The Role of Information in College Saving Decisions: A Principal-Agent Approach

THESIS

Presented in Partial Fulfillment of the Requirement for Degree for Master of Science in the Graduate School of The Ohio State University

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The Ohio State University

2015

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Abstract

In this study, I investigate whether and how much parents save for their children’s college when they have more information about the costs and benefits of college. I combine data from Consumer Expenditure Survey, 2004 – 2012, Simmons National Consumer Survey, and a self-collected dataset of magazine articles. Using principal-agent model, the paper first lays out the theoretical framework and predicts that parents with different amount of information about the costs of college or about the available scholarship will have different saving behaviors. Further, these saving behaviors will also vary with the demographic characteristics of households holding the same amount of information. Results show that there is indeed heterogeneity among different groups of parents. The marginal effect of information affects the amount of and share of resource allocate to the annual principal payments for their home mortgage. Specifically, there is a sharp contrast between families with lower income and families in the highest income group in the sample. Parents with some college education or college degree are more sensitive to information about the costs of college, while parents with no college education at all are more sensitive to information about available scholarships. Comparing parents with different race/ethnicity, information about the available scholarships have the largest marginal effect on Hispanic parents, then on the non-Hispanic, non-Black parents, and least on black parents with children younger than 16. With the only consideration of the number of children are about to go to college, there are not many significant marginal effects of information among parents with more children
who are 16 or 17 years old. However, information shows consistent marginal effects on
the non-Black, non-Hispanic parents who have at least one child is ready to go to college.
Acknowledgement

I would like to thank my advisor, Dr. Dean Lillard, for his tremendous support in the completion of this thesis. His advice, explanations and demonstrations have inspired me greatly for knowledge and technical skills for this research and future academic study.

I also wish to thank the rest of my committee, Dr. Sherman Hanna and Dr. Andrew Hanks. Dr. Sherman Hanna has provided me with many valuable comments and feedback regarding the concepts and technical skills. Dr. Andrew Hanks has also provided great amount of help in econometric analysis and programming techniques.

Lastly, I want to thank my family for their support throughout my graduate program.
Vita

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Section I. Introduction

In this study, I investigate whether parents save or change how much they save for their children’s college education when they get more information about the costs and benefits of college.

I focus on parental saving for their children’s college because of the institutional difference between financing of K-12 education and higher education. People indirectly pay the cost of K-12 education - typically by paying state or local taxes. In the 2004-05 school year, spending by state and local governments comprised 45.6 and 37.1 percent of all the spending on K-12 education respectively (US Department of Education 2005). The federal government accounted for another 8.3 percent. However, to pay for education past high school, people must, in principle, directly pay some or all of the costs.

If children are younger than 18 years old, in order to finance their college in future, parents have to decide how much to spend for their current consumption and how much to save for their children’s college based on their perceived costs and perceived benefits of higher education. During this decision-making process,

---

1 The remainder was spending from private source, which mainly for private schools.
information unambiguously affects parents’ perception. In this study, I will use magazine articles as the source of information, and link parental saving behaviors with predicted exposure of the information from magazine articles.

There is a relatively small literature investigating the effect of information on households’ financial decisions. Even fewer studies examine the effect of information on households’ saving behavior for their children’s higher education. Existing literature has examined the relationship between parental accumulated assets and children’s education attainment. Here I study whether information affects parental saving behavior for their children’s college. Therefore, this paper will contribute to the existing literature related to how people finance the costs of higher education.

The rest of this paper consists of 7 parts. In Section II, I review relevant literature and describe a simple Principal-Agent Model. In Section III, I adopt the principal-agent relationship to model parental saving behavior. In Section IV, I specify two basic statistical models with and without perfect information. In Section V, I describe the data. In Section VI, I describe the models to be estimated. In Section VII, I present the results. I conclude the paper in Section VIII.
Section II. Literature Review

i.  The Relationship between Parental Saving and Children’s Education Attainment

As college tuition has increased over the past three decades, from $9,554 in 1981 to $23,066 in 2011 (National Center for Education Statistics, 2012), students are relying more on financial support from parents to pay for college.\(^2\) At the same time, funding from schools and other organizations has not increased at the same rate. As a result, students have heavily relied on parental assistance in financing their higher education (Cha et al, 2005; Kane, 2007; Cao, 2008; Yilmazer, 2008). Access to parental savings appears to matter. Research documents that there is a positive association between children’s educational attainment and household’s financial assets (Conley, 2001; Lerman & McKernan, 2008; Nam, Huang & Sherraden, 2008). What remains unclear is whether and how much parents accumulate their financial assets or save for their children’s college as a function of their financial education, saving mechanism, and saving incentives (Beverly & Sherraden, 1999; Beverly et al, 2008).

\(^2\) These numbers are the average total tuition, fees, room and board rates charged per year for full-time undergraduate students in a 4-year degree-granting institution in constant 2011-12 dollar.
Although the federal and state governments subsidize the cost of college, the student aid rules implicitly tax on parents who save. Consequently, those rules create perceived incentives. In order to receive financial aid, parents may strategically save less (Case & McPherson, 1986; Edlin, 1993, 1992; Feldstein, 1995; Dick & Edlin, 1997; Kim, 1999, 2000; Dick, Edlin & Emch, 2003; Dynarski, 2004). Feldstein (1995) estimates that if a household earns $40,000 a year with two children before going to college, the amount of accumulated assets would be approximately 50 percent of the amount this household would have accumulated without the incentive to receive any financial aid. Edlin (1992, 1993) estimates that if families invest their money with a 10 percent return for their two children before college, the implicit tax effect of financial aid reduces the purchasing power by 75% after their children attend college. Using National Postsecondary Student Aid Survey 1986-1987, Dick, Edlin, & Emch (2003) estimated that households reduce $5000 in their assets on average after knowing there are available funding. Under this calculation, this implicit tax effect of financial aid would cause a $250 billion reduction in assets nationwide.

When parents decide whether and how much to save for their children’s college, information, or the lack of information, will affect the costs and benefits they perceive to be associated with higher education. Parents may be misinformed because it is sometimes difficult to know how colleges decide whether and how much financial aid they will offer. Colleges and universities offer financial aid to help students to pay for college when there is a gap between the cost and the estimated amount a household can afford. To calculate how much parents can
pay, schools estimate parents’ discretionary income and assets from which they might pay. To estimate a family’s discretionary income, colleges sum a household’s gross income, tax deduction, interests, dividends, capital gains, and then adjust that total to allow for a minimum level of consumption of families with the same composition and employment. To estimate a family’s available assets, schools consider the value of real estate (excluding their primary residence) and financial assets. Schools do not include the value of annuity and social security benefits. If parents are aware of these rules, then they have incentives to reduce their financial assets, because it increases the probability their child receives financial aid.

ii. Role of Information in Decision-Making

In the existing literature, researchers characterize information in several ways. Some researchers characterize information by tabulating articles published each year on particular topics. Brown and Schrader (1990) construct a quarterly cholesterol information index. They count medical journal articles published from 1966 to 1976 to investigate whether and how information affects shell egg consumption. Using the same index but extended to later years, Kinnucan et al. (1997) study whether and how U.S. meat demand varies with the number of medical journal articles about cholesterol from 1976 to 1993. Piggott & Marsh (2004) construct a similar quarterly information index by adding up all newspaper articles about food safety from 1982 to 1999 to study the effect of information on
Paudel et al. (2010) count the number of medical journal articles about low-carbohydrate diet to examine how information affects the demand for fruit from 1980 to 2003.

More recent research refines the basic approach by not only context, but also by differentiating between different types of information that these articles convey. Using data on household media consumption, Smed (2012) investigates how the demand for organic food varies with a count of newspaper articles about pesticides in conventional fruits or vegetables, and with a count of newspaper articles about health benefits of organic fruits or vegetables. Lillard (2014) constructs a similar index of magazine articles about the relationship between cigarette smoking and health. His index varies over time and across states. The author categorizes the articles that clearly warn about the health risks of smoking as "anti-smoking"; the articles that promote smoking as "pro-smoking"; and articles that note the causal relationship between smoking and health was still unsettled as "neutral". He finds that information about the health risks of smoking systematically affects smoking behaviors, including the probability a person starts to smoke, whether one smokes in a given year, and the probability that a smoker quits.

I investigate the role information plays in parental decisions to save for a child’s college. I first categorize magazine articles about the benefits and the costs of college. I then use Lillard’s (2014) method to generate a predicted exposure of information for each household.
iii. Theoretical Background of Principal-Agent Theory

Since the early 1970s, researchers have used the principal-agent (P-A) model to analyze various questions, such as how managers determine employment contracts (Harris & Raviv, 1978, 1979; Sappington, 1983; Holmstrom & Milgrom, 1991; Baker, 1992; Macleod, 2003; Cruz et al, 2010) and how they organize a firm (Nonaka et al, 2000; Ricketts, 2002; Stieglitz & Heine, 2007; Aghion & Holden, 2011). While researchers apply the P-A model mostly in these managerial business areas, one can also apply it to a broader set of topics and questions. In a more general context, a principal-agent relationship exists when two parties have entered into a relationship where one party (the agent) acts on behalf of the other party (the principal). The principal has an objective, which she cannot achieve effectively by herself. Hence, she hires an agent to help her. The agent helps the principal to accomplish her goal, and in return the principal compensates the agent for working on her behalf.

