The Role of Parental Wealth & Income in Financing Children's College Attendance & Its Consequences*

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Abstract

This paper examines the influence of parental wealth and income on their children's college attendance and parents' financial support for it and whether the latter affects the subsequent levels of indebtedness of parents and their children. We use data from the PSID, especially data in the 2013 Rosters and Transfers Module on the incidence and amounts of parents' financial support for their children's college. To instrument for the potential endogeneity of parental housing wealth and income on these decisions, we use changes in parents' local housing and labor market conditions. We find that increases in both parents' housing wealth and income increase the likelihood of their children attending college through the effect of parents' financial support. This parental financing leads to parents carrying more debt after their child would have graduated, but their children having greater, rather than less, student loan debt after graduation. The latter is partially attributable to the child attending a higher quality college, but other explanations are possible.

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1 Introduction

In the last 35-40 years, the U.S. experienced dramatic increases in the costs of a college education. Between 1980 and 2000, college tuition and fees increased at an annual rate of 3.6% in real terms in 4-year public universities, 3.8% in 4-year non-profit universities and 3.8% in 2-year public colleges. Since 2000, while the tuition at private colleges continued to increase at 2.5% per year and 2-year public colleges by 2.6% per year, tuition and fees at 4-year public universities increased an annual rate of 4.2%, faster than the average increase in prices in the economy.[1] (See Figure 1.) Such increases have placed a great deal of pressure on parents and students to be able to afford obtaining a college degree in the U.S.

An important manifestation of this pressure is the rise in student loan debt in the U.S. (Avery and Turner, 2013; Edmiston, Brooks and Shepelwich, 2013; Elliott and Nam, 2013). As shown in Figure 2(a), households with outstanding student loan debt doubled from 1989 (9%) to 2010 (19%) with this debt disproportionately being held by younger adults (Figure 2(b)). As of 2017Q3, outstanding student loan debt stands at $1.36 trillion and constitutes 10% of the total debt balance of American households, second only to mortgage debt.[2]

The changes in the cost of a college education and the rise in student loan debt coincided with important trends in household wealth and income in the U.S. With respect to wealth, the U.S. experienced a major boom in housing, in which housing prices increased over 85% (Shiller, 2007) (Figure 3(a)), and homeownership increased by 5 percentage points (Figure 3(b)) through 2005, only to be followed by the collapse of housing markets starting in 2006 in which housing prices fell by one third through 2009 (Grusky, Western and Wimer, 2011) and homeownership rates fell by more than 10 percent. Furthermore, these fluctuations in housing values and home ownership have had a major impact on the consumption and investment decisions of American families (Hurd and Rohwedder, 2010), because homes are the largest asset most families hold second sometimes only to retirement savings (Gottschalck, Vornovytskyy and Smith, 2013).

With respect to household income, Figure 4 displays the trends in median household income

[1] See CollegeBoard, *Trends in College Pricing 2017*.

[2] See Federal Reserve Bank of New York, *Quarterly Report on Household Debt and Credit*, released November 2017.

over the same period as displayed in Figure 3 for housing. Like housing prices, household income fell in real terms as a result of the Great Recession and has risen since the recovery. But, prior to the Great Recession, household income fluctuated more than housing prices, reflecting, in part, the consequences of the recessions in the early 1990s and 2000s, respectively. While not shown, over this same period, income became more unequal. In 1984, households in the top quintile of the distribution received 43.6% of total household income increasing to 50% in 2016.[3]

The recent trends in household income and a housing wealth are likely to have important consequences for the educational attainment and college financing decisions of the next generation, as parents have long been a primary source of financial support for their children's post-secondary education.[4] With respect to the influence of parental income on their children's college attendance, early research found little evidence of effects of parental income on their offspring's college attendance, especially after accounting for children's ability and academic preparation (Cameron and Heckman, 1998, 2001; Keane and Wolpin, 2001; Cameron and Taber, 2004). More recent research documents that the relationship between parental income and the college attendance decisions of their children have changed, with parental income more likely to be predictive of the likelihood of their children going to college, even after controlling for the ability and/or academic preparation of their children (Belley and Lochner, 2007; Lochner and Monge-Naranjo, 2011, 2012).

With respect to parental wealth, several recent studies examine the link between the housing wealth of parents and their children's college outcomes.[5] Lovenheim (2011) finds that increases in parental wealth during a child's teenage years increases the probability that the child attends college. He uses increases in house prices as an instrument for wealth. He further shows that the effects are largest for children from lower income families (below $70,000 total family income per year) and for the years after 2000 when home equity loans became more common. Lovenheim

[3]Source: U.S. Census Bureau, Current Population Survey, 1968 to 2017 Annual Social and Economic Supplements.

[4]Based on a survey of college students and their parents in 2017, Sallie Mae Bank estimates that parents cover 31% of the cost of their child's college costs, second only to costs covered by scholarships and grants (35%). Of the parents financial contribution, the survey found that 23% of these costs are funded out of parents' income and savings while 8% is covered by parental borrowing. Students cover a total of 27% of college costs, 19% out of student loans and 8% out of students' income and savings. (SallieMae, 2017).

[5]We note that Belley and Lochner (2007) present some evidence of the relationship between components of parental wealth and the college attendance of their children.

and Reynolds (2013) show that among children who go to college, an increase in parental housing wealth (measured in dollars) during a child's teenage years increases the likelihood of attending a flagship public university relative to a non-flagship public university and decreases the probability of attending community college.[6] Finally, Cooper and Luengo-Prado (2015) show that children of homeowners who live in areas where house prices increased (measured in percents) around the time that they are 17 are more likely to enroll in college (though are not more likely to graduate) and are more likely to go to higher ranked colleges.[7]

The premise underlying these papers, and of models of parents' investment in their children's human capital in the presence of credit constraints more generally, is that parents use their wealth – here in the form of home equity – to finance college attendance for their children (Keane and Wolpin, 2001; Lochner and Monge-Naranjo, 2011, 2012). However, none of these papers directly consider whether and how much parents help finance their children's college education, how these choices vary by parental wealth/income, and whether they have changed over time. Furthermore, while there is a sizable literature on the use of student loans[8] or grants-in-aid[9] in funding college education, much less is known about how parents' financing of their children's education affects their financial situations, especially with respect to taking on debt, and their financial well-being and that of their children in later life.

In this paper, we address two related issues concerning parent's investments in their children's human capital and the consequences of how these investments are financed. First, we examine how parental income and wealth, as measured by housing wealth, affects the likelihood of their children going to college and how this investment is financed. In particular, does greater parental income and housing wealth increase the likelihood that parents finance their children's college attendance relative to attending college without financial help fro parents? We expli-

[6]Lovenheim and Reynolds (2013) find that these effects are driven by students from lower and middle income families (less than $70,000 and $70,000-$125,000). Children from low income families are also more likely to complete college.

[7]Cooper and Luengo-Prado (2015) also find that these children of homeowners were likely earn more later in life.

[8]Since 2004, the share of undergraduate students who have taken federal subsidized and unsubsidized student loans has increased from 28% in the 2004-05 academic year to 36% in 2014-15, with a decreasing share of students only having subsidized loans (Board, 2015).

[9]In terms of such grants, in 2015, colleges and universities provide 41% of such aid, 37% from federal sources, 14% from employers and private sources, and 8% coming from state governments (Board, 2015).

citly examine the mechanism for how changes in parental wealth affect their children's college attendance decision and the decision about how college is financed.

Second, we examine the consequences of the parental financing decision for the subsequent debt of parents and their children. In particular, while parents, especially those with higher incomes, may choose to finance their children's college education directly out of family income, as noted in footnote 4, some parents choose to borrow funds to cover this expense, often using their housing wealth as collateral via home equity loans. Such debt financing allows parents to finance these investments while still smoothing their consumption and, possibly, their children's. Alternatively, taking on debt can expose borrowers to the repayment risks arising from uncertain future income streams and/or unanticipated fluctuations in the value of their assets. In our analysis, we examine the effect of parental decisions to help finance their children's college education on their subsequent indebtedness. Furthermore, we examine whether parental financing affects their children's later indebtedness, looking to see, for example, whether parental financing reduces their children's student loan debt later in their lives.

Our paper is related to several strands of the literature and models of parents' investments in their children's human capital. In the classic model of Becker and Tomes (1979), altruistic parents decide whether and how much to invest in their children's human capital in an efficient manner, investing more in those children for whom the returns to such investments are higher and where these higher returns are the result of differences in "endowments" across one's children. Such an efficient investment "reinforces" the endowment differences across children, but as Becker and Tomes (1979) note, altruistic parents can use *inter vivos* transfers and bequests to compensate for lower investments made in children with lower endowments, thereby equalizing wealth across their children.

However, as Behrman, Pollak and Taubman (1995) point out, the predictions of the Becker-Tomes model depend crucially on either having parents who are "sufficiently wealthy" and/or having access to perfect capital markets. The models of the college attendance decisions of youth developed in Keane and Wolpin (2001) and Lochner and Monge-Naranjo (2011, 2012) allow for constraints on borrowing by youth or, more likely, their parents, that potentially constrain the choices of the former. And, on the preferences side, Becker-Tomes requires that

parents also are "sufficiently altruistic." As Behrman, Pollak and Taubman (1995) show, having parents who are wealth-constrained and without adequate access to capital markets and/or are insufficiently altruistic can lead to very different conclusions that those reached in Becker and Tomes (1979) with respect to parental resource allocation. Most notably, Behrman, Pollak and Taubman (1995) show that the parental investments may compensate for, rather than reinforce, endowment differences across children.

