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 housing wealth and income on their children's college attendance and parents' financial support for it, college graduation rates and quality of college attended and whether parental financing affects the subsequent indebtedness of parents and 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. We instrument for the potential endogeneity of parental housing wealth and income on these decisions with changes in parents' local housing and labor market conditions. We find that increases in parents' income increases the likelihood of their children attending college, largely because it increases parents' provision of financial support, while parental wealth does not appear to affect either. Parental income also increases the children's graduation rates, but little evidence that housing wealth does. We also find that neither parental income or wealth affects indicators of the quality of colleges children attend. Finally, we find little evidence that parental financing affects the indebtedness of parents or children later in life.

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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 (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.[1]

This paper focuses on the role that parents and their resources play in the decisions for their children's college attendance and the financing of it and on how these decisions affect the subsequent indebtedness of their children, including student loan debt, and their own indebtedness. Parents have long been a primary source of financial support for their children's post-secondary education.[2] Previous research has focused on the impact of parental income on their children's college attendance. Much of it found little evidence that parental income had an independent effect on the likelihood of young adults attending college, 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 bet-

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

[2] 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).

ween 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).

More recent studies have examined the impact of parental wealth, most notably housing wealth, on college attendance and other outcomes for young adults.[3] For example, 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 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.[4] 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.[5]

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 resources – here in the forms of parental home equity and income – 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 and these choices vary by parents' wealth and income. Furthermore, while

[3]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.

[4]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.

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

there is a sizable literature on the use of student loans[6] or grants-in-aid[7] 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.[8]

In this paper, we address three 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? This part of this question is similar to that addressed in Lovenheim (2011) and Lovenheim and Reynolds (2013), who examine the effects of 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 housing wealth and parental income affect not just the attendance decision but also whether parents help pay for their child to go to college. This extension provides an explicit analysis of the link between parental resources and the educational decisions of children that is implied by earlier work. But, we also extend the previous literature to include an analysis of the effect of both wealth and income on college attendance and financing decisions which we show to be important.

Second, we examine the effects of parental net housing equity and income on whether or not their child actually graduated from the college they attended, whether they attained any post-baccalaureate education, as well as the tuition and types of colleges they attended. It is well-documented that while college attendance has increased in the U.S., graduation completion

[6]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 (College Board, 2015).

[7]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 (College Board, 2015).

[8]Two exceptions are Lochner, Stinebrickner and Suleymanoglu (2013) and Belley, Frenette and Lochner (2014). Lochner, Stinebrickner and Suleymanoglu (2013) examine the extent to which the influence of parental income on children's college attendance is affected by college financial aid policies, including student loan programs. Lochner, Stinebrickner and Suleymanoglu (2013) examine the extent to which parental income plays a role in student debt repayment in the Canada Student Loan Program.

rates have not (Bound, Lovenheim and Turner, 2010; Bound and Turner, 2011). For example, among individuals who began seeking a bachelor's degree at a 4-year institution in the U.S. in the fall of 2009, only 59% completed that degree within 6 years (McFarland et al., 2017). Thus, it is important to assess whether parents with greater parental wealth and income not only increase the likelihood that their children attend college but also they make a difference in completing college[9] and, thus, improve the chances that their children subsequently attain post-baccalaureate education. In addition, there is a sizable literature on the differential returns to the types of colleges student attend, including 4-year versus 2-year institutions (Kane and Rouse, 1995), public versus private colleges (Scott, Bailey and Kienzl, 2006) and, more generally the quality of colleges students attend, including the selectivity of admissions and quality of their faculty (Black and Smith, 2004, 2006; Black, Smith and Daniel, 2005; Dillon and Smith, 2017*a*). Accordingly, we examine how parents' wealth and income affects some of these same measures of the "quality" of colleges their children attend.

Third, we examine the consequences of the parental financing decision for the subsequent debt of parents and their children. As noted above, a great deal of attention has been paid to the rising levels of debt that students accumulate as a result of going to college, irrespective of whether they complete a degree. But, parents, too, may take on debt to help finance a child's college education, often using their housing wealth as collateral via home equity loans (see footnote 2) and this debt is likely to persist well after the child has completed college. While taking on debt to finance a college education may be an efficient way of financing these costs in the presence of well-functioning capital markets, it does 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 serves as a substitute for their children accumulating debt through student loans to attend college.

[9]We note that previous work using the PSID by Cooper and Luengo-Prado (2015) find that increases in parental housing wealth increase the income of children as adults, has not found any effects of parental wealth on college completion.

To address these three issues, 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 changes in local housing and labor 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*[10] 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 the effects of housing wealth on college attendance decisions.[11]

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

[11]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 (2017), Browning, Gørtz and Leth-Petersen (2013), and

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 lay out