However, problems arise frequently between the principal and the agent when there is asymmetric information about the amount of effort the agent expends. To measure the agent’s performance and monitor the agent’s effort, the principal must gather information about the agent’s effort and productivity. On the other hand, the agent’s incentive is to minimize the effort he expends to earn a given amount. The agent holds private information, when it is costly for the principal to observe the agent’s effort and productivity. As the cost of information rises, the principal-agent relationship is more likely to fail.
To solve the problem of asymmetric information, the principal chooses a policy or designs a contract to (explicitly or implicitly) motivate the agent to work as the principal wants (Ross, 1973). Employers commonly use employment contracts, which specify legally verifiable outcomes that employers can use to evaluate whether an employee has met a minimum level of effort. When employer and employees agree to such terms, the employer (the principal) is able to compensate (or punish) employees (the agents) who meet (or fail to meet) the targeted level of effort. One simple explicit contract is a linear compensation scheme, which includes a basic salary and a piece-rate bonus on each unit of output of a given quality.

However, sometimes it is hard for the principal to write an explicit contract with legally enforceable outcomes. The employee might engage in many types of behaviors that are difficult to observe or to measure, such as participating in group projects. Under such conditions, the employer often relies on implicit contracts that exploit the incentives of a rational agent. When an employer can identify her agent’s incentives and when these incentives are compatible with her own objectives, then an implicit contract will be self-enforcing. As the agent pursues his own interests, he also pursues the interests of the principal. Sometimes, firms take actions to align their workers’ incentives with the one of the firms. For example, corporations commonly give employees options to purchase company stocks/shares at favorable prices as a way to create incentives for employees to maximize the corporation’s profit. In order to maximize the value of their stocks/shares, the employees would work to maximize the value of
the company even without a legally enforceable contract (Holmstrom & Milgrom, 1991).
Section III. Principal-Agent Relationship within Family

In this study I use the P-A model to analyze parents’ decisions about saving for their children’s college. In the P-A framework, a child is the principal and her parents are the agents. The child wants to maximize her utility, $U^c$. When utility is separable, she can simply maximize her earning potential. In order to maximize her earning potential, she invests in her human capital. In a world of perfect capital market with perfect information, the child would know whether it is optimal for her to attend college, which college to attend, how much to pay for the college, and borrow the money to pay for her higher education. Under perfect information with legally enforceable contracts, banks would lend her the money and charge an interest rate ($r$) which is equal to the sum of rate of return on the best alternative investment ($r^m$) and the premium banks change if she defaults on the loan. That premium is determined by her true risk of default ($d^*$).

However, it is fairly costly for the child to borrow money from the capital market. Firstly, the legal system does not allow banks to enforce its contract with borrowers (for example, by indentured servitude). Banks are only willing to lend money at a much higher rate because there is a higher risk that one person can abscond with his/her human capital. Moreover, as it is costly for banks to observe each person's true risk of default $d^*$, banks are likely to add another risk premium for the possibility a person fails to pay back the money. Thus, when the child
borrow money for her college education, she has to pay a higher rate of interest, which is equal to the sum of the rate of return on the best alternative investment \( r^m \), the premium banks charge based on the child’s true risk of default \( d^* \) and another risk premium based on the imperfect capital market.

A rational principal may hire an agent, if by hiring an agent, the child pays less to finance her higher education. Clearly, the child needs to hire agents for other reasons as well, such as to feed her, bath her, take care of her, and so on. She can hire other people or hire her parents. Several factors suggest that biological parents should be the child’s preferred agents. First, if parents have a natural affinity for their child, their interests are more likely to be compatible with the interests of their child and they also would be less likely to shirk (Alchian & Demsetz, 1972). Researchers explain this relation as warm glow, prestige or joy (i.e. utility) (Benabou & Tirole, 2010; Ireland, 1969; Andreoni, 1995; Harbaugh, 1998). However, the warm glow effect may simply reflect the fact that a child shares genes with her biological parents. Because parents have an interest in passing their genes on through time, they will be more likely to act in the best interest of their child. Thus, parents are more likely to be willing to lend money to their child at a discounted interest rate.\(^3\) This aligning of interests is an essential feature of well-functioning P-A relationships with an implicit contract. Also, parents usually have more private information about their child, which they gather at lower costs over the years a child grows up. Therefore, her parents' estimate of

\[^3\text{Note that } \frac{dR}{d_{gene}} < 0, \text{ where } R \text{ is the interest rate at which parents lend money to their child, and gene is the percentage of the amount of shared genetic information.} \]
$d$, the default risk of a child, is likely to be much closer to her true risk of default, $d^*$. 

To make decisions regarding investment in their child’s human capital, particularly whether to save and how much to save, parents must collect information about the benefits and the costs of college, including the information about potential return of higher education, the tuition and other costs of education, the amount of available financial aids, such as scholarships or tuition subsidies. This information matters greatly as it affects the benefits and the costs parents perceive. As a result, parents observe the expected costs and expected benefits of college based on the information they gather. For some parents, these costs and benefits may deviate more or less from the true costs and the true benefits. I will test whether perceived benefits and perceived costs affect whether and how much parents save for their child's college education under the influence of different types and amount of information.
Section IV. Empirical Model

i. With Perfect Information:

In order to make predictions about parents’ saving behavior, it is necessary to consider the objective functions of the child and of her parents. As discussed in the previous section, the objective of the child $i$, the principal, is to maximize her life-time utility, $U_{it}^c$, particularly through increasing her earning potential by investing in her human capital. Following Becker & Tomes (1986), the child’s earning $Y_{it}$ mainly depends on her human capital $(H_{it})$, and the market luck $(l_t)$ at time $t$. Thus, the child’s objective function is:

$$
\text{(1)} \quad \max_{H_{it}} \sum_{t=0}^{T} \beta^c U_{it}^c (Y_{it}) = \max_{H_{it}} \sum_{t=0}^{T} \beta^c U_{it}^c \left( g(H_{it}) + l_t \right),
$$

subject to

$$
\sum_{t=0}^{T} \frac{Y_{it}}{(1 + r^m)^t} = \sum_{t=0}^{T} \left[ (H_{it} \ast \theta_{it} - x_{it} - s_t) / (1 + r^m)^t \right]
$$

where $\theta_{it}$ is unit cost of human capital, $x_{it}$ is the amount that child $i$’s parents contribute to pay for her human capital, and $s_t$ is the amount of tuition subsidies or scholarships the child can get from the society at time $t$. As in Becker & Tomes (1986), I will assume that human capital directly affects future earning with weight of 1. Each unit of human capital generate the earnings. In equilibrium, a person equates the marginal rate of return on human capital to the best use of the
money paid to acquire the human capital, i.e. \(\frac{dg(H_{it})}{dH_{it}} = r_m\). To evaluate the marginal rate of return on human capital, one compares the discounted present value of net earnings with and without an additional unit of human capital. Therefore,

\[
\sum_{t=0}^{T} Y_{it}/(1 + r)^t = \sum_{t=0}^{T} [W(H_{it}) \times H_{it} - \theta_{it} \times H_{it}] / (1 + r)^t,
\]

where \(W(\cdot)\) is the unit wage rate firms pay to a person with human capital \(H_{it}\).

Assuming that utility is separable, the parents’ objective is to maximize their life-time utility \(U^p_t\) by choosing a bundle of their own consumption, private saving and the expenditure on their child’s human capital, as:

\[
\max_{(C_{it}, p_{sit}, x_{it})} \sum_{t=0}^{T} \beta^p U^p_{it} = \sum_{t=0}^{T} \beta^p \left[ U^p(C_{it}) + \delta \times \rho(x_{it}) \right]
\]

subject to \(\sum_{t=0}^{T} (C_{it} + p_{sit} + x_{it}) / (1 + r^m)^t = \sum_{t=0}^{T} E_{it} / (1 + r^m)^t\)

where \(C_{it}\) represents the dollar value of the total amount of parental consumption at time \(t\), \(p_{sit}\) is the amount parents save at time \(t\), \(\beta\) is parents’ rate of preference over time and \(\delta\) measures the weight parents give to the probability \(\rho\) of passing their gene to the future generations as a function of their expenditure on their child’s human capital \(x_{it}\). For simplicity, I have assumed that parents finance their consumption and spending on their child from an endowment of assets they hold.

The budget constraint indicates the sum of the dollar value of the total parental consumption \((C_{it})\), the amount of private saving \((p_{sit})\) and parental expenditure on their child’s human capital \((x_{it})\) should be equal to the present value of parental assets \((\sum_{t=0}^{T} E_{it} / (1 + r^m)^t)\) at time \(t\). Parents choose the bundle of their own
consumption, saving and the expenditure on their child's human capital in order to maximize their utility. Thus, in order to allocate their total assets, parents must evaluate the utility of their own consumption and the increase in the probability of passing their gene to the future generations with an extra unit in their child’s human capital. In addition, parents also take actions on behalf of their children to maximize their children’s utility as shown in equation (1). Therefore, parents must also evaluate how much the child will benefit from an additional unit of human capital and how much an additional unit of human capital.

Assuming that parents have perfect information, the model yields several predictions about parents’ saving behavior. First, parental behavior varies with the initial endowment of assets. According to first order condition, the model predicts that:

a) parents with fewer assets will invest less in their child’s human capital;

b) parents with fewer assets are more likely to save for their child’s college if capital markets are imperfect because these households have fewer assets to use as collateral to borrow money for their child in the capital market;

c) comparing to parents with more liquid assets, parents with more illiquid assets are more likely to borrow for their child’s college at a favorable rate, since banks could treat these illiquid assets as collateral against parental loans.
Further, the model predicts that the investment in human capital will systematically vary with the relative difference between the marginal rate of return on parental expenditure on child’s human capital \( \frac{\partial x_{it}}{\partial H_{it}} \) and the marginal rate of return on the best market alternative assets \( r_m \). As rational agents, the parents will:

d) borrow more to invest in a child’s human capital when \( \frac{\partial x_{it}}{\partial H_{it}} > r_m \);

e) borrow less to invest in a child’s human capital when \( \frac{\partial x_{it}}{\partial H_{it}} < r_m \).