Brown, Scholz and Seshadri (2012) consider a collective model in which borrowing constraints affect children's college decisions that emphasizes parents and children as separate actors that face different constraints and have different preferences. In their model, while parents have access to complete credit markets and children do not, parents cannot be guaranteed to share in the monetary returns that a child realizes from obtaining a college degree, which potentially can lead to disagreement between parents and their children. Brown, Scholz and Seshadri (2012) establish that the strategic interactions between parents and children over college and its financing can lead parents to underinvest in the education of their children. This can be due to parents being poor and limited in how much they can borrow (due to limited collateral) to help fund their child's college attendance. But, parents may choose to limit their transfers to their children because of their inability to obtain a credible commitment from their children to share the returns to the child's acquired human capital.[10]

While testing for the presence of and/or relative influence of limited commitment and borrowing constraints facing parents and their children is beyond the scope of the current paper, these theoretical models all suggest the importance of parental decisions with respect to helping finance their children's college educations. But equally important, as suggested by Brown, Scholz and Seshadri (2012), is what happens during the post-schooling period. In particular, Brown, Scholz and Seshadri (2012) establish that one can distinguish between equilibria in which parents underinvest their children's education versus one in which parents make efficient investment decisions as in Becker and Tomes (1979) – i.e., parental make investments in their child's human capital so as to equalize the rate of return with the market return on financial assets – by whether or not one observes parents making post-schooling financial transfers to the

[10]See Mazzocco (2007) and Chiappori and Mazzocco (forthcoming) for more on the problem of limited commitment in models of family interactions and decision-making.

child.

To address the questions we pose above, we use data from the 2013 Panel Study of Income Dynamics (PSID) and the new Rosters and Transfers Module which obtained information from all parents in the PSID on the financial help (transfers) they provided to each of their adult children for education, housing and other larger expenses (Schoeni et al., 2015). In addition, we exploit the data collected in the PSID on family wealth and debt, especially with respect to the value of family's home and what they owe in debt on mortgages, and the debt of their children, especially in the form of student loan debt. These data allow us to directly examine how parental wealth affects on the financing of their children's going to college using parents' responses to the financial transfer questions in the PSID and to relate them to parents' and children's subsequent indebtedness.

A key issue is the extent to which parental resources, either in the form of income or housing wealth, have a causal impact on parental decisions with respect to financing their children's education and and on their and their children's subsequent indebtedness. For example, any finding an association of parental housing wealth and their children's college attendance and its financing may simply reflect sorting across families with respect to unobserved parental preferences for higher education and their own earnings capacities as well as the earlier investments in and unobserved traits (e.g., abilities) of their children.

To address this issue, we develop a set of instrument variables by constructing measures of local labor and housing market conditions to instrument for parental housing wealth and income at various points in their life cycles, as well as the income of their children in early adulthood. Changes in rates of unemployment, employment or labor force participation, as well as wage rates in local labor markets have been used to create *Bartik shocks*[11] that are often used as instrumental variables in labor economics studies. Furthermore, we follow previous studies closely related to ours (Lovenheim, 2011; Lovenheim and Reynolds, 2013; Cooper and Luengo-Prado, 2015) which use data on data on local housing conditions, including average housing values, foreclosure rates, rental rates for residential real estate, etc., to instrument or measure

[11]See Bartik (1991) and Blanchard and Katz (1992) for more on the theory and methods for constructing these measures of local labor market shocks.

the effects of housing wealth on college attendance decisions.

The detailed geographic information included in the PSID makes it possible to incorporate these contextual data to identify exogenous shocks to parental resources and examine the effect of these changes in parental income and wealth on transfers parents make to fund their college educations. As discussed below, we use data on local labor markets from the Quarterly Census of Employment and Wages (QCEW) and for local housing markets from Zillow and Federal Housing Finance Agency (FHFA) to construct our instruments.

The remainder of the paper is organized as follows. In Section 2 we describe the PSID data and the samples we use in our analyses. In Section 3, we consider children's college attendance and parental financing decisions. We begin by describing the measures of college and financing choices and and parental housing wealth and income in in our analysis in section 3.1. We then characterize how the college attendance and financing choices varies across the distributions of parental housing wealth and income in section 3.2. We next layout our econometric model for estimating these educational and financing decisions in section 3.3 layout our measures of local housing and labor market conditions that we use as instruments in section 3.4, and present results for this analysis in section 3.5. In Section 4, we analyze the impacts that children's college attendance and parental financing decisions have on the subsequent indebtedness of parents and their children. We describe our measures of parents' and children's indebtedness in section 4.1 and provide a brief description of these outcomes in section 4.2. We lay out estimating equations for this part of our analysis in section 4.3 and report on their estimates in section 4.4. Finally, in Section 5, we present results on whether parental income and wealth and parents' financing decisions affected the quality of the college that college-bound children attended. We offer concluding comments in Section 6.

2 The PSID Data

The PSID began with a sample of roughly 18,000 people in approximately 5,000 household units in 1968. All individuals in households recruited into the PSID in 1968 are said to have the

PSID gene. Individuals who are born to or adopted by someone with the PSID gene acquire the gene themselves and are recruited to become members of the PSID sample for the rest of their lives. This genealogical design implies that the study provides data on a sample of extended families at each wave. Individuals without the PSID gene also are represented in the PSID as long as they live with a PSID sample member. These individuals without the gene are not followed if they stop living with a PSID sample member. Though the PSID provides a sample of extended families at each wave, this extended family is incomplete because some children (particularly step children and children who have left the PSID sample), and some parents (for example in-laws without the PSID gene) are not included in the sample. The 2013 Roster and Transfers Module was designed to complete the parent-adult child information in the PSID and to describe the transfers that parents and adult children make to one another.

2.1 The 2013 PSID Roster and Transfers Module

We use the Roster and Transfer Module of the 2013 PSID in which respondents (PSID heads and wives) are asked to list and describe their adult children and step children age 18 and older, as well as their parents, step parents, and in-laws (including in-laws from long-term cohabiting relationships). Importantly for our purposes, parents report about the age and educational attainment of their adult children. Respondents also report about transfers of time and money that they give to and receive from each parent and adult child over the last year and about transfers of money for school, housing, and other large expenses since they (their children) were 18 years old. In what follows, we refer to these larger forms of help as long-term transfers. Respondents report about relationships and transfers with coresident and non-coresident children and parents (see Schoeni et al. (2015) for a more complete description of the module).

2.1.1 Long-term Transfers

The 2013 Roster and Transfers Module includes questions about large transfers that the Head and Wife of a PSID household each may have received from their parents since the head and wife were age 18 (whether or not the parents are alive in 2013) and provided to each of their

children since their children were age 18. Two specific long-term transfers questions were asked, one for financial help for post-secondary education and a second for help with the purchase of a home, along with a more general question on other large financial transfers between parents and their adult children. These questions capture retrospective information about important and salient types of transfers. For transfers to offspring, both whether assistance was provided and the amount of assistance was assessed. However, for transfers from parents only yes/no and whether the transfer was received from the parent of the head, the parent of the wife, or both, was assessed because of the potentially long recall period and the difficulty in determining which parents the head and wife were reporting about (especially in the case in which parents divorce and remarry). In what follows, we rely on reports from parents about what they gave to children for schooling but in future work we can also examine whether adult children report receiving a transfer from their parents. Until 2013, the PSID had never asked these types of life-cycle transfer questions.

2.2 Samples

Our sample uses the educational attainment of adult children reported in the 2013 Roster and Transfers Module linked with the financial and family characteristics of their biological or adopted father and mother. We focus on two points in time: the year in which the child turns 18 when decisions about college are made, and the year in which the child turns 24 when some of the consequences of financing college can be observed. More specifically, we find the year in which the child turned 18 using the birth year in the Childbirth and Adoption History augmented by age reported in the Roster and Transfers Module. Using the Parent ID file augmented with the relationship information in the Roster and Transfers Module, we link each child with his or her father and mother. We use information on home values, mortgage balances, family structure, and income of the child's father and mother from the annual PSID data in the year in which the child turns age 18. We require that parents are a PSID head or wife at the time of the match.[12] We restrict our sample of parent-child "pairs" to parents with children who turn 18 after 1997, which corresponds to children in birth cohorts beginning in 1979. We focus on those

[12]If we cannot match the parents to a PSID head or wife in the year in which the child turns 18 we go back one year at a time until the child is 13 at which point we drop the child-parent pair.

parent-child pairs in which the parents were homeowners in the year leading up to the college decision. Finally, as discussed below in section 3.4, we removed 14 parent-child observations because of large (in absolute value) changes in local housing prices. We use the latter data to construct instrumental variables for some of our analysis. After all of these sample selections, we have a sample of $N = 2{,}658$ parent-child pairs with which to estimate the effect of parental wealth on college attendance and parental transfers for college.[13]

As noted above, we also are interested in the consequences of the college attendance and financing decisions for later life indebtedness of both parents and their children. We measures these relationships when the child is age 24.[14] For parents, we examine the level of their mortgage debt and "other debt" that includes credit card debt, auto loan debt, etc., all obtained from the PSID annual survey. We are able to measure parental mortgage debt, which includes any home equity loans the parents may hold, and other debt when the child is age 24 for 1,930 of the parent-child pairs.

With respect to children's indebtedness when they are age 24, we look at two measures of non-housing debt – "other debt", defined above, and student loan debt – which we obtain from different sources. We obtain our measure of other debt, which consists primarily of credit card and student loan debt, for two subsets of children: (a) those who have become a PSID heads or wives by age 24 or (b) those who are still members of their parents' at age 24 but who are interviewed at that age as part of the PSID's Transition to Adulthood (TA) Study. Our measures of debt for the children who became heads/wives of PSID households are obtained in the regular PSID survey. The TA study has attempted to interview all children who had been members of the PSID's Child Development Study (CDS) that followed a subset of children of PSID households who were between the ages of 0-12 in 1997 and interviewed these children in all subsequent waves until they reached the age of 17. Upon reaching age 18, the children in the CDS were then interviewed during odd-numbered years after age 18 as part of the TA study. The TA survey includes questions about their student loan debt. Because the TA study did not enroll children in PSID households who were age 13 or older in 1997 in the CDS and given that

[13]Of these 2,6458 parent-child pairs, the children in 359 (13.5% of the sample) did not have the PSID gene.

