-0.556	-2.013**	
Student Loan				2.495***	0.644	-1.539***
Collapsed Education Levels						
HS or GED					6.339**	
Associate's					8.479***	
College					24.77***	
N	4,737	4,729	4,726	3,316	3,316	3,115
Constant	27.18***	52.78***	26.67***	36.62***	30.13***	10.37***

Note:
Models are estimated using ordinary least squares regression. See Table 3 for definitions and notes regarding variable construction. All results are weighted using the inverse sampling probability weights provided by the NLS staff based on 2007.

The NLS staff's disclosure on the ASVAB variable indicates that taking it was voluntary. Among the 7,703 participants who did take the test, the NLS staff rescaled their scores into a percentile distribution. The data still contain ordinal, though no cardinal value. In order to test whether this selection of the test-takers influenced its purpose as an ability estimate I re-estimate models (28) – (39) exactly the same except I exclude the ASVAB control variable. The results, presented here in the appendix in Table 12, models (82) – (93), show largely similar results, except that the effect of financial literacy on wealth is stronger in levels for 25 year olds than before, and weaker for 30 year olds. It also shows a statistically significant interaction term for financial literacy with women that is actually more negative than the male term, suggesting higher literacy is correlated with decreased wealth for women. Concerns regarding differential selection into the ASVAB test are allayed through examination of Table 12's strong consistency with the main results in Table 7. Additionally, the sample sizes overlap nearly 90%.

Still, there is some concern that ability, which one would believe is positively correlated to wealth, is negative and statistically significant in models (28) – (31) and (11). Evidence in Table 14 above shows the ASVAB variables cross-correlations with the other independent variables and one new one, a student loan indicator. ASVAB is positively and strongly correlated with financial literacy. Thus, its omission from a model would cause a negative bias to the financial literacy coefficient. Further, it is strongly correlated to whether a respondent had a student loan and with higher levels of education.[14] Table 14's results point to the conclusion that higher ability is correlated with those who pursued higher education. Model (99)'s results show that those who may have pursued higher education by borrowing had lower wealth when measured in levels at age 25.

[14] See model (97).

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