Finally, if the financial aid the child could get from the society \( s_t \) and her parental expenditure \( x_{it} \) on human capital are perfect substitutes, then:

f) as \( s_t \) decreases, \( x_{it} \) will increase by the same amount;

g) as \( s_t \) increases, \( x_{it} \) will decrease by the same amount (Yet, since parental expenditures \( x_{it} \) on human capital cannot be negative, then \( x_{it} \geq 0 \)).

ii. With Imperfect Information

It is much more likely that the parents would not have perfect information about the costs and the benefits of college. Deviated from the model with perfect information, the constraint of the child’s objective will be based on the expectation of the cost of human capital, the expectation of marginal rate of return
of the market and the expectation of funding she could get from the society on human capital as following:

\[
\max_{H_{it}} \sum_{t=0}^{T} \beta^c U^c_{it} (Y_{it}) = \max_{H_{it}} \sum_{t=0}^{T} \beta^c U^c_{it} (g(H_{it}) + l_t), \quad \text{subject to}
\]

\[
\sum_{t=0}^{T} \frac{Y_{it}}{(1 + E(r^m))^t} = \sum_{t=0}^{T} \frac{[(H_{it} \ast E(\theta_{it}) - x_{it} - E(s_t)]}{(1 + E(r^m))^t}.
\]

In addition, the future earnings would also be an estimate based on expectation as parents do not have perfect information about the wage rate given certain amount of human capital. Hence,

\[
(2)' \quad \frac{\sum_{t=0}^{T} Y_{it}}{[1 + E(r^m)]^t} = \frac{\sum_{t=0}^{T} [E(W(H_{it})] \ast H_{it} - E(\theta_{it}) \ast H_{it}]}{[1 + E(r^m)]^t}.
\]

As parents gather the information about wages with and without a college degree, the cost of college, the marginal rate of return of the market \((r^m)\) and the available funding from the society on human capital \((s_i)\), parents must act on their perceived costs and their perceived benefits. Consequently, the variation of information they gather would affect the variation of parents’ perceived costs and perceived benefits of college.

There are two aspects of information that may affect parents’ decisions: the mean and the variance in perceived benefits and perceived costs. Consider the perceived cost of college as an example. Suppose the true cost of 4-year college degree has a normal distribution with a mean \(\bar{c}\), but the parents may perceive the
cost with mean $c$. As shown below, the mean of the true cost is higher than the mean of the perceived cost. Thus, with a lower perceived cost of college, parents may over invest in their child's human capital.

Figure 1. Distribution of Perceived Cost of College with Smaller Mean

Second, even if the distribution of the parents’ perceived cost of college has the same mean as the true distribution of the cost of college $\tilde{c}$, information can still affect the variance of the distribution of the cost of college: greater variance with less information, smaller variance with more information. As shown below, the true distribution of the cost of college and the perceived distribution of the
cost of college have the same mean, as $\bar{c} = c$. Meanwhile, the variance of the
distribution of the perceived cost of college is smaller than the variance of the true
distribution of the cost of college.

![Figure 2. Distribution of Perceived Cost of College with Smaller Variance](image)

If the child is risk averse, the variance in the perceived cost will affect her human
capital investment decision. Thus, based on the child’s decision, as her agents,
parents who are better informed would invest differently than parents who are less
well-informed.
Section V. Data

I draw data from the 2004 to 2013 waves of the Consumer Expenditure Survey on households’ spending habits and demographic characteristics. To investigate the effect of information, I will use data for magazine reading habits from Simmons National Consumer Survey.

i. Consumer Expenditure Survey (CEX)

The Consumer Expenditure Survey (CEX) is an on-going survey, conducted by U.S. Census Bureau for the Bureau of Labor Statistics. The data of CEX links households’ buying habits with the households’ income and other characteristics by two Weekly Diary Surveys and five Quarterly Interview Surveys. Particularly, I will use the Quarterly Interview Survey of CEX, which focus on the relatively large and regular expenditures over 3 months or longer. Furthermore, I will select only the households with at least one child under the age of 18. Theoretically, people may start saving for child’s college once they have the idea. Parents or parents who expect babies might not be the only people who save to finance children’s college cost. Other people related to a child may also help to pay for the child’s college. They may not live together, such as grandparents, family relatives, or divorced parents. They may not be biologically related, such as step-parents or friends. According to Sallie Mae’s National Study
of College Students and Parents, relatives and friends contributed 4% to the total cost of college on average in 2014. In this study, I will include parents (biological, adopted, and step parents) under one household unit in the sample for two reasons. One reason is the limitation of data. In Consumer Expenditure Survey, “own” children refer blood-related, step and adopted children, and all the questions related to “children” under 18 years are asked in reference to children who live in the same household. The other reason is that parents are the major source of funding for children’s college. In 2014, parents on average contributed 37% to the total cost of college, 7% from borrowing and 30% from their income and savings.4

I use quarterly data from 2004 to 2012 for two reasons. Firstly, since 2004, the survey started to ask questions about educational saving plans, and currently the information about households’ financial information of 2013 is not publicly available on BLS website. The second reason is that, since 2003, the Bureau of Labor Statistics started to collect data using Computer Assisted Personal Interview (CAPI). Thus, the variance in questions and noise from the data collection process over the period from 2004 till 2012 will be presumably smaller, compared to data prior to 2004. After combining all the data from 2004 to 2012, there are 258,420 unique households, where approximately half of the households have no children or all their children are older than 17. For the purpose of studying parental saving behavior for their children’s college, I drop these

4 Student borrowing counts for 15%, student income and savings for 12%, and grand & scholarships for 31%.
households, which left me 80303 in the sample. For simplicity and accuracy of the household expenditure estimate, I only keep the households with more than three quarters of expenditure data and complete data on the state of residence. The final sample size of Consumer Expenditure Survey consists of 26025 households.

Based on the descriptive statistics in Appendix C, among these 26025 households, majority of them are white, married, employed, with high school or above education, and live in a Metropolitan Statistical Area. 44.15% of the reference person are male. The average age of the reference person is about 40. On average they work 34 hours a week. The average income of these households are $64923.5, and the median slightly higher, $68331.54 (adjusted to 2012 dollars). The mean of their annual consumption is $12851, and the median is $9424.13. Due to the incomplete data on financial asset, the mean will be $143.14 (including zeros and missing data) and $1864.5 (excluding zeros and missing data). Similarly with housing assets, the mean is $2629 (including zeros and missing data) and $4394.92 (excluding zeros and missing data). The average amount of debt among these households is $223121.2, and the average of net worth (i.e. subtracting debt from total assets) is $20040.36.

ii. Information Measure


To measure information households might get, I draw data from the Reader's Guide Full Text Mega (H. W. Wilson). I searched magazine article
titles from 1983 to present using 18 different combinations of key words, such as “cost of college”, “financing college”, “scholarship/grant”, “saving for college”, “pay for college”, “student financial aid”, “student loan”, etc. From the resulting set, I then selected the articles with topics that align with the interest of this study by titles, topics, subjects, key words and text. After deleting the irrelevant and duplicate articles, there are over 1,500 different articles of interest published in over 100 different magazines. According to the information conveys in the text, I then categorize all the articles into five different major groups: scholarship group (705 articles), rising college cost group (285 articles), financing college group (254 articles), burden of student loan group (160 articles), and benefits of college group (93 articles). I label articles that describe the availability of scholarships or external funding as disincentive type of information. I label articles that describe the rising cost of college as incentive type of information.

In order to measure the amount of information households might have been exposed to, I will use the Simmons National Consumer Survey data on magazine readership.

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5 There are several other groups in the process of categorization, which are negligible due to small number of articles. They are the ease of student loan, the declining cost of college, and the unnecessary of college. Each of these groups has less than 5 articles over the collection period.
b. The Simmons National Consumer Survey (NCS)

From Simmons National Consumer Survey (NCS), I will use the repeated cross-sectional survey on individual magazine readerships in this study. The survey asks detailed questions about consumer behaviors, magazine reading habits and reference person’s demographic information. For each of more than 230 magazines, the interviewer shows the participant the cover of the magazine and ask him/her to report how many of the last four issues he/she has read. Articles in my data appear in 36 of the NCS magazines.

Using the NCS data on the demographic characteristics of the people who read these 36 magazines, I estimate a model of the probability of reading each magazine and of the frequency of reading these magazines. It is generally known that magazine readership began to sharply decline after 1995. However, since I use NCS surveys starting in 1995, I add a cubic time trend to capture the trend in the magazine readership. Based on the demographic information of the CEX data, I run two models for the readership separately using the comparable demographic in NCS, which includes age, gender, race/ethnicity, education attainment, number of hours work per week of the reference person, household income, marital status, number of children, household ownership, state information, and the year trend of magazine readership as following:

\[ Prob(reading)_{itm} = \alpha_0 + \alpha_1 X_{it} + \varepsilon_i \]
(4)′ \( \text{Intensity(reading)}_{i:t} = \alpha_0 + \alpha_1 X_{i:t} + \varepsilon_i. \)

After running these two models, I use the coefficients matrix from these two models and the corresponded demographic information from the CEX data to generate the predicted probability and predicted intensity of reading a magazine for each CEX household in my sample. (The Appendix B Magazine lists of names of these 36 magazines.)