[14]Given that the PSID survey is conducted every other year and that parents may miss a survey, our measures of parental outcomes when their child is age 24 are taken between the ages of 23 and 27, depending on availability.

not all children in our parent-child pairs had become heads/wives of PSID households by the time they reach age 24, we have data on other debt or student loan debt for only a subset of the children for whom we analyze their college attendance and financing decisions. In particular, we have information on other debt for 1,802 and student loan debt information for 1,310 of the 2,658 full sample of children.

Finally, because of our focus on the effects of parental housing wealth on children's college attendance and financing decisions, we restrict our sample to those parents who were homeowners when their child was age 18. This restriction reduces our sample by approximately 35%.

The sample sizes for the parent-child pairs used in our analyses and for the various outcomes we analyze when the children of these parents are 18 and age 24, are summarized in Table 1. And, in Table 2, we provide some statistics on the demographic characteristics of the parents in our sample and their college-age children.

3 Parental Wealth & their Children's College and Financing Choices

In this section we examine children's college attendance decisions and parents' role in helping to finance their children's choices. In particular, we are interested in how changes in parents' wealth and income affect these choices. We begin by defining the measures of college attendance and parental financing thereof, as well as parental wealth and income from the PSID data, and show how college attendance and financing varies across the the parental wealth and income distributions. We then describe our econometric strategy for estimating the impacts of changes in parental wealth and income on the decision of children to attend college and the decision of parents to help pay for it. Finally, we present and discuss our empirical findings for the effects of parental income and wealth on children's college attendance and parental financing decisions.

3.1 Measuring College Attendance, Parental Financing and Parental Wealth & Income

Our interest is in the impacts of parental wealth and income on children's college attendance and whether parents help finance it. In this section we describe how we define children's college enrollment and parents' financing decisions using the information parents provided in the 2013 Roster and Transfers Module. We also discuss how we measure parents' housing wealth and income around the age when the above decisions were being made for each of their college-age children.

With respect to college enrollment, we consider a child to have enrolled in college if the parents reports that the child has attended some college or has a college degree. This measure is somewhat different from the previous literature (Lovenheim, 2011; Lovenheim and Reynolds, 2013; Cooper and Luengo-Prado, 2015) which uses the annual PSID data to determine enrollment. The benefit of the measure from the Roster and Transfers data is that is considerably easier to identify students who enroll in but who do not complete college. This is important to understanding the potential difference in effects of attending (or financing) a college education for those who finish and those who do not.

Parents are considered to have given a financial transfer to a child for educational expenses if they report having done so in the long-term transfers question in the Roster and Transfers Module. We eliminate the small number of cases in which parents report that their child has educational attainment below "some college" and report having given a transfer for post-secondary educational expenses.

More precisely, we define the following variables to characterize the college attendance decision and parental financing decisions for the j^{th} child of the i^{th} parent when the child is age 18:

$$EduFin0_{ij,18} = \begin{cases} 1, & \text{if child } j \text{ of parent } i \text{ did } \textit{not} \text{ enroll in college,} \\ 0, & \text{otherwise.} \end{cases} \tag{1}$$

$$EduFin1_{ij,18} = \begin{cases} 1, & \text{if child } j \text{ of parent } i \text{ enrolled in college \& parents didn't help pay,} \\ 0, & \text{otherwise.} \end{cases} \quad (2)$$

and

$$EduFin2_{ij,18} = \begin{cases} 1, & \text{if child } j \text{ of parent } i \text{ enrolled in college \& parents did help pay,} \\ 0, & \text{otherwise.} \end{cases} \quad (3)$$

where $EduFin0_{ij,18}+EduFin1_{ij,18}+EduFin2_{ij,18} = 1$. Finally, conditional on $EduFin2_{ij,18} = 1$, we can measure the *amount of financial help* parent i provided to child j in support of the child's college attendance. Denote this amount as $CollTrans_{ij,18}$. We measure this amount in 2013\$.[15]

As noted above, we focus on how changes in parental housing wealth and parental income influence these decisions. To begin, we characterize the housing measures we construct from the PSID data. Over the entire span of the PSID, heads of households or their proxy are asked whether they are a homeowner and, if they are, to provide an estimate of the value of their home and the remaining balance, if any, on their home mortgages and/or home equity loans. As noted above, we restrict our sample to parents who were homeowners when child j was age 18. Let $MktValue_{imt_{18,j}}$ denote the *parents' estimated market value of their home*, measured in 2013 dollars, in year $t_{18,j}$. Further, let $MortBal_{imt_{18,j}}$ denote the remaining balances on parents' home mortgages and home equity loans as of year $t_{18,j}$, again in 2013\$. Mortgage debt includes all primary and secondary mortgages, along with home equity loans and lines of credit on the individual's primary residence. Then, we define an estimate of the parents *(net) home equity*

[15]We note that the decision to measure the amount of transfers in 2013\$ is not straightforward. Though parents were asked the question on amounts of transfers in 2013, it is not clear whether the reported amounts in terms of current dollars or the dollar value(s) at the time the transfers were made. We have re-run our specifications of regressions for the effects of parental housing wealth and income on the amount of transfers given to support a child's college education under either of these two assumptions about parental reporting. While the magnitudes of the corresponding coefficients differed, none of the inferences we make below were affected. Accordingly, we only present results under the assumption that parents reported the amounts of these transfers in current (2013) dollars.

as:

$$H_{imt_{18,j}} = MktValue_{imt_{18,j}} - MortBal_{imt_{18,j}}. \tag{4}$$

Below, we present tabulations of the distribution of H for the following 4 categories: parents who have negative home equity and terciles for those with positive home equity. The cut points for the terciles are constructed annually using the data on the data on $H_{imt_{18,j}}$ (measured in 2013$) each year of our data.

Finally, let $Y_{imt_{18,j}}$ denote the parent i's *total household income* in the year in which child j was age 18 ($t_{18,j}$) when they were residing in local labor market m. Below, we also provide tabulations for quintiles of the distribution of Y, using a strategy to determine the cut points of this distribution similar to the one we used for the distribution of net home equity.

3.2 Distribution of College & Financing Choices by Parental Housing Wealth & Income

We now examine the distribution of college choices and how they are financed of young adults and their parents across the distributions of parental housing wealth, $H_{imt_{18,j}}$, and income, $Y_{imt_{18,j}}$, These results are presented in Table 3 which shows the percent of children who enroll in college, the percent of parents who made a financial transfer conditional on a child enrolling in college, and the average transfer amount per child conditional on making a financial transfer for college in each parental wealth and income quintile. There are substantial differences in college enrollment and financing decision across the level of parental housing wealth. Over 80% of children with parents whose housing equity is in the top tercile conditional on positive equity enroll in college compared to 49% and 67% in the bottom and second tercile, respectively. Differences in enrollment in the PSID by parental wealth are consistent with Lovenheim (2011). Interestingly, the likelihood of attending college without a transfer is relatively stable across the wealth distribution, possibly the result of differences in financial aid for college attendance across the (parental) wealth and income distributions. However, the likelihood of attending college and receiving a financial help from parents is much higher for children with more wealthy parents. Only 20% of children in the bottom tercile of parental wealth (conditional on positive

wealth) receive financial help from parents to attend college compared with 56% of children whose parents have housing equity in the top tercile. Descriptively, Table 3 suggests that the differences in college enrollment by parental wealth are driven by whether children receive parental transfers for college. We see similar patterns by parental income quintile but there are larger differences in the likelihood of attending college without a parental transfer for children from the bottom income quintile. Finally, the amount of transfer, conditional on receiving a transfer, increases nearly three-fold with parental wealth and over four-fold with parental income. Differences in the likelihood of a transfer for college by parental wealth are consistent with other research on more general types of financial transfers which shows that, conditional on being given, financial transfers from parent to children are more likely and larger for parents with more wealth (McGarry and Schoeni, 1995; Zissimopoulos and Smith, 2009).

3.3 Modeling Children's College and Parental Financing Choices

In this section, we characterize the choices parents make concerning their child's choices of college attendance and financing as a function of changes in parents' housing wealth and household income for parents who are homeowners. In our model, we examine how changes in parental housing wealth and income affect parents' decisions to finance their child's college education and what affect these changes in parental resources have on whether their child goes to college. Lovenheim (2011) and Lovenheim and Reynolds (2013) examine the effects of changes in housing wealth on whether or not their child attends college and whether they attend the flagship university in their state-of-residence. Here we extend that notion to examine how changes in housing wealth and parental income affect not just the attendance decision but also whether parents help pay for their child to go to college.

As noted above, our approach is also in the spirit of the literature on the effects of changes in wealth and income on household consumption. See, for example, Paiella and Pistaferri (forthcoming), Browning, Gørtz and Leth-Petersen (2013), and Carroll, Otsuka and Slacalek (2011) for analyses of the effects of changes in housing wealth on consumption. These papers pay particular attention to distinguishing between permanent and transitory changes in wealth on consumption. We pay less attention to trying to separate changes into these types of changes,

but we do attempt to use sources of variation for these changes that are less likely to be endogenously determined. For example, we want to avoid using reductions in parents' housing wealth, or increases in housing debt, that arise as parents take out loans for their child's college education. Similar concerns apply to changes in parental income. As discussed in Section 3.1, we use measures of changes in housing wealth and income driven by changes in local housing and labor market conditions. This strategy is a form of using Bartik shocks to local market conditions as a source of exogenous varation (Bartik, 1991; Blanchard and Katz, 1992). Furthermore, we use lagged values of housing value, $H_{imt_{16,j}}$, and parental income, $Y_{imt_{16,j}}$ as the base for changes in parents' housing value and income.