After generating the predicted probability and the predicted frequency of reading a magazine for the CEX households, based on the types of information that the college-related articles convey, incentive type vs. disincentive type, in the categorization, I can construct the predicted information exposure measurement for each household by type of information following the formula:

\[
(5) \quad \text{Information(type)}_{i:s} = \sum_{t=0}^{T} \sum_{m=1}^{M} \text{InformationScore}_{i:m:t} \\
\quad \quad \times \text{Article (type)}_{m:t}, \\
\text{where InformationScore}_{i:m:t} = \text{Probability}_{i:m:t} \times \text{Frequency}_{i:m:t}
\]
Section VI. Model Specification

In the CEX data, there are two questions which specifically relate to households’ saving behavior for their children’s college. These two questions ask whether the households have put any money into a tax-free or tax-deferred educational saving account during the last 12 month period and how much money the households have put into such educational accounts. Surprisingly, only few households actually invest into these educational saving plans. As shown below, on average there are 34 households putting money in a tax-free or tax-deferred educational saving plan each year, and most of households invest about $200 each month. Noticeably, even though the amount of money households put in these educational saving plans are steady from 2005 to 2012, we can also see that the number of households who invest in these educational saving plan decreases over time.
<table>
<thead>
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<th>Mean($)</th>
<th>Std. Dev.</th>
<th>Median($)</th>
<th>Min</th>
<th>Max</th>
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<tr>
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<td>7507.216</td>
<td>2425</td>
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</table>

Table 1: Descriptive Statistics of Educational Saving Plan by Year in CEX

There are several reasons for choosing general saving behavior as the targeted outcome. First of all, it is because the small variance in these educational saving plans and the small size of observations as discussed above. Secondly, even though there are specific educational saving accounts, due to the inflexibility of these accounts and the profitability of the alternative investments, it is likely that people may save money in other accounts, such as general saving accounts, Individual Retirement Accounts, stocks, or mutual funds. Thus, I will include all types of financial assets the CEX collects. Meanwhile, as capital market normally treats households’ illiquid assets, particular the housing asset, as collateral, parents can invest in houses so that they would have a more favorable interest for parental loans in future.
Therefore, in order to study households’ saving behavior more thoroughly, the first outcome variable in this study is the probability that a household saves over the past 12 months. Since the CEX does not directly ask whether the households save during the past 12 months, I code the households as having saved if the household spends less than their total revenue during the past 12 months:

\[
\text{Saving} = \frac{\text{Revenue of Households}}{-\text{Annual Expenditure of Households}},
\]
where Revenue

\[ = \text{Income} + \text{Change in Financial Asset} \]

\[ + \text{Change in Housing Asset}. \]

If Saving > 0, then \( \text{Prob}(\text{saving}) = 1; \)

if Saving ≤ 0, then \( \text{Prob}(\text{saving}) = 0 \)

Because of the definition of saving in this study, about 98% of households in the CEX sample save during the last 12 months. This classification might generate a bigger proportion of households who saved, and some households might not realize that they spent less than they made. However, this would not lead to a problem. When the parents help their children to pay for their college, it is the total amount of the households’ assets that affects the methods of financing, which parents might not recognize.

The second outcome variable in this study is the ratio of the annual contribution to mortgage principal to the household’s total revenue as a measure of parental investing behavior to allocate resources in the housing asset. The 12-month principal payment is the only portion that contributes to the ownership of the family’s house. Thus, the calculation of this allocation variable follows equation (7):

(7) \[ \text{Allocation}_{it} = \frac{\text{Annual Contribution to Mortgage Principal}}{\text{Revenue}_{it}}, \]

where \( \text{Revenue}_{it} = \text{Income}_{it} + \text{Change in Financial Asset}_{it} + \text{Annual Contribution to Mortgage Principal}. \)
The average of this allocation ratio is 0.04 with zeros, 0.06 excluding zeros, and the median of this ratio is 0.02 with zeros, 0.04 without zeros. The graph below shows the median of allocation from 2004 to 2012. Clearly, there are some limitations of this allocation measurement. Even though I include the national Case-Shiller Home Price index in the model, there will be some deviations by states. As the change in the value of housing assets varies across states over years, the allocation might not be able to fully capture the change of value in the housing asset. However, the proportion of allocating resources into the housing assets should reflect households’ decision of investing in their major illiquid asset with their own expectation of the housing market. Over 70% of the households in the

![Figure 4. Plots of Median of Share of Resource Allocate to Principal Payment, 2004-2012](image-url)
CEX sample have houses. Thus, this variable will capture the households’ preference in allocating money to their house for a majority of the sample.

The last two outcome variables in this study are the dollar amount of the annual change of the financial assets and the natural log of the annual contribution to mortgage principal. The change in financial asset includes the change in saving account, checking account, U.S. bonds and securities. This change could be positive if the households have more money in these financial accounts in the last 12 months, negative if they have less, and zero if they have the same amount. The first graph in the following page shows the mean of the change amount in financial assets by year. Due to the long tail of the distribution of the dollar amount of annual contribution to home mortgage, I use the natural log of this dollar amount if this annual contribution to mortgage payment is bigger than zero. If the household owns the house with no outstanding mortgage or the household does not own any house property, then there is no principal payment to home mortgage. Thus, I set the natural log of the dollar amount of annual contribution to mortgage principal to zero for the households with no outstanding mortgage or with no housing property. The second graph in the following page shows the median of the natural log of the dollar amount of annual contribution to mortgage principal.

Several factors affect whether and how much parents save. For example, their decision to either save or borrow will depend on the households’ credit score. Parental and household characteristics also influence their decisions. For
example, the number and age distribution of children will affect demand for resources and the timing of expenditures. If parents intend to retire at the age of 65, the current age of parents might indicate their flexibility and ability to pay back any parental loans. Even holding income constant, the occupation of parents may capture differences in future wages and the stability of jobs that banks will take into account.

Figure 5. Plot of the Mean of Net Annual Change in Financial Asset, 2004 - 2012

In the empirical model, I control for the occupation of the reference person (and/or spouse), the log of household income and the log of the sum of the total
present value of the housing, the total value of owned vehicles and the total amount of net worth. I also control for demographic characteristics of parents and households. The set of controls includes the age, race, Hispanic origin, gender, marital status and education of the reference person (and/or spouse). I also control for the number of children under 18 years old living in the households, if the reference person currently has a child in college, and the distribution of the age of the children. In all but the most basic model, I include state, urban/rural, metropolitan statistical area, and the local population size fixed-effects for the place where the household currently lives. Due to the limitation of

Figure 6. Plot of the Median of Natural Log of Annual Principal Payment, 2004–2012
the CEX data, I cannot observe some important variables which also strongly influence the parents’ saving behavior for their child’s college, such as the intelligence level of the child, her willingness of going to college, or types of college (public, private or community) to which the child might apply. However, I control for the amount a household currently spends on education (other than for college costs). I treat the educational expenses as an indicator for the household’s attitude about their child’s education. Lastly, as discussed in the theoretical model, it is necessary to consider the rate of return of the other assets when parents make financial decisions. Therefore, the last two exogenous control variables are the yearly S&P 500 index and the yearly national Case-Shiller House Index as proxies for the rate of return on liquid assets and the rate of return on illiquid assets in general. These two exogenous variables in the model also capture some of the change in saving behavior caused by the recession that occurred during the sample period.

In the basic model, I run a simple regression of the dependent variable on the predicted information exposure vectors ($I$). The models are given by:

$$Prb(Save)_{it} = \beta_0 + \beta_1 I_{it} + \epsilon_{it}; \tag{8}$$

$$\frac{Annual \ Contribution \ to \ Mortgage \ Principal}{Total \ Revenue}_{it} = \beta_0 + \beta_1 I_{it} + \epsilon_{it}; \tag{9}$$

$$Dollar \ Amont \ of \ Annual \ Change \ in \ Finacial \ Asset_{it} = \beta_0 + \beta_1 I_{it} + \epsilon_{it}; \tag{10}$$

$$Natural \ Log \ of \ Annual \ Contribution \ to \ Mortgage \Principal_{it} = \beta_0 + \beta_1 I_{it} + \epsilon_{it}. \tag{11}$$
Clearly, there are other factors that would affect parents’ saving behavior. Thus, to minimize the omitted variable bias, in the second set of models, I add the control variables. These models are given by:

\[
(12) \quad \text{Prob}(\text{Save})_{it} = \beta_0 + \beta_1 I_{it} + \beta_2 C_{it} + \beta_3 X_{it} + \beta_4 S&P_t + \beta_5 \text{Shiller}_t + \epsilon_{it};
\]

\[
(13) \quad \frac{\text{Annual Contribution to Mortgage Principal}}{\text{Total Revenue}}_{it} = \beta_0 + \beta_1 I_{it} + \beta_2 C_{it} + \beta_3 X_{it} + \beta_4 S&P_t + \beta_5 \text{Shiller}_t + \epsilon_{it};
\]

\[
(14) \quad \text{Dollar Amount of Annual Change in Financial Asset}_{it} = \beta_0 + \beta_1 I_{it} + \beta_2 C_{it} + \beta_3 X_{it} + \beta_4 S&P_t + \beta_5 \text{Shiller}_t + \epsilon_{it};
\]

\[
(15) \quad \text{Natural Log of Annual Contribution to Mortgage Principal}_{it} = \beta_0 + \beta_1 I_{it} + \beta_2 C_{it} + \beta_3 X_{it} + \beta_4 S&P_t + \beta_5 \text{Shiller}_t + \epsilon_{it}
\]

where \(C_{it}\) are the dollar value of households’ total consumption at time \(t\), \(X_{it}\) is the demographic vector at time \(t\), \(S&P_t\) is the exogenous instrumental variable for the market rate of return of liquid asset at time \(t\), and \(\text{Shiller}_t\) is the exogenous instrumental variable for the market rate of return of illiquid asset at time \(t\).

Finally, I specify models in which I interact the information variables with selected characteristics to allow for heterogeneity across groups. These models are given by:

\[
(16) \quad \text{Prob}(\text{Save})_{it} = \beta_0 + \beta_1 I_{it} + \beta_2 C_{it} + \beta_3 X_{it} + \beta_4 S&P_t + \beta_5 \text{Shiller}_t + \beta_6 I_{it} X_{it} + \epsilon_{it};
\]
The five models with different interaction terms alternatively include information interacted with: (a) log of household income, (b) parental education, (c) the number of children who are 16 or 17 years old, (d) the race/ethnicity of the parents, and (e) the three-way interaction between information, race/ethnicity of the parents and the number of children who are 16 or 17 years old. I specify these models to investigate potential selection bias. Certain households are likely to have more information of the costs and benefits of college, then the propensity score of information exposure might not measure exposure as well. For example, if parents belong to the minority race/ethnicity group, their children would have higher probability to get scholarship. Then, these households should be more sensitive to the information of college regarding possible funding opportunities. Or, by reading more articles about the availability of scholarship, the black or Hispanic parents might perceive a higher chance their children would get some funding, which lowers the necessity of saving for their children’s college. Thus, without the interaction terms of information exposure and parental race/ethnicity,
there will be a selection bias due to a potential nondependent relationship between information and parental race/ethnicity.
Section VII. Results

As results shown in Appendix C, I compare all the coefficients of information for all 4 outcome variables across all models. Without any control variables, households who read more magazine articles are more likely to save, put bigger percentage of annual revenue into mortgage principal, and pay higher principal payment to their home mortgage. When households read more magazine articles about available scholarship, they would reduce the proportion of annual revenue into housing asset, and lower the amount of principal payments to their home mortgage. Notably, the effect from one additional unit of these information exposure changes fairly fast as information increases. The coefficient on the quadratic terms of incentive and disincentive are statistically significant. However, there is evidence that some of the association between information and these outcomes is simply because of omitted variable bias. After adding control variables, some significant effects of information disappears. In the models with interaction terms, the coefficients on information and on the interaction between information and selected covariates indicate some interesting heterogeneity among different groups of parents. Because of these interaction terms, I calculate the marginal effects of one unit change in information and then show how that effect differs across demographic groups.
As shown in Appendix C, these are the main effect of information on each outcome variable across all models. After including the interaction terms, the main effect of information shows significance only in the dependent variables related to principal mortgage. For the annual principal payment, every additional ten articles about rising costs of college will lower the amount of annual principal payment by about 0.51% with the interactions between information and parental education or number of children who are 16 or 17, which is similar to the model with control variables only. On the other hand, for every additional 10 articles about available scholarships parents read, they will reduce 0.26% and 0.20% in the models with the interactions between information and log of household income and parental education respectively. Interestingly, in the models with interaction between information and race and the three way interaction between information, race and number of children who are 16 or 17, the marginal effect of 10 articles about available scholarship is much bigger, 1.17% and 1.23% respectively. The marginal effect of 10 additional articles about available scholarship on lowering the ratio of annual principal payment to the sum of principal payment, net financial asset and annual income also correspond to the relatively large marginal effect of information on the reduction in annual principal payment in the last two models.

Also shown in Appendix C, I calculate the marginal effect of the interaction terms between information and selected covariates. When I include the interaction term between information and the natural log of household income, the marginal effects of every 10 articles about rising college costs are different across
different income groups. For the households with the highest income in the sample, after seeing 10 articles about this *incentive* type of information, they will be less likely to save and they will lower the proportion of money for principal payment. One explanation is that parents with higher income may perceive lower probability of receiving the scholarship. Thus, when they see more information about rising costs of college, they reallocate their money to financial asset for financing the cost of college for their children or for their own consumption. This reason also explains that, when these parents with higher income see more articles about available scholarships, they reduce the amount of annual principal payment. However, for parents with lower income, when parents exposed to more information of the rising costs of college, they reduce their annual principal payment by a significant percentage, and this marginal effect on the percentage of reduction gets smaller when households has more income. On the other hand, when parents see more articles about available scholarships, they will increase the amount of money for principal payment, but this marginal effect on the increase also gets smaller when households have more income.

The marginal effect of interactions between information and parental education also shows significance. For every additional articles about rising costs of college that parents see, they reduce the amount of principal payment. Parents with college degree reduce the most, then the parents with some college education. The largest marginal effect is for parents with no college education. Interestingly, the parents with none college education also are the only ones to react to the *disincentive* type of information. When they see more articles about
available scholarships, they will put less money toward principal payments and also reduce the share of resources allocate to principal payment. One explanation might be that parents who have attend college before would have a better understanding of the costs of college, availability and eligibility of scholarships. Thus, the *incentive* type of information shows relatively stronger effect on these groups of parents and *disincentive* type of information shows no significance on these groups.

The marginal effect of the interaction terms between information and the number of children age 16 or 17 only shows significance when there is only one child who is close to the usual age of college attendance. One may expect that households with more children who are 16 or 17 years old would be more sensitive to the information on the cost of college or external funds than the households with children at a younger age. However, the data from CEX does not show such a difference. A possible explanation is that parents of children who are almost ready to go to college already acquired certain amount of information, the additional information on college would not affect these parents’ saving behavior. In addition, with such a short horizon before their children go to college, these parents might not change their saving behavior when they have more than one child older than 15.

Based on the theoretical model, minority parents should be more sensitive to the information about scholarship, since their children are more likely to receive some financial support. Results mostly support this predication especially for the Hispanic parents. For every additional 10 articles about the available
scholarship or external funding, Hispanic parents become less likely to save, reduce both the amount of and share of resource allocated to principal payments. Interestingly, the magnitude of these marginal effects are the highest for Hispanic parents, even though non-black, non-Hispanic parents also reduce the amount of and share of resource allocate to their principal payments.

Considering the significant effect of information on minority parents, I expect that there might be a difference among the minority parents with children at different age. Therefore, in the last set of full model, I include not only the interaction terms between information and race of the parents, between information and the number of children who are 16 or 17 years old, but also the three way interaction term of information, race of the parents and the number of children who are 16 or 17 years old. Results show that minority parents do have different saving behaviors, but not as that much these models with three way interactions. The only significant marginal effect of minority parents are the Hispanic parents when they have 4 children who are 16 or 17. When these Hispanic see more articles about available scholarship they lower the share of resource allocate to principal payment by a statistically significant amount. Other than this finding, all other significance are shown in the groups of non-black and non-Hispanic parents with more than 1 child who are 16 or 17. They are sensitive to both types of information. As they seen more information about rising cost of college, they increase the amount of and share of resource allocate to principal payments. When they see more information about the available scholarships, they reduce both the amount of and share of resource allocate to principal payments.
One explanation might be that these non-black and non-Hispanic parents might perceive a relatively lower probability that their children will receive the scholarship. Thus, when they see more articles about higher costs, they invest in housing so that they might take a loan to finance their children’s education, and when they see more articles about more available funding, they might allocate more into their financial assets to pay the costs directly.
Section VIII. Conclusion

This paper examines how information of the cost and benefits of college affect parents’ saving behavior for their children’s college. In order to study the effect of information, I combine two datasets to estimate information exposure and one dataset for household demographic information and saving behavior.

The analysis is based on the principal-agent model. Theoretically, the child has a goal to maximize her utility by maximize her earning potential in future. In order to do so, she chooses to invest in her human capital. However, due to the imperfect capital market, she cannot borrow money herself to finance her higher education. Therefore, she hires agents to help her to finance her college at a lower cost. As the child’s parents, they have more information about the child and they have a natural affinity with the child as she grows up. More importantly, the child shares genetic information with her parents. In order to pass their gene to future generate, the parents have incentive to finance their child’s higher education at a lower rate so that the child might have a better mate and the future generation might also have better living conditions. Parents make the decisions about how much they consume, save and allocate to savings to finance for their child’s college costs. Those decisions vary with the perceived costs and benefits of college. If parents perceive a high cost of college, they save more; if parents perceive a lower cost of college, they consume more. I use variation in exposure
to magazine articles about the costs and benefits of college to proxy for information about college.

I categorize magazine articles that should induce parents to save and articles that should induce them to not save. The first type of articles are about the rising cost of college, the burden of student loans, and financing college through saving plans or tax deductions. The second group of articles are about the availability of scholarship, external funding and any financial support for college. I use the Simmons National Consumer Survey to approximate a probability of readership for each magazine where the selected articles appeared and the frequency of reading a given magazine. Then, assuming people remember all, I take the sum of the count of articles times the predicted probability of readership and predicted intensity of readership over all years from the birth of the oldest child to the survey year. I select a sample of households from Consumer Expenditure Survey from 2004 to 2012 that all have at least one child in their household who is under 18 years old.

I estimate three sets of models: a simple correlation; with controls; and with interaction terms between information and selected covariates. Results show that when parents see more information about disincentive, they become less likely to save and they allocate less money to paying for their home mortgage. The saving behavior of lower income households are more sensitive to information. Particularly, black parents actually put more money for their home mortgage, when they have higher information exposure rate of the disincentive to

45
save. Hispanic parents, who as minorities should qualify for scholarships, behave like non-Hispanic, non-black parents.