Recall the definitions for $EduFink_{ij,18}, k, k = 0, 1, 2$ in (1), (2) and (2), respectively. Let the utility/payoff for $EduFink_{ij,18}$ be denoted by $U^*_{kijm,18}$ and assume that choice $k = 0$ is the base category. The payoff functions for parent i of child j made when the child is age 18 are given by:

$$\begin{aligned} U_{kijm,18} &= \lambda_{k0} + \lambda_{k1} H_{imt_{18,j}} + \lambda_{k2} Y_{imt_{18,j}} + \lambda_{k5} X_{ij} + \lambda_{k6} M_{mt_{18,j}} \\ &\quad + \phi_{t_{18,j}} + \delta_{ijm} + \zeta_{kij,18}. \end{aligned} \tag{5}$$

where $H_{imt_{18,j}}$ and $Y_{imt_{18,j}}$ are defined in section 3.1, X_{ij} is a vector of other demographic characteristics of parents i and their j^{th} child, $M_{mt_{18,j}}$ is a set of time-varying characteristics of location m in year $t_{18,j}$,[16] $\phi_{t_{18,j}}$ and δ_{ijm} are year and state-of-residence *fixed effects*, respectively, and $\zeta_{kij,18}$ are choice-specific unobserved parent and child traits. It follows that the optimal

[16]We include in $M_{mt_{18,j}}$ the following set of control variables: average weekly wage and employment rate in location m in year $t_{18,j}$, where the latter variables are taken from the QCEW. We also control for the college-wage premium for younger workers directly. Following Lovenheim and Reynolds (2013) we use data from the Current Population Survey to calculate the college-wage premium for young workers in the state of location m in year $t_{18,j}$ as the ratio of hourly wages of 25 - 40 year olds with a bachelor's degree (BA) to the hourly wages of 25 - 40 year olds whose highest level of educational attainment is a high school diploma. As long as high-skilled labor demand is not highly localized, these state-level measures control for the demand for high-skilled vs. low-skilled labor for younger workers. In some specifications, we also included indirect measures of the cost of college by including in $M_{mt_{18,j}}$ the distance to the nearest two-year and four-year college for individuals in location m in year $t_{18,j}$ and the average in-state tuition cost in the state of location m at $t_{18,j}$.

college/financing choice for child j, $k^{\dagger}$, is characterized by:

$$k_i^{\dagger} = \arg\max_k U_{kijm,18}, k = 0, 1, 2. \tag{6}$$

Assuming that the random variable, $\zeta_{kij,18}$, has a Type II extreme value distribution and assuming that we treat $H_{imt_{18,j}}$ and $Y_{imt_{18,j}}$ as exogenous to child j's college enrollment and parental financing decisions, it follows that the model of the college attendance and its financing choice can be estimated as a multinomial logit model.

But, as noted in the Introduction, the assumption that $H_{imt_{18,j}}$ and $Y_{imt_{18,j}}$ are exogenous is a strong one. Accordingly, we wish to allow for the potential endogeneity of these two variables in the estimation of the payoff functions in (5). To deal with the endogeneity of $H_{imt_{18,j}}$ and $Y_{imt_{18,j}}$, we use a control function estimator (Blundell and Powell, 2003) applied to the multinomial logit specification (Petrin and Train, 2010; Wooldridge, 2014). This estimator can be implemented in two stages. In the first stage, we regress the endogenous variables $H_{imt_{18,j}}$ and $Y_{imt_{18,j}}$ on exogenous regressors, including the exogenous variables, X_{ij}, $M_{mt_{18,j}}$, $\phi_{t_{18,j}}$ and δ_{ijm} in (5), as well as a vector of instruments, $Z_{ikmt_{18,j}}$, which we define in the next section to instrument for $H_{imt_{18,j}}$ and $Y_{imt_{18,j}}$. For the latter variables we use $\Delta HPI_{imt_{18,j}}$ defined in (10) and $\Delta W_{imt_{18,j}}$ in (11) of Section 3.1. That is, these first-stage regressions are:

$$H_{imt_{18,j}} = \pi_1^H Z_{ikmt_{18,j}} + \pi_2^H X_{ij} + \pi_3^H M_{mt_{18,j}} + \phi_{t_{18,j}}^H + \delta_{ijs}^H + \nu_{kij,18}^H, \tag{7}$$

$$Y_{imt_{18,j}} = \pi_1^Y Z_{ikmt_{18,j}} + \pi_2^Y X_{ij} + \pi_3^Y M_{mt_{18,j}} + \phi_{t_{18,j}}^Y + \delta_{ijs}^Y + \nu_{kij,18}^Y, \tag{8}$$

One then retrieves the residuals from the regressions in (7), which we denote as $\widehat{\nu}_{kij,18}^H$ and $\widehat{\nu}_{kij,18}^Y$, respectively.

In the second stage, we estimate a multinomial logit model where we include $\widehat{\nu}_{kij,18}^H$ and $\widehat{\nu}_{kij,18}^Y$ as additional regressors, with separate coefficients, in the payoff functions in (5).

To account for the estimation error in $\widehat{\nu}_{kij,18}^H$ and $\widehat{\nu}_{kij,18}^Y$ and the quasi-ML nature of estimation in the second stage, we adjust the estimation of the variance-covariance matrix of the λs as

characterized in Wooldridge (2014). We use bootstrap to calculate these standard errors.

Finally, conditional on $EduFin2 = 1$, we can estimate the impacts of parental housing wealth and household income on the amount of the parents' transfer, $CollTrans_{ij,18}$. Mimicking the specification of payoffs in (5), we estimate the following regression:

$$\begin{aligned} CollTrans_{ij,18} &= \kappa_0 + \kappa_1 H_{imt_{18,j}} + \kappa_2 Y_{imt_{18,j}} + \kappa_8 X_{ij} + \kappa_9 M_{mt_{18,j}} \\ &\quad + \nu_{t_{18,j}} + \eta_{ijm} + \varepsilon_{ij,18}. \end{aligned} \tag{9}$$

To account for the potential endogeneity of $H_{imt_{18,j}}$ and $Y_{imt_{18,j}}$ in (9), we employ an instrumental variables estimator, using the same vector of instruments used in the control function estimator of the parameters in of the payoff functiosn in (5).

3.4 Instrumental Variables: Changes in Local Housing Prices & Wages

As noted above, we seek to instrument for parent's housing wealth, $H_{im,t_{18,j}}$, and income, $Y_{im,t_{18,j}}$, in the estimation of the payoff functions for the college education and financing choices parents make for their jth child. In this section, we describe these instruments and how they are constructed.

We use changes in local housing market prices and changes in labor market wages as our instruments. In particular, we construct measures of the change in the parents' housing wealth and parental income immediately before child j reaches age 18 to serve as instrumental variables for parental housing wealth and income in the estimation of our college attendance and financing models and our estimation of the effects of these decisions on parent's and children's subsequent indebtedness below. In spirit of the approach in Lovenheim and Reynolds (2013), we use changes in market-level measures of average housing values in the local market in which parent (and their children) resided in the year in which the child was age 16, i.e., in year $t_{16,j}$.

We use changes for the housing market preceding the parents' and child's college decisions

– which take place when the child is age 18 (in year $t_{18,j}$) – for two reasons. First, we want to to avoid the possible endogenous decision that parents may make to move to a different locality (market) at the time of their child's college decision, possibly to improve either their ability to finance the costs of college, e.g., they sell a more expensive home, take the equity from that home to pay for college and move to a less expensive home, or to reduce the cost of the college their child may attend, e.g., moving closer to a college or to a state that charges lower tuition. Second, one might expect that parents base their assessment of whether they can use the equity in their home as collateral for a loan to pay for their children's college education (via a home equity loan, for example) based on any changes in local housing values one or two years prior to the actual decision, rather than based on what happens to housing values in the year when their child would be going to college. We note that this strategy of using changes in local housing values a few years prior to the child's college decision is similar to the one used by Lovenheim (2011) and Lovenheim and Reynolds (2013) in their studies of the effects of parental housing wealth on children's decisions to attend college. Finally, we note that we use the same strategy when constructing measures of the changes in local labor market conditions that may be expected to affect their personal income.

More precisely, we construct our instrumental variable for changes in local housing values as follows. For the locality, m, in which parents reside in year $t_{16,j}$, we obtain housing price indices, HPI_{mt}, from external data sources to construct the percentage change in local housing values. Where possible, i.e., where we have data on local housing prices, we define the local housing market at the zip code level and, where possible, we use housing price indices constructed by Zillow. For zip codes where a Zillow price index is not available in and around year $t_{16,j}$, we use the Zillow index for the county in which the parents/child reside in that/those years. When a price index is not available for the parents' county of residence in that year, we use the price index of the MSA- or state-of-residence. Finally, for some years and locations in which the parents in our data reside in markets not covered by Zillow data, we make use of the price index from FHFA data – which are Case-Shiller housing price indices – as our measure of HPI_{mt}. With the resulting indices, we construct the percentage change in this index over a 4-year

period centered on year $t_{16,j}$,

$$\frac{HPI_{m,t_{16+2,j}} - HPI_{m,t_{16-2,j}}}{HPI_{mt_{16-2,j}}}.$$

We note that by using percentage changes in housing price indices, $HPI_{m,t}$, rather than simple changes, we minimize any problems of non-comparability of the Zillow and FHFA price indices.[17] We then "scale" this percentage change by the net home equity the parents report in year $t_{16,j}$ to form our housing market instrument:

$$\Delta HPI_{mt_{18,j}} \equiv H_{im,t_{16,j}} \left[\frac{HPI_{m,t_{16+2,j}} - HPI_{m,t_{16-2,j}}}{HPI_{mt_{16-2,j}}} \right]. \tag{10}$$

We note that we found that trimming the changes affects the precision of our results.

For our instrumental variable for local labor market conditions, we use data from the Quarterly Census of Employment and Wages (QCEW) to measure average annual wages, $W_{m,t}$, in the parents' county-of-residence, m, around year $t_{16,j}$ to construct the percentage change in average wages in $t_{16,j}$,

$$\frac{W_{m,t_{16+2,j}} - W_{m,t_{16-2,j}}}{W_{m,t_{16-2,j}}},$$

and scale it by parent's annual income in year $t_{16,j}$ to construct the following instrumental variable:

$$\Delta W_{mt_{18,j}} \equiv Y_{im,t_{16,j}} \left[\frac{W_{m,t_{16+2,j}} - W_{m,t_{16-2,j}}}{W_{m,t_{16-2,j}}} \right]. \tag{11}$$

3.5 Children's College & Parental Financing Decisions: Empirical Results

Table 4 shows the results of estimating (5) and (9). For the college choice and financing models, (5), we show marginal effects for the unadjusted multinomial logit specification as well as those for our preferred estimates based on the control function estimator. For the models of

[17] We trimmed these changes when they were exceedingly large in absolute value.

amounts conditional on a transfer, (9), we show coefficients from the OLS and IV regressions.