The results must be qualified because the data are not perfect. The CEX questions about changes in financial assets and in housing value are not clear. Consequently, the resulting data may be noisy. The second major limitation is that I only measure information exposure using variation in magazine articles. After 1995, the role of magazine articles is not as important as posts on internet. If future research could have more specific data, then it would be more accurate to identify the casual relationship between information and households’ investment in their children’s human capital.
References


Kane, T. J. (2007). Evaluating the impact of the DC tuition assistance grant program. Journal of Human Resources, 42(3), 555-582.


http://nces.ed.gov/FastFacts/display.asp?id=76


Appendix A Magazine Lists
US News & World Report
Jet
Kiplinger's Personal Finance
Black Enterprise
Time
Ebony
Business Week
Newsweek
Forbes
Money
Sports Illustrated
People Weekly
Essence
New Yorker
Reader's Digest
Seventeen
Fortune
Atlantic

Harper's
Esquire
Good Housekeeping
Teen
Working Mother
Working Woman
Rolling Stone
Better Homes & Gardens
Consumers Digest
Ladies' Home Journal
Parents
Parenting
PC Computing
Vanity Fair
Yankee
Flying
New York Magazine
Baby Talk
Appendix B Tables
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Table 2. Descriptive Statistics about Asset and Income
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Table 3. Descriptive Statistics for Sample Demographic Information
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Table 4: Results – Information Coefficients: Probability Household Saved Money in Previous Year
Table 4. continued

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<td>(0.1927)</td>
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Notes: Coefficients denoted by ***, **,* statistically differ from zero with p-values of <0.01, <0.05, and <0.1 respectively. Models 2-7 also control for the age, occupation, race/ethnicity of the reference and spouse, marital status, log of household income, household net asset, parental education attainment, # children younger than 18, the total expenditure, current expenditure on education, State information, unemployment rate, S&P Index, Case-Shiller Index at a given year and year trend.
Table 4. continued

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**Coefficients on Quadratic Terms**

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Continued
Table 4. Continued

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Notes: Coefficients denoted by ***, **, * statistically differ from zero with p-values of <0.01, <0.05, and <0.1 respectively. Models 2-7 also control for the age, occupation, race/ethnicity of the reference and spouse, marital status, log of household income, household net asset, parental education attainment, # children younger than 18, the total expenditure, current expenditure on education, State information, unemployment rate, S&P Index, Case-Shiller Index at a given year and year trend.
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Coefficients on Quadratic Terms

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Table 5. Results – Information Coefficients: Net Change in Financial Asset

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Table 5. Continued

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Notes: Coefficients denoted by ***, **, * statistically differ from zero with p-values of <0.01, <0.05, and <0.1 respectively. Models 2-7 also control for the age, occupation, race/ethnicity of the reference and spouse, marital status, log of household income, household net asset, parental education attainment, # children younger than 18, the total expenditure, current expenditure on education, State information, unemployment rate, S&P Index, Case-Shiller Index at a given year and year trend.

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Table 5 Continued

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Coefficients on Quadratic Terms

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Interacted with:

| *Log of income* | 1.79 (3.87) |
| Education       |             |
| *some college*  | -3.89 (145.81) |
| *college*       | -133.89 (157.25) |
| **Children 16-17** | 38.70 (52.34) | -335.13 (1149.92) |

Race/ethnicity

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Table 6. Results – Information Coefficients: Natural Log of Principal Payment

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Coefficients on Quadratic Terms

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Interacted with:

| *Log of income | 0.0031***   | (0.0006)       |             |                |
| Educatio n:    |             |                |             |                |
| *som college   |             |                |             |                |
| *college       |             |                | 0.0078      | (0.0229)       |
| # Children 16-17|             |                | 0.0042      | (0.008)        |
|               |             |                | -0.1050     | (0.1677)       |
| Race/ethnicity |             |                |             |                |
| *Black         |             |                | 0.312***    | (0.0876)       |

Continued
Table 6. Continued

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Notes: Coefficients denoted by ***, **, * statistically differ from zero with p-values of <0.01, <0.05, and <0.1 respectively. Models 2-7 also control for the age, occupation, race/ethnicity of the reference and spouse, marital status, log of household income, household net asset, parental education attainment, # children younger than 18, the total expenditure, current expenditure on education, State information, unemployment rate, S&P Index, Case-Shiller Index at a given year and year trend.
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Table 7. Results – Information Coefficients: Ratio of Principal Payment to the Sum of Principal Payment, Net Change in Financial Asset and Annual Income

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Table 7 Continued

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Notes: Coefficients denoted by \***, **, * statistically differ from zero with p-values of <0.01, <0.05, and <0.1 respectively. Models 2-7 also control for the age, occupation, race/ethnicity of the reference and spouse, marital status, log of household income, household net asset, parental education attainment, # children younger than 18, the total expenditure, current expenditure on education, State information, unemployment rate, S&P Index, Case-Shiller Index at a given year and year trend.

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**Coefficients on Quadratic Terms**

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Notes: Coefficients denoted by ***, **, * statistically differ from zero with p-values of <0.01, <0.05, and <0.1 respectively. Models 2-7 also control for the age, occupation, race/ethnicity of the reference and spouse, marital status, log of household income, household net asset, parental education attainment, # children younger than 18, the total expenditure, current expenditure on education, State information, unemployment rate, S&P Index, Case-Shiller Index at a given year and year trend.
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Table 8. Predicted Marginal Effect of Information on Probability Household Saved Money in Previous Year

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<th>494.505 (481.50)</th>
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<th>-343.71 (832.01)</th>
<th>208.59 (897.81)</th>
<th>-380.15 (812.0)</th>
<th>-218.21 (1114.01)</th>
<th>-28.058 (1133.36)</th>
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<td>-212.28 (358.81)</td>
<td>96.32 (679.48)</td>
<td>48.05 (704.89)</td>
<td>62.51 (710.17)</td>
<td>95.75 (683.99)</td>
<td>211.31 (1452.08)</td>
<td>84.97 (1492.16)</td>
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Table 9. Predicted Marginal Effect of Information on Net Change in Financial Asset

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<th>0.5122** * (0.1178)</th>
<th>0.5094** * (0.1213)</th>
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<th>0.5140** * (0.1185)</th>
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Table 10. Predicted Marginal Effect of Information on Natural Log of Principal Payment
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<td>Incentive</td>
<td>0.0216**</td>
<td>(0.0014)</td>
<td>-0.0033</td>
<td>(0.0024)</td>
<td>-0.003</td>
<td>(0.0024)</td>
<td>-0.0019</td>
<td>(0.0026)</td>
<td>-0.0036</td>
<td>(0.0024)</td>
</tr>
<tr>
<td>Disincentive</td>
<td>-0.0151**</td>
<td>(0.0011)</td>
<td>-0.0037*</td>
<td>(0.0020)</td>
<td>-0.0015</td>
<td>(0.0021)</td>
<td>-0.0036*</td>
<td>(0.0021)</td>
<td>-0.0035*</td>
<td>(0.0020)</td>
</tr>
</tbody>
</table>

Table 11. Predicted Marginal Effect of Information on Ratio of Principal Payment to the Sum of Principal Payment, Net Change in Financial Asset and Annual Income
<table>
<thead>
<tr>
<th>Dependent variable: Probability Household Saved Money in Previous Year</th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log of HH Income:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 ($1096.63)</td>
<td>0.0723* (0.0391)</td>
<td>-0.0478** (0.0219)</td>
</tr>
<tr>
<td>8 ($2980.96)</td>
<td>0.1299* (0.0742)</td>
<td>-0.0856** (0.0435)</td>
</tr>
<tr>
<td>9 ($8103.08)</td>
<td>0.0614 (0.0526)</td>
<td>-0.0402 (0.0367)</td>
</tr>
<tr>
<td>10 ($22026.47)</td>
<td>-0.0008 (0.0158)</td>
<td>0.0021 (0.0141)</td>
</tr>
<tr>
<td>11 ($59874.14)</td>
<td>-0.0033 (0.0023)</td>
<td>0.0029 (0.0025)</td>
</tr>
<tr>
<td>12 ($162754.79)</td>
<td>-0.0005** (0.0002)</td>
<td>0.0005* (0.0003)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent Variable: Net Change in Financial Asset</th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log of HH Income =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 ($1096.63)</td>
<td>-2010.6 (3282.6)</td>
<td>945.7 (1713.2)</td>
</tr>
<tr>
<td>8 ($2980.96)</td>
<td>-1518.2 (2432.3)</td>
<td>699.1 (1297.1)</td>
</tr>
<tr>
<td>9 ($8103.08)</td>
<td>-1053.7 (1665.9)</td>
<td>458.1 (940.6)</td>
</tr>
<tr>
<td>10 ($22026.47)</td>
<td>-616.9 (1050.8)</td>
<td>222.6 (715.8)</td>
</tr>
<tr>
<td>11 ($59874.14)</td>
<td>-207.9 (828.3)</td>
<td>-7.4 (732.9)</td>
</tr>
<tr>
<td>12 ($162754.79)</td>
<td>173.3 (1155.6)</td>
<td>-231.8 (965.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent Variable: Natural Log of Principal Payment</th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log of HH Income =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 ($1096.63)</td>
<td>-2.3681*** (0.4786)</td>
<td>1.4641*** (0.2498)</td>
</tr>
<tr>
<td>8 ($2980.96)</td>
<td>-1.8571*** (0.3546)</td>
<td>0.9911*** (0.1891)</td>
</tr>
</tbody>
</table>

Continued

Table 12. Model 3: Log of Household Income (Figure in Parentheses Represent Observed Income)
Table 12 Continued

<table>
<thead>
<tr>
<th></th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 ($8103.08)</td>
<td>-1.3539***</td>
<td>0.5277***</td>
</tr>
<tr>
<td></td>
<td>(0.2429)</td>
<td>(0.1371)</td>
</tr>
<tr>
<td>10 ($22026.47)</td>
<td>-0.8587***</td>
<td>0.0739</td>
</tr>
<tr>
<td></td>
<td>(0.1532)</td>
<td>(0.1044)</td>
</tr>
<tr>
<td>11 ($59874.14)</td>
<td>-0.3713***</td>
<td>-0.3703***</td>
</tr>
<tr>
<td></td>
<td>(0.1208)</td>
<td>(0.1069)</td>
</tr>
<tr>
<td>12 ($162754.79)</td>
<td>0.1081</td>
<td>-0.8048***</td>
</tr>
<tr>
<td></td>
<td>(0.1685)</td>
<td>(0.1407)</td>
</tr>
</tbody>
</table>