Our results from estimating (5), in Table 4 columns (1) - (3), show that a $10,000 increase in home equity increases the likelihood of attending college with a transfer by 0.37 percentage points and decreases the likelihood of not attending college by 0.41 percentage points. Once we account for the endogeneity of parental wealth, the point estimates remain quite similar but are imprecisely estimated. The marginal effects that we estimate are very small and suggest that even the large increases in average home equity in local areas, which averaged $28,300 in our sample, only increased the likelihood of attending college with a parental transfer by about one percentage point on a base probability of 34%. We do not see any effect of increases in home equity on the likelihood of attending college without a parental transfer. The effect size that we estimate is similar to Lovenheim (2011), who finds that a $10,000 increase in home equity increases the likelihood of going to college by 0.7 percentage points. Our findings, though imprecisely estimated, broadly support the hypothesis in Lovenheim (2011) by showing that parental transfers are the mechanism through which increases in parental home equity increase the likelihood of a child attending college.

We extend previous work by also considering the role of increases in parental income in college choice and financing decisions. We show that an increase of $10,000 in family income increases the likelihood of attending college with a transfer by 0.85 percentage points, increases the probability of attending college without a transfer by 0.73 percentage points, and decreases the probability of not attending college by 1.57 percentage points. Once we account for the endogeneity of parental income, a $10,000 increase in parental income increases the likelihood of attending college with a transfer by 2.57 percentage points and reduces the likelihood of not attending college by 1.5 percentage points, but there is not statistically significant effect of parental income on the likelihood of attending college without a parental transfer. The results from the unadjusted multinomial logit suggests, unsurprisingly, that parental income is correlated with college attendance and with parental transfers. However, the results using the control function estimator suggest that exogenous increases in parental income increase the likelihood of attending college with a transfer relative to not attending college at all but have little effect on the likelihood of attending college without a parental transfer.

Finally, we consider the effect of home equity and income on the amount of parental transfers conditional on parents providing a transfer for college. In our preferred IV specification, we find that a $10,000 increase in home equity increases parental transfers by $151 but that the increase is not statistically significant. Increases in income have a much larger effect on the amount of transfers. A $10,000 increase in income increases parental transfers by $1460.

Taken together these results complement earlier work by confirming that increases in wealth increase the likelihood of attending college by increasing the probability of parental transfers but suggest that understanding the importance of parental income in the decision of parents to make financial transfers to children to pay for college is also crucial.

4 Consequences of Parental Financing Decisions for Parents' and Child's Subsequent Indebtedness

In this section, we consider the effect of decisions parents made on whether their child attended college and how it was financed on the subsequent debt, measured six years later, of the parents and of their (adult) child.

4.1 Measuring Subsequent Indebtedness of Parents & their Children.

We consider indebtedness of parents and children using mortgage debt and other debt for parents and using other debt as well as student debt for children. Let $Debt_{nht_{a,j}}$ denote the debt of household n where $n = i$ for the parent household and $n = j$ for the child household, of type h, measured at time t when child j is age a. We choose $a = 24$ as six-years after enrollment decisions and when financing for higher education is largely complete. $h = MortBal$ when we consider mortgage debt which, as defined earlier, is the sum of all primary and secondary mortgages along with home equity loans and lines of credit on an individual's primary residence. $h = OthDebt$ is all non-housing debt which includes credit card debt, student loans, medical debt, and loans from relatives and is taken from the wealth modules which were conducted in 1984, 1989, 1994, 1999, 2001-2015 and is measured in 2013 dollars. $h = StudentDebt$ is student debt which is measured only for individuals in the Transition to Adulthood sample through

2015 or for PSID household heads and spouses in the 2011 - 2015 wealth modules.

4.2 Parents' & Children's Indebtedness by College Attendance & Financing Decisions

We display the parents' subsequent mortgage indebtedness and the student loan and other debt of children when children are age 24 in Table 5 for the college attendance and financing decisions that parents and children make when children are age 18. $Debt_{i,MortBal,t_{24,j}}$ and $Debt_{i,OthDebt,t_{24,j}}$ are higher for parents whose child attends college and even higher for parents who provide financial transfers to their child for college though differences in mortgage debt between parents whose child attends college without a financial transfers and those who provide financial transfers for college are quite large, nearly $40,000. The debt of children, both in the form of $Debt_{j,StudentDebt,t_{24,j}}$ and $Debt_{j,OthDebt,t_{24,j}}$, is higher among children who attend college related to those who do not, though differences between children who attend college with parental financial support and those who do not receive such support are small. Mean levels of student debt are $1700 lower among children whose parents provide financial support for college. Finally, we note that some students who do not attend college report having student debt. This could be debt that is accrued while pursuing non-academic schooling post high school.

4.3 Modeling the Effects of College/Financing Choices on Later Financial Debt of Parents and Adult Children

We now consider various specifications for estimating the effects of the college/financing choices of on the later-life financial debt positions of parents and their children. The idea here is to ask what is the effect of whether a child went to college and whether parents helped finance college on the subsequent indebtedness of parents and their children.

In the most basic specification, we model parental and child indebtedness when children are age 24 as follows:

$$\begin{aligned} Debt_{nht_{24,j}} &= \beta_{nh0} + \beta_{nh1} Attend_{ij} + \beta_{nh2} AttendFin_{ij} + \beta_{nh3} Y_{nmt_{24,j}} \\ &\quad + \beta_{nh4} X_{nt_{24,j}} + \beta_{nh5} M_{mt_{24,j}} + \phi^D_{t_{24,j}} + \delta^D_{nmt_{24,j}} + u^D_{nht_{24,j}}. \end{aligned} \tag{12}$$

for $n = i$ (parent), j (child) and $h = MortBal, OthDebt, StudDebt$, where the outcome, $MortBal$ only applies to parents and $StudDebt$ only applies to the child, and where $Attend_{ij}$ is an indicator variable equal to 1 if child j of parent i actually attends college,[18] $AttendFin_{ij}$ denotes the indicator variable equal to 1 if child j attended college and parent i provided funds to finance it and zero otherwise,[19] $Y_{nmt_{24,j}}$ is the total family income of n when children are age 24, $X_{nt_{24,j}}$ is a vector of parent i's $(n = i)$ and child j's characteristics at child age 24 including non-housing wealth, and $M_{mt_{24,j}}$ are the corresponding characteristics for location m at $t_{24,j}$. In the above specification, $Attend_{ij}$ and $AttendFin_{ij}$ are clearly endogenous and, consistent with our modeling of parental income and wealth at the time of the child's college decision, $Y_{nmt_{24,j}}$ likely to be endogeous vis-a-vis the indebtedness outcomes, $Debt_{nht_{24,j}}$. To account for the endogenity of these variables, we use our instruments $\Delta HPI_{mt_{18,j}}$ and $\Delta W_{mt_{18,j}}$ defined in section 3.4 to instrument for $Attend_{ij}$ and $AttendFin_{ij}$ and use an analogous measure of ΔW, defined based on the market, m, in which n resides in year $t_{24,j}$ as an instrument for $Y_{nmt_{24,j}}$. Accordingly, we use an instrumental variable estimator to estimate the parameter in (12).

4.4 Empirical Results

Table 6 shows the results of estimating equations of the form in (12) for parental debt. We show estimates from OLS specifications in which college attendance and financing is taken as exogenous and from IV specifications in which these are instrumented using changes in wealth and income when the child was a teenager. Though we only show the coefficients for the college attendance and financing decisions, in these specifications, parental income at age 24 is included as a control variable in the OLS specification and is instrumented in the IV specifications. We begin by considering the correlation between college and financing choices and parental debt in the form of mortgage debt in Table 6, Panel A, Columns (1) and (2). In both the OLS and the IV results, providing children with a financial transfer for college increases parental housing debt when children are age 24. In the OLS specifications, parents who provide financial support for their children to attend college have \$18,130 more in housing debt with their children are 24 relative to having a child who attends college without a financial transfer. One we account for

[18] $Attend_{ij} = 1$ if either $EduFin1_{ij} = 1$ or $EduFin2_{ij} = 1$ and equals zero otherwise.
[19] That is, $AttendFin_{ij} = EduFin2_{ij}$.

the endogeneity of college attendance and financing decisions in the IV specification, providing a transfer for a child to attend college increases housing debt when the child is age 24 by $230,230. There is not a statistically significant increase in housing debt for parents whose children attend college but who do not provide a financial transfer to their children.

The increase in parental housing debt for parents who provide financial transfers for college is large in the IV estimates relative to the OLS estimates despite controls for the level of non-housing wealth of parents when the child is age 24. In Table 6, Column (3) and (4), we repeat the analysis with a richer set of covariates for parental housing wealth which decreases the effect size somewhat. The effect size declines to $109,840 when we control for the home equity of parents when their child is 18. This variable is clearly endogenous but the decline in the magnitude of the coefficient suggests that a richer set of controls may reduce the effect of providing financial support for children's education on parental debt later in life.

More generally, we suspect that the large increase in housing debt as a result of providing financial support for college tuition suggests that the treatment effect may be heterogeneous. Parents whose decision to provide financial support to their children is changed by an increase in housing wealth or labor income shortly before the child attends college may take on more housing debt than the average parent who provides financial support for their child's education. In particular, large increase in home equity in the years before a child attends college may increase the likelihood of taking on a home equity loan or line of credit. Parents may take on such debt both to finance their child's education but also to spend on other consumption. That is, the entire amount of the debt they take on may not be to pay for college for their children. Thus, the increase in their housing debt is larger than the amount of the transfer they provide to children.

We also consider how college financing decisions affect "other" parental debt including credit card and medical debt. In both the OLS and the IV estimates, we find that having a child who attends college increases parental non-housing debt when their child is age 24 relative to having a child who does not attend college. But, non-housing debt does not differ between parents who provide financial transfers to their children to attend college those who do not.

Table 7 shows the results of estimating equations in the form of (12) for the debt that children hold at age 24. We examine both "other" debt and student loan debt and again show OLS specifications in which college attendance and financing is taken as exogenous and IV specifications in which these are instrumented using changes in wealth and income when the child was a teenager. Family income of the child at age 24 is also treated as a control variable in the OLS specifications and is instrumented in the IV specifications. In the OLS specifications, children who attend college have $12,050 more "other" debt and $15,810 more in student debt that children who do not attend college but having a parent pay for college does not have a statistically significant effect on levels of debt – importantly, it does not reduce the debt that children have at age 24. Once we have controlled for the endogeneity of college attendance and financing decisions, there are no statistically significant differences in debt levels across either college attendance or college financing decisions. Though not statistically significant, children whose parents provide financial transfers for college appear to actually have *more* student debt at age 24 than their counterparts whose parents do not provide transfers.

5 Parental Wealth, Income and Financing & Quality of College Child Attended

Our results on parent and child debt are somewhat puzzling because parental investments in college increase parental debt substantially but do not reduce student debt. The results suggest that parental investment and student loans may be complements rather than substitutes. To investigate this puzzle, we build on the work of Lovenheim and Reynolds (2013) and consider that parental decisions to finance college may change not only the likelihood of the child attending college but also the quality or cost of the college the student choses to attend.

To measure the quality of colleges that the (young adult) children attended, we use an college quality index constructed and used by Dan Black, Jeff Smith and their co-authors in their studies of the effects of college quality (Black and Smith, 2004; Black, Smith and Daniel, 2005; Black and Smith, 2006; Dillian and Smith, 2017; Dillon and Smith, 2017).[20] The index

[20]We thank Nora Dillon and Jeff Smith for providing us with the latest version of these quality indices for 4-year and 2-year colleges in the U.S.

is based on the following measures of colleges' selectivity and resources: college's mean SAT or ACT scores; percent of applications rejected; average salary of faculty involved in instruction; and the undergraduate faculty-student ratio. These measures are obtained for colleges in the U.S. from the Integrated Post-Secondary Education Data System (IPEDS) and college rankings by *U.S. News & World Report*. The actual index used is the first principal component of these measures Dillian and Smith (2017); Dillon and Smith (2017); it ranges in value from -10 to 10. We link this quality indices to the data for children who attended college in our sample, using information on the college attended by PSID sample members collected in the PSID core interview for those children in our sample that became heads/wives of their own PSID household or from PSID-TA survey for those who were not a head/wife by the time they reached age 24. Let $Quality_{ij,18}$ denote the value of the index for child j of parent i for the college in which they enrolled in year $t_{18,j}$.

We examine how parental financing decisions affect college quality in three ways. First, we examine how parental income and parental housing wealth affect college quality using changes in parental income and wealth in the years before a child turns 18 as instruments for income and housing wealth. These specifications mirror those on college attendance and financing decisions in Section 3.5 estimating regressions of the following form:

$$\begin{aligned} Quality_{ij,18} &= \theta_0 + \theta_1 H_{imt_{18,j}} + \theta_2 Y_{imt_{18,j}} + \theta_3 X_{ij_{18,j}} + \theta_4 M_{mt_{18,j}} \\ &\quad + \nu_{t_{18,j}} + \eta_{ijm} + \varepsilon_{ij,18}. \end{aligned} \tag{13}$$

To account for the potential endogeneity of $H_{imt_{18,j}}$ and $Y_{imt_{18,j}}$ in (13), we employ an instrumental variables estimator, using the same vector of instruments used in the control function estimator of the parameters in of the payoff functions in (5). Second, we examine the direct effect of attending college with a parental transfer or the amount of a parental transfer on college quality using changes in parental income and wealth in the years before a child turns 18 as instruments for attending college with a financial transfer from parents or on the amount of the transfer. The specifications mirror those on child debt in Section 4.4 and take the following

form:

$$\begin{aligned} Quality_{ij,18} &= \theta_0 + \theta_1 AttendFin_{ij} + \theta_2 Y_{imt_{18,j}} + \theta_3 X_{ij_{18,j}} + \theta_4 M_{mt_{18,j}} \\ &\quad + \nu_{t_{18,j}} + \eta_{ijm} + \varepsilon_{ij,18}. \end{aligned} \tag{14}$$

where $AttendFin_{ij}$ denotes the indicator variable equal to 1 if child j attended college and parent i provided funds to finance it and zero otherwise. To account for the endogenity of $AttendFin_{ij}$, we use our instruments, $\Delta HPI_{mt_{18,j}}$ and $\Delta W_{mt_{18,j}}$, defined in section 3.4 to instrument for $AttendFin_{ij}$. Finally, we use a similar specification to examine the effect of the amount of the parental transfer using the following specification:

$$\begin{aligned} Quality_{ij,18} &= \theta_0 + \theta_1 CollTrans_{ij} + \theta_2 Y_{imt_{18,j}} + \theta_3 X_{ij_{18,j}} + \theta_4 M_{mt_{18,j}} \\ &\quad + \nu_{t_{18,j}} + \eta_{ijm} + \varepsilon_{ij,18}. \end{aligned} \tag{15}$$

Again, we use an instrumental variables estimator to account for the endogeneity of $CollTrans_{ij}$ and $Y_{imt_{18,j}}$ in (14). We estimate equations (13) - (15) on the subset of children who attend college and who report the name of the college they attend.[21]

Table 8 shows the results of estimating equations 13 and 14. In Columns (1) and (2), we find that parental income increases college quality by a small amount – a $10,000 increase in income increases college quality by 0.0186 points on a mean of 0.21. After accounting for the endogeneity of parental income in college quality decisions, the effect is not statistically significant. Columns (3) and (4) show that attending college with a transfer has no statistically significant effect on college quality. Finally, Columns (5) and (6) show that larger parental transfers do increase quality. An additional $10,000 in financial transfers increases college quality by 0.0748 again on a mean of 0.21. The effect size is similar in the OLS and IV specifications though the results are less precise in the IV specifications. These results suggest that college financing decisions have

[21]This is the sample of children who report the college that they attend either as part of the main PSID interview or as part of the TA interview.

at most a small effect on college quality operating mostly through larger transfers. Table 8 does not "solve" the puzzle that student debt does not decline in the presence of parental transfers for college. However, we note that these results are quite preliminary. In future versions of the paper, we will investigate the effects on quality in more depth and examine the robustness of these results to different sets of control variables. We will also examine whether the college financing decisions of parents affects the cost of college, even in the absence of an effect on quality.

6 Conclusion

This paper considers the role of parental wealth and income for decisions about college attendance and financing, and, in turn, examines the implications of these decisions for the debt burden of parents and children later in life. We use *Bartik style* instruments for housing wealth and income to generate exogenous shocks to parental home wealth and income during the four-years prior to a child attending college. We find substantial evidence that exogenous increases in parents' housing wealth and income increase the likelihood of their children attending college and that the mechanism works through an increase in parental transfers. We also show that income is particularly important for explaining college attendance and financing decisions. Finally, we show that increases in income and wealth also increase the amount of transfers for college conditional on a child receiving a transfer from their parents.

Our results on the implications of decisions about college attendance and financing on debt later in life are suggest that parents who provide transfers have substantially higher debt burdens when their children are 24 years old. However, we see little impact of college financing decisions on debt levels for children later in life. In particular, it does not appear that children whose parents provide transfers for college have lower levels of debt than children who attend college without a parental transfer. These results raise some important questions about whether parental investments in college and student loans are complements or substitutes. Our preliminary analyses suggest that parental transfers are correlated with small increases in college quality but the results are not consistent across specifications. It is this puzzle that we will focus on in future drafts of the paper. In particular, we will examine whether children who receive

transfers are more likely to graduate from college or, whether children whose parents provide transfers simply take longer to finish college or are more likely to attend more expensive, but not necessarily higher quality colleges.

Finally, a potential extension of this research would be to look at the impact of college financing decisions on the consumption of both parents and of children in order to determine whether these decisions materially alter the levels and types of consumption each generation. Nonetheless, the evidence provided in this paper does suggest that parents role in the financing of their children's education is an important form of intergenerational transfers and that this role may not only increase the human capital of the next generation and that the later life consequences of these investments may have may be quite different for each generation.

References

Avery, Christopher, and Sarah Turner. 2013. "Student Loans: Do College Students Borrow Too Much–Or Not Enough?" *Journal of Economics Perspectives*, 26(2): 165–192.

Bartik, Timothy J. 1991. *Who benefits from state and local economic development policies?* WE Upjohn Institute for Employment Research.

Becker, Gary S., and Nigel Tomes. 1979. "An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility." *Journal of Political Economy*, 87(6): 1153–89.

Behrman, Jere R., Robert A. Pollak, and Paul Taubman. 1995. "The Wealth Model: Efficiency in Education and the Distribution in the Family." In *From Parent to Child: Intrahousehold Allocation and Intertemporal Relations in the United States.* , ed. J.R. Behrman, R.A. Pollak and P. Taubman, 113–138. University of Chicago Press.

Belley, Philippe, and Lance Lochner. 2007. "The Changing Role of Family Income and Ability in Determining Educational Achievement." *Journal of Human Capital*, 1(1): 37–89.

Black, Dan, and Jeffrey A. Smith. 2004. "How Robust is the Evidence on the Effects of College Quality? Evidence from Matching." *Journal of Econometrics*, 121(1): 99–124.

Black, Dan, and Jeffrey A. Smith. 2006. "Estimating the Returns to College Quality with Multiple Proxies for Quality." *Journal of Labor Economics*, 24(3): 701–728.