Dependent Variable: Ratio of Principal Payment to the Sum of Principal Payment, Net Change in Financial Asset and Annual Income

<table>
<thead>
<tr>
<th>Log of HH Income :</th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ($1096.63)</td>
<td>0.0231**</td>
<td>-0.0269***</td>
</tr>
<tr>
<td></td>
<td>(0.0096)</td>
<td>(0.0050)</td>
</tr>
<tr>
<td>8 ($2980.96)</td>
<td>0.0158**</td>
<td>-0.0200***</td>
</tr>
<tr>
<td></td>
<td>(0.0071)</td>
<td>(0.0038)</td>
</tr>
<tr>
<td>9 ($8103.08)</td>
<td>0.0086*</td>
<td>-0.0131***</td>
</tr>
<tr>
<td></td>
<td>(0.0049)</td>
<td>(0.0028)</td>
</tr>
<tr>
<td>10 ($22026.47)</td>
<td>0.0016</td>
<td>-0.0064***</td>
</tr>
<tr>
<td></td>
<td>(0.0031)</td>
<td>(0.0021)</td>
</tr>
<tr>
<td>11 ($59874.14)</td>
<td>-0.0052**</td>
<td>0.0002</td>
</tr>
<tr>
<td></td>
<td>(0.0024)</td>
<td>(0.0021)</td>
</tr>
<tr>
<td>12 ($162754.79)</td>
<td>-0.0120***</td>
<td>0.0066**</td>
</tr>
<tr>
<td></td>
<td>(0.0034)</td>
<td>(0.0028)</td>
</tr>
</tbody>
</table>
## Dependent variable: Probability Household Saved Money in Previous Year

<table>
<thead>
<tr>
<th></th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>College</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0.0016</td>
<td>-0.0021</td>
</tr>
<tr>
<td></td>
<td>(0.0051)</td>
<td>(0.0031)</td>
</tr>
<tr>
<td>1</td>
<td>-0.0042</td>
<td>0.0006</td>
</tr>
<tr>
<td></td>
<td>(0.0042)</td>
<td>(0.0043)</td>
</tr>
<tr>
<td>SomeCollege</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>-0.0023</td>
<td>-0.0006</td>
</tr>
<tr>
<td></td>
<td>(0.0047)</td>
<td>(0.0033)</td>
</tr>
<tr>
<td>1</td>
<td>0.0064</td>
<td>-0.0027</td>
</tr>
<tr>
<td></td>
<td>(0.0062)</td>
<td>(0.0039)</td>
</tr>
</tbody>
</table>

## Dependent Variable: Net Change in Financial Asset

<table>
<thead>
<tr>
<th></th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>College</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>661.80</td>
<td>-289.68</td>
</tr>
<tr>
<td></td>
<td>(1127.77)</td>
<td>(761.50)</td>
</tr>
<tr>
<td>1</td>
<td>-812.96</td>
<td>492.29</td>
</tr>
<tr>
<td></td>
<td>(944.09)</td>
<td>(900.58)</td>
</tr>
<tr>
<td>SomeCollege</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>108.02</td>
<td>62.98</td>
</tr>
<tr>
<td></td>
<td>(965.32)</td>
<td>(751.95)</td>
</tr>
<tr>
<td>1</td>
<td>462.80</td>
<td>61.93</td>
</tr>
<tr>
<td></td>
<td>(1212.35)</td>
<td>(905.33)</td>
</tr>
</tbody>
</table>

## Dependent Variable: Natural Log of Principal Payment

<table>
<thead>
<tr>
<th></th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>College</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>-0.1730</td>
<td>-0.2092*</td>
</tr>
<tr>
<td></td>
<td>(0.1645)</td>
<td>(0.1111)</td>
</tr>
<tr>
<td>1</td>
<td>-0.6052***</td>
<td>-0.1896</td>
</tr>
<tr>
<td></td>
<td>(0.1377)</td>
<td>(0.1314)</td>
</tr>
<tr>
<td>SomeCollege</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>-0.2760**</td>
<td>-0.3037***</td>
</tr>
<tr>
<td></td>
<td>(0.1408)</td>
<td>(0.1097)</td>
</tr>
<tr>
<td>1</td>
<td>-0.5708***</td>
<td>0.0791</td>
</tr>
<tr>
<td></td>
<td>(0.1769)</td>
<td>(0.1321)</td>
</tr>
</tbody>
</table>
Table 13 Continued

<table>
<thead>
<tr>
<th>College</th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>College</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0.0019</td>
<td>-0.0061***</td>
</tr>
<tr>
<td></td>
<td>(0.0033)</td>
<td>(0.0022)</td>
</tr>
<tr>
<td>1</td>
<td>-0.0070***</td>
<td>-0.0005</td>
</tr>
<tr>
<td></td>
<td>(0.0028)</td>
<td>(0.0026)</td>
</tr>
<tr>
<td>SomeCollege</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>-0.0002</td>
<td>-0.0057***</td>
</tr>
<tr>
<td></td>
<td>(0.0028)</td>
<td>(0.0022)</td>
</tr>
<tr>
<td>1</td>
<td>-0.0066*</td>
<td>0.0020</td>
</tr>
<tr>
<td></td>
<td>(0.0035)</td>
<td>(0.0027)</td>
</tr>
<tr>
<td># Children 16-17:</td>
<td>Incentive</td>
<td>Disincentive</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>1</td>
<td>0.0007 (0.0047)</td>
<td>-0.0049 (0.0032)</td>
</tr>
<tr>
<td>2</td>
<td>0.0039 (0.0050)</td>
<td>-0.0064* (0.0036)</td>
</tr>
<tr>
<td>3</td>
<td>0.0053 (0.0053)</td>
<td>-0.0062 (0.0041)</td>
</tr>
<tr>
<td>4</td>
<td>0.0058 (0.0056)</td>
<td>-0.0056 (0.0044)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Children 16-17:</th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>954.42 (1041.23)</td>
<td>-490.78 (829.16)</td>
</tr>
<tr>
<td>2</td>
<td>2356.02 (1567.66)</td>
<td>-1119.86 (1164.85)</td>
</tr>
<tr>
<td>3</td>
<td>344.16 (2245.92)</td>
<td>-1629.0 (1477.63)</td>
</tr>
<tr>
<td>4</td>
<td>4218.82 (3312.63)</td>
<td>-2018.20 (1737.56)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Children 16-17:</th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.3037** (0.1520)</td>
<td>-0.1511 (0.1210)</td>
</tr>
<tr>
<td>2</td>
<td>0.0167 (0.2288)</td>
<td>-0.2064 (0.1700)</td>
</tr>
<tr>
<td>3</td>
<td>0.3770 (0.3278)</td>
<td>-0.2487 (0.2156)</td>
</tr>
<tr>
<td>4</td>
<td>0.7773 (0.4834)</td>
<td>-0.2779 (0.2536)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Children 16-17:</th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.3037** (0.1520)</td>
<td>-0.1511 (0.1210)</td>
</tr>
<tr>
<td>2</td>
<td>0.0167 (0.2288)</td>
<td>-0.2064 (0.1700)</td>
</tr>
<tr>
<td>3</td>
<td>0.3770 (0.3278)</td>
<td>-0.2487 (0.2156)</td>
</tr>
<tr>
<td>4</td>
<td>0.7773 (0.4834)</td>
<td>-0.2779 (0.2536)</td>
</tr>
</tbody>
</table>

Table 14. Model 5: Number of Children Who Are 16 or 17
Table 14 continued

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0002</td>
<td>-0.0047**</td>
</tr>
<tr>
<td></td>
<td>(0.0031)</td>
<td>(0.0024)</td>
</tr>
<tr>
<td>2</td>
<td>0.0036</td>
<td>-0.0058*</td>
</tr>
<tr>
<td></td>
<td>(0.0046)</td>
<td>(0.0034)</td>
</tr>
<tr>
<td>3</td>
<td>0.0056</td>
<td>-0.0065</td>
</tr>
<tr>
<td></td>
<td>(0.0066)</td>
<td>(0.0043)</td>
</tr>
<tr>
<td>4</td>
<td>0.0062</td>
<td>-0.0068</td>
</tr>
<tr>
<td></td>
<td>(0.0097)</td>
<td>(0.0051)</td>
</tr>
</tbody>
</table>
### Table 15. Model 6: Parental Race/Ethnicity

**Dependent variable: Probability Household Saved Money in Previous Year**

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Black</td>
<td>0.0051 (0.0057)</td>
<td>-0.0096 (0.0069)</td>
</tr>
<tr>
<td>Black</td>
<td>0.0031 (0.0081)</td>
<td>-0.0053 (0.0035)</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>-0.0002 (0.0056)</td>
<td>-0.0062 (0.0075)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.0161 (0.0103)</td>
<td>-0.0209*** (0.0077)</td>
</tr>
</tbody>
</table>

**Dependent Variable: Net Change in Financial Asset**

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Black</td>
<td>-196.61 (1167.58)</td>
<td>308.21 (1464.74)</td>
</tr>
<tr>
<td>Black</td>
<td>-586.00 (1831.90)</td>
<td>39.98 (867.40)</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>-592.10 (1109.54)</td>
<td>413.59 (1485.59)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1529.95 (2044.07)</td>
<td>-845.49 (2128.19)</td>
</tr>
</tbody>
</table>