Black, Dan, Jeffrey A. Smith, and Kermit Daniel. 2005. "College Quality and Wages in the United States." *German Economic Review*, 6(3): 415–443.

Blanchard, Olivier J., and Lawrence F. Katz. 1992. "Recentgional Evolutions." *Brookings Papers on Economic Activity*, 1992(1): 1–75.

Blundell, Richard, and James L. Powell. 2003. "Endogeneity in Nonparametric and Semiparametric Regression Models." In *Advances in Economics and Econonometrics: Theory and Applications, Eighth World Congress Volume.* , ed. M. Dewatripont, L.P. Hansen and S.J. Turnovsky, 312–357. Cambridge University Press.

Board, College. 2015. "Trends in Student Aid 2015." trends.collegeboard.org.

Browning, Martin, Mette Gørtz, and Søren Leth-Petersen. 2013. "Housing wealth and consumption: a micro panel study." *The Economic Journal*, 123(568): 401–428.

Brown, Meta, John Karl Scholz, and Ananth Seshadri. 2012. "A New Test of Borrowing Constraints for Education." *Review of Economic Studies*, 79: 511–538.

Cameron, Stephen, and Christopher Taber. 2004. "Estimation of educational borrowing constraints using returns to schooling." *Journal of Political Economy*, 112: 132–182.

Cameron, Stephen, and James J. Heckman. 1998. "Life cycle schooling and dynamic selection bias: models and evidence for five cohorts of American males." *Journal of Political Economy*, 106: 262–333.

Cameron, Stephen, and James J. Heckman. 2001. "The Dynamics of Educational Attainment for Black, Hispanic, and White Males." *Journal of Political Economy*, 109: 455–99.

Carroll, Christopher D., Misuzu Otsuka, and Jiri Slacalek. 2011. "How large are housing and financial wealth effects? A new approach." *Journal of Money, Credit and Banking*, 43(1): 55–79.

Chiappori, Pierre-André, and Maurizio Mazzocco. forthcoming. "Static and Intertemporal Household Decisions." *Journal of Economic Literature*.

Cooper, Daniel, and Maria José Luengo-Prado. 2015. "House price growth when children are teenagers: A path to higher earnings?" *Journal of Urban Economics*, 86: 54–72.

Dillian, Eleanor W., and Jeffrey Andrew Smith. 2017. "Determinants of the Match between Student Ability and College Quality." *Journal of Labor Economics*, 35(1): 45–66.

Dillon, Eleanor W., and Jeffrey A. Smith. 2017. "The Consequences of Academic Match between Students and Colleges." CESIfo.

Edmiston, Kelly D., Lara Brooks, and Steven Shepelwich. 2013. "Student Loans: Overview and Issues." Federal Reserve Bank of Kansas City.

Elliott, William, and IlSung Nam. 2013. "Is Student Debt Jeopardizing the Short-Term Financial Health of U.S. Households?" *Federal Reserve Bank if St. Louis Review*, 95(5): 405–24.

Gottschalck, Alfred, Marina Vornovytskyy, and Adam Smith. 2013. "Household Wealth in the US: 2000 to 2011." U.S. Census Bureau.

Grusky, David B., Bruce Western, and Christopher Wimer. 2011. "The consequences of the Great Recession." In *The Great Recession.* , ed. David B Grusky, Bruce Western and Christopher Wimer, 3–20. Russell Sage Foundation New York, NY.

Hurd, Michael D., and Susann Rohwedder. 2010. "Effects of the financial crisis and great recession on American households." National Bureau of Economic Research.

Keane, Michael, and Kenneth I. Wolpin. 2001. "The effect of parental transfers and borrowing constraints on educational attainment." *International Economic Review*, 42: 1051–1103.

Lochner, Lance J., and Alexander Monge-Naranjo. 2011. "The Nature of Credit Constraints and Human Capital." *American Economic Review*, 101(6): 2487–2529.

Lochner, Lance J., and Alexander Monge-Naranjo. 2012. "Credit Constraints in Education." *Annual Review of Economics*, 4(1): 225–256.

Lovenheim, Michael F. 2011. "The Effect of Liquid Housing Wealth on College Enrollment." *Journal of Labor Economics*, 29(4): 741–771.

Lovenheim, Michael F., and C. Lockwood Reynolds. 2013. "The Effect of Housing Wealth on College Choice: Evidence from the Housing Boom." *Journal of Human Resources*, 48(1): 1–35.

Mazzocco, Maurizio. 2007. "Household intertemporal behaviour: A collective characterization and a test of commitment." *The Review of Economic Studies*, 74(3): 857–895.

McGarry, Kathleen, and Robert F. Schoeni. 1995. "Transfer behavior in the health and retirement study: Measurement and the redistribution of resources within the family." *Journal of Human resources*, 30: S184–S226.

Paiella, Monica, and Luigi Pistaferri. forthcoming. "Decomposing the wealth effect on consumption." *Review of Economics and Statistics*.

Petrin, Amil, and Kenneth Train. 2010. "A Control Function Approach to Endogeneity in Consumer Choice Models." *Journal of Marketing Research*, XLVII: 3–13.

SallieMae. 2017. "How America Pays for College 2017." Sallie Mae Bank.

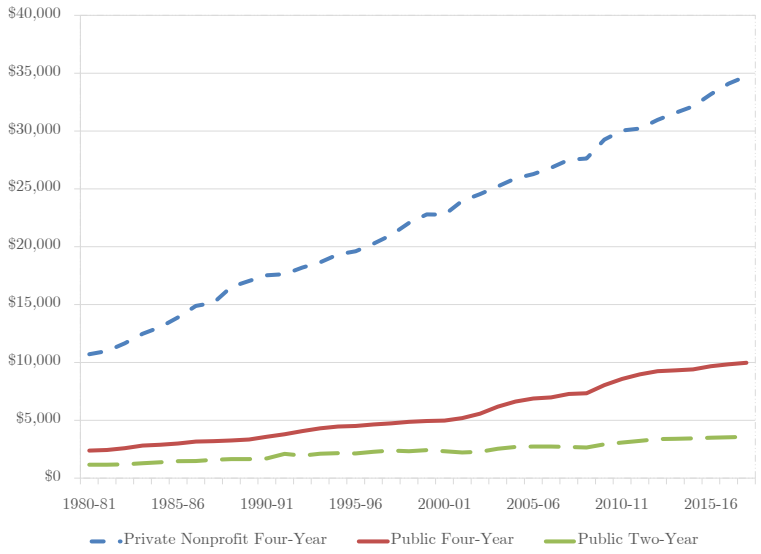
Schoeni, Robert F., Suzanne M. Bianchi, V. Joseph Hotz, Judith A. Seltzer, and Emily E. Wiemers. 2015. "Intergenerational transfers and rosters of the extended family: A new substudy of the Panel Study of Income Dynamics." *Longitudinal and life course studies*, 6(3): 319–330.

Shiller, Robert J. 2007. "Understanding recent trends in house prices and home ownership." NBER Working Paper 13553.

Wooldridge, Jeffrey M. 2014. "Quasi-Maximum Likelihood Estimation and Tests for Nonlinear Models with Endogenous Explanatory Variables." *Journal of Econometrics*, 182: 226–234.

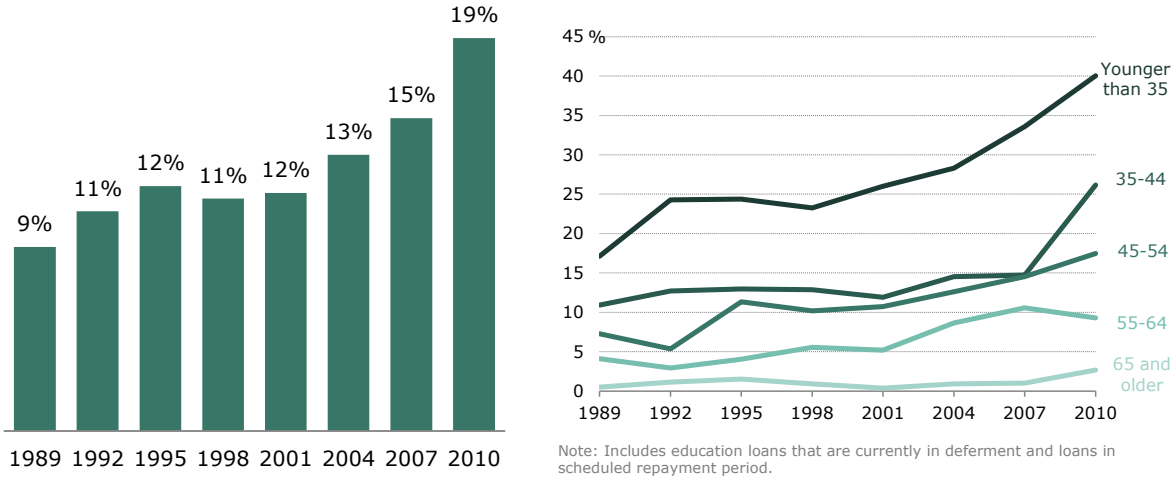
Zissimopoulos, Julie M., and James P. Smith. 2009. "Unequal giving: Monetary gifts to children across countries and over time." RAND Working Paper WR-723.

FIGURE 1. Trends in Costs of College in the U.S. (2017$)



Source: The College Board, *Trends in College Pricing 2017*.

FIGURE 2. Trends in Households with Student Loan Debt in the U.S.

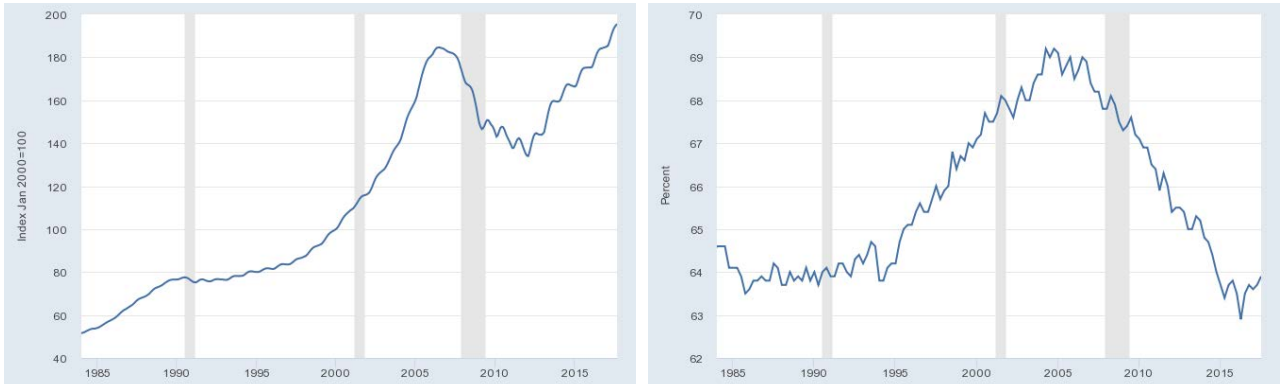


(a) All Households)

(b) Households by Age of Head

Source: Pew Research Center, *Record 1-in-5 Households Now Owe Student Loan Debt*, 2012.

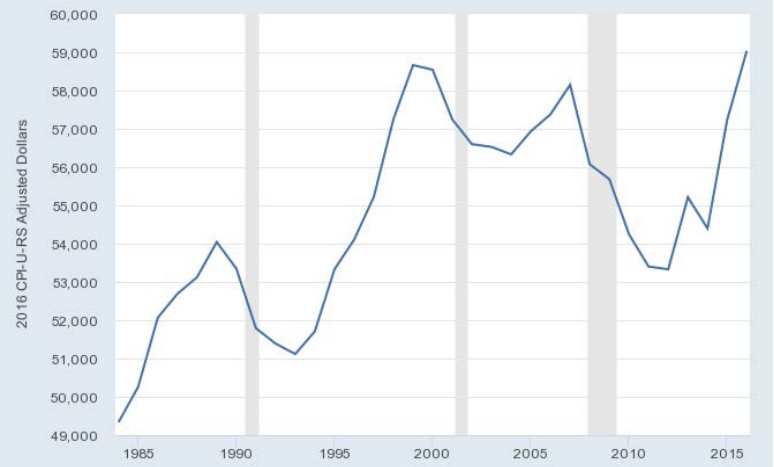
FIGURE 3. Trends in Home Prices and Homeownership in the U.S., 1984-2017



(a) Case-Shiller Home Price Index (b) Homeownership Rates

Source: FRED Economic Data, Federal Reserve Bank of St. Louis.

FIGURE 4. Trend in Real Median Household Income, 1984-2016 (2016$)



Source: FRED Economic Data, Federal Reserve Bank of St. Louis.

TABLE 1. Sample Sizes

	N
Parent-Child Pairs:	2,658
with Housing and "Other" Debt Data at age 24	1,930
Children at age 24:[*]	
with "Other Debt" Data	1,802
with Student Loan Debt Data	1,310

[*] Data on the debt of children at or near when they are age 24 is obtained from either the regular PSID survey or from the the Transition to Adulthood (TA) survey which covers children who are age 18 or older regardless of whether they have become the head of their own household.

TABLE 2. Characteristics of Homeowning Parents & College-Age Children in PSID, 1997-2015*

Variable	Mean
Child does not enroll ($EduFin0$)	0.35
Child enrolls, no transfer ($EduFin1$)	0.29
Child enrolls, transfer ($EduFin2$)	0.36
Amount of Transfer ($CollTrans$)	\$3.24
Parent Characteristics when Child was Age 18:	
Parents' Net Home Equity ($H_{t_{18}}$)	\$8.75
Value of Parents' Home ($MktValue_{t_{18}}$)	\$17.02
Parents' Income ($Y_{t_{18}}$)	\$10.00
Parent married/cohabiting	0.85
Number of children under 16 in parent HH	0.85
Age of parent Household Head	46.83
Time Invariant Parent Characteristics:	
Sex of Head of parent HH (male=1)	0.90
Parent HH hd white	0.79
Parent HH hd other race (nonwhite)	0.21
Parent's Education:	
High school or less	0.20
Some College	0.42
College graduate	0.38
Child Characteristics:	
Sex of child (male=1)	0.49
Year child turned 18**	2005

* Dollar amounts are in 10K of 2013\$. Statistics weighted using PSID family weights.

** The range of years in which children turned age 18 is 1998–2015.

TABLE 3. Distributions of Child's College Attendance & Parents' Financing, by Parents' Housing Wealth & Household Income when Child Age 18*

When Child Age 18:	Share of Parents	$EduFin0$ (No College)	$EduFin1$ (College, but No Transfer)	$EduFin2$ (College & Transfer)	Amount of Transfer, if $EduFin2 = 1$
All Parents	1.00	0.35	0.29	0.36	\$3.24
Parental (Net) Home Equity (H):					
Negative Equity	0.04	0.61	0.25	0.13	\$1.07
Positive Equity	0.96	0.35	0.30	0.35	\$3.17
Bottom 3rd	0.39	0.50	0.29	0.20	\$1.57
Middle 3rd	0.30	0.33	0.30	0.37	\$2.55
Top 3rd	0.26	0.15	0.28	0.56	\$4.50
Parental Income (Y):					
Bottom Quintile	0.11	0.66	0.29	0.05	\$1.10
Bottom Middle	0.17	0.65	0.27	0.08	\$0.90
Middle Quintile	0.20	0.59	0.27	0.14	\$0.91
Top Middle	0.24	0.41	0.29	0.29	\$1.78
Top Quintile	0.28	0.18	0.28	0.53	\$4.01
No. of Parent-Child Pairs	2,762				

* Dollar amounts are in 10K of 2013\$. Statistics weighted using PSID family weights.

TABLE 4. Marginal Effects of Changes in Wealth and Income on College and Financing Choices

	College and Financing Choices:						*Amount of Transfer:*	
	Multinomial Logit			Control Function Method			*Conditional on Transfer:*	
	$EduFin0$ (No Coll)	$EduFin1$ (Coll, but No Transfer)	$EduFin2$ (Coll & Transfer)	$EduFin0$ (No Coll)	$EduFin1$ (Coll, but No Transfer)	$EduFin2$ (Coll & Transfer)		
Variable	(1)	(2)	(3)	(4)	(5)	(6)	OLS (7)	IV (8)
$H_{imt_{18,j}}$	-0.0041*	0.0004	0.0037***	-0.0044	0.0013	0.0031	0.0273***	0.0151
	(0.0021)	(0.0014)	(0.0012)	(0.0052)	(0.0050)	(0.0034)	(0.0103)	(0.0250)
$Y_{imt_{18,j}}$	-0.0157***	0.0073**	0.0085***	-0.0155**	-0.0103	0.0257***	0.0622***	0.1460***
	(0.0031)	(0.0030)	(0.0020)	(0.0080)	(0.0079)	(0.0055)	(0.0112)	(0.0385)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	No	No
MSA Fixed Effects	No	No	No	No	No	No	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 5. Distributions of Parents' & Child's Debt when Child Age 24, by College Attendance and Financing Decisions at Age 18*

Debt in Year $t_{24,j}$	Full Sample	$EduFin0$ (No Coll)	$EduFin1$ (Coll , No Transfer)	$EduFin2$ (Coll & Transfer)
Parents' Debt:				
Mortgage Debt	6.71	4.54	5.83	9.48
Other Debt	1.26	0.78	1.37	1.62
Child's Debt:				
Other Debt	1.11	0.36	1.50	1.38
Student Debt	1.20	0.20	1.71	1.65

* All forms of debt amounts are in 10K of 2013$. Statistics weighted using PSID family weights.

TABLE 6. Effects of College Attendance, Financing and Changes in Parental Housing Wealth & Income on Parents' Indebtedness at Child Age 24*

	No Control for Equity in Year $t_{18,j}$		Control for Equity in Year $t_{18,j}$	
	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
Panel A: Mortgage Debt				
Attends College (*Attend*)	-0.075	4.348	-0.459	-2.080
	(0.373)	(14.155)	(0.373)	(7.372)
Attends with Financing (*AttendFin*)	1.813***	23.230*	1.409**	10.984*
	(0.569)	(12.201)	(0.571)	(5.997)
Panel B: Other Debt				
Attends College (*Attend*)	0.377**	4.112**	0.364**	3.986**
	(0.171)	(2.019)	(0.179)	(1.969)
Attends with Financing (*AttendFin*)	0.063	-0.833	0.046	-1.061
	(0.246)	(2.693)	(0.245)	(2.327)

* *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 7. Effects of College Attendance, Financing and Changes in Child Indebtedness at Child Age 24*

	OLS	IV
	(1)	(2)
Panel A: Other Debt		
Attends College (*Attend*)	1.205***	-1.118
	(0.144)	(2.499)
Attends with Financing (*AttendFin*)	-0.109	-0.131
	(0.286)	(3.080)
Panel B: Student Debt		
Attends College (*Attend*)	1.581***	0.121
	(0.252)	(2.319)
Attends with Financing (*AttendFin*)	0.144	2.381
	(0.430)	(3.187)

* *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 8. Effects of Parent Income and Net Equity, College Attendance and Parental Financing, and Transfer Amount on Quality of College (*Quality*)

	Eqn. (13)		Eqn. (14)		Eqn. (15)	
	OLS	IV	OLS	IV	OLS	IV
Variable	(1)	(2)	(3)	(4)	(5)	(6)
$H_{imt_{18,j}}$	0.0071	-0.0004				
	(0.0078)	(0.0274)				
$Y_{imt_{18,j}}$	0.0186***	0.0086				
	(0.0052)	(0.0218)				
$AttendFin$			0.0378	0.5490		
			(0.1310)	(1.2290)		
$CollTrans_{ij,18}$					0.0748***	0.0669
					(0.0286)	(0.1320)
State Fixed Effects	No	No	No	No	No	No
MSA Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

* *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.