**Dependent Variable: Natural Log of Principal Payment**

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Black</td>
<td>0.1772 (0.1703)</td>
<td>-1.1397*** (0.2136)</td>
</tr>
<tr>
<td>Black</td>
<td>-0.2760 (0.2672)</td>
<td>0.0153 (0.1265)</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>0.1030 (0.1618)</td>
<td>-1.1545*** (0.2167)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.2986 (0.2981)</td>
<td>-1.2233*** (0.3104)</td>
</tr>
</tbody>
</table>

**Dependent Variable: Ratio of Principal Payment to the Sum of Principal Payment, Net Change in Financial Asset and Annual Income**

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Incentive</th>
<th>Disincentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Black</td>
<td>0.0030 (0.0034)</td>
<td>-0.0125*** (0.0043)</td>
</tr>
<tr>
<td>Black</td>
<td>0.0077 (0.0054)</td>
<td>-0.0060** (0.0025)</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>0.0019 (0.0032)</td>
<td>-0.0119*** (0.0043)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.0116** (0.0060)</td>
<td>-0.0239*** (0.0062)</td>
</tr>
</tbody>
</table>
### Dependent variable: Probability Household Saved Money in Previous Year

<table>
<thead>
<tr>
<th># Children 16-17</th>
<th>Incentive Non-Black</th>
<th>Incentive Black</th>
<th>Disincentive Non-Black</th>
<th>Disincentive Black</th>
<th>Incentive Non-Hispanic</th>
<th>Incentive Hispanic</th>
<th>Disincentive Non-Hispanic</th>
<th>Disincentive Hispanic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0138* (0.0075)</td>
<td>-0.0004 (0.0157)</td>
<td>-0.023** (0.0074)</td>
<td>0.0066 (0.0047)</td>
<td>0.0061 (0.0071)</td>
<td>0.0145 (0.0122)</td>
<td>- 0.00193** (0.0084)</td>
<td>- 0.024** (0.0093)</td>
</tr>
<tr>
<td>2</td>
<td>0.0087 (0.0142)</td>
<td>-0.0018 (0.0113)</td>
<td>-0.0157 (0.0134)</td>
<td>-0.0022 (0.0064)</td>
<td>0.0071 (0.0057)</td>
<td>-0.0650 (0.2604)</td>
<td>- 0.0171** (0.0083)</td>
<td>0.0491 (0.1682)</td>
</tr>
<tr>
<td>3</td>
<td>0.0000 (0.0382)</td>
<td>-0.0055 (0.0211)</td>
<td>-0.0044 (0.0367)</td>
<td>0.0044 (0.0128)</td>
<td>0.0052 (0.0073)</td>
<td>-0.1964 (0.7760)</td>
<td>-0.0109 (0.0101)</td>
<td>0.1688 (0.4708)</td>
</tr>
<tr>
<td>4</td>
<td>-0.0155 (0.0491)</td>
<td>-0.0073 (0.0757)</td>
<td>0.0134 (0.0351)</td>
<td>0.0061 (0.0719)</td>
<td>0.0027 (0.0208)</td>
<td>-0.3530 (0.7993)</td>
<td>-0.0055 (0.0258)</td>
<td>0.3223 (0.4381)</td>
</tr>
</tbody>
</table>

### Dependent Variable: Net Change in Financial Asset

<table>
<thead>
<tr>
<th># Children 16-17</th>
<th>Incentive Non-Black</th>
<th>Incentive Black</th>
<th>Disincentive Non-Black</th>
<th>Disincentive Black</th>
<th>Incentive Non-Hispanic</th>
<th>Incentive Hispanic</th>
<th>Disincentive Non-Hispanic</th>
<th>Disincentive Hispanic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>693.5 (1925.8)</td>
<td>-1854.9 (2853.9)</td>
<td>568.0 (2590.0)</td>
<td>860.7 (1367.4)</td>
<td>543.0 (1802.4)</td>
<td>70.3 (3442.4)</td>
<td>453.9 (2679.8)</td>
<td>1876.1 (3840.8)</td>
</tr>
<tr>
<td>2</td>
<td>2027.6 (3007.8)</td>
<td>-2564.7 (4324.0)</td>
<td>71.8 (4695.7)</td>
<td>1574.9 (2246.8)</td>
<td>1935.0 (2802.3)</td>
<td>1208.3 (8163.6)</td>
<td>282.4 (4431.0)</td>
<td>3487.2 (6513.4)</td>
</tr>
<tr>
<td>3</td>
<td>3678.9 (4849.9)</td>
<td>-2574.1 (5686.5)</td>
<td>-1601.5 (9878.6)</td>
<td>2163.3 (3026.9)</td>
<td>3394.3 (4007.4)</td>
<td>5657.7 (19882.3)</td>
<td>-421.1 (6359.0)</td>
<td>3078.4 (9214.9)</td>
</tr>
<tr>
<td>4</td>
<td>5647.6 (8488.7)</td>
<td>-1883.1 (7395.8)</td>
<td>-4451.8 (18916.0)</td>
<td>2625.8 (3671.0)</td>
<td>492.1 (6217.1)</td>
<td>13418.5 (38581.0)</td>
<td>-1656.8 (9515.7)</td>
<td>649.6 (13480.4)</td>
</tr>
</tbody>
</table>

Continued

Table 16. Model 7: Three Way Interaction between Information, Parental Race/Ethnicity and Number of Children 16 or 17
Table 16 Continued

<table>
<thead>
<tr>
<th>Dependent Variable: Natural Log of Principal Payment</th>
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<tbody>
<tr>
<td></td>
<td>Incentive</td>
<td>Disincentive</td>
<td>Incentive</td>
<td>Disincentive</td>
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</tr>
<tr>
<td># Children 16-17</td>
<td>Non-Black</td>
<td>Black</td>
<td>Non-Black</td>
<td>Black</td>
<td>Non-Hispanic</td>
<td>Hispanic</td>
<td>Non-Hispanic</td>
<td>Hispanic</td>
</tr>
<tr>
<td>1</td>
<td>0.6528* (0.2808)</td>
<td>0.0160 (0.4161)</td>
<td>-1.494** (0.3776)</td>
<td>0.0548 (0.1994)</td>
<td>0.6397** (0.2628)</td>
<td>0.2950 (0.5019)</td>
<td>-1.5365** (0.3907)</td>
<td>-0.9613* (0.5600)</td>
</tr>
<tr>
<td>2</td>
<td>1.19*** (0.4386)</td>
<td>0.2820 (0.631)</td>
<td>-2.30*** (0.6847)</td>
<td>0.1197 (0.3276)</td>
<td>1.310*** (0.4086)</td>
<td>-0.3221 (1.1903)</td>
<td>-2.17*** (0.6461)</td>
<td>-1.0769 (0.9497)</td>
</tr>
<tr>
<td>3</td>
<td>1.6724* (0.7072)</td>
<td>0.565 (0.829)</td>
<td>-3.48** (1.4404)</td>
<td>0.1490 (0.4414)</td>
<td>1.989*** (0.5843)</td>
<td>-1.4336 (2.8990)</td>
<td>-2.98*** (0.9272)</td>
<td>-1.8185 (1.3436)</td>
</tr>
<tr>
<td>4</td>
<td>2.0947* (1.2377)</td>
<td>0.8658 (1.078)</td>
<td>-5.024* (2.7581)</td>
<td>0.1428 (0.5353)</td>
<td>2.676*** (0.9065)</td>
<td>-3.0394 (5.6255)</td>
<td>-3.39*** (1.3875)</td>
<td>-3.1861 (1.9565)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent Variable: Ratio of Principal Payment to the Sum of Principal Payment, Net Change in Financial Asset and Annual Income</th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Incentive</td>
<td>Disincentive</td>
<td>Incentive</td>
<td>Disincentive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Children 16-17</td>
<td>Non-Black</td>
<td>Black</td>
<td>Non-Black</td>
<td>Black</td>
<td>Non-Hispanic</td>
<td>Hispanic</td>
<td>Non-Hispanic</td>
<td>Hispanic</td>
</tr>
<tr>
<td>1</td>
<td>0.0116* (0.0056)</td>
<td>0.0045 (0.0084)</td>
<td>-0.020*** (0.0076)</td>
<td>-0.0024 (0.0040)</td>
<td>0.0109** (0.0053)</td>
<td>0.0110 (0.0101)</td>
<td>-0.194*** (0.0078)</td>
<td>-0.0211* (0.0112)</td>
</tr>
<tr>
<td>2</td>
<td>0.0213* (0.0088)</td>
<td>0.0026 (0.0127)</td>
<td>-0.038*** (0.0137)</td>
<td>0.0012 (0.0066)</td>
<td>0.0209** (0.0082)</td>
<td>0.0175 (0.0239)</td>
<td>-0.0318** * (0.0130)</td>
<td>-0.0291 (0.0191)</td>
</tr>
<tr>
<td>3</td>
<td>0.0309* (0.0142)</td>
<td>0.0037 (0.0166)</td>
<td>-0.0645** (0.0289)</td>
<td>0.0036 (0.0089)</td>
<td>0.0302** * (0.0117)</td>
<td>0.0347 (0.0582)</td>
<td>-0.0484** * (0.0186)</td>
<td>-0.0511* (0.0270)</td>
</tr>
<tr>
<td>4</td>
<td>0.0402 (0.0248)</td>
<td>0.0078 (0.0216)</td>
<td>-0.1000* (0.0554)</td>
<td>0.0050 (0.0107)</td>
<td>0.0388** (0.0182)</td>
<td>0.0623 (0.1129)</td>
<td>-0.0692** * (0.0279)</td>
<td>-0.0872* (0.0395)</td>
</tr>
</tbody>
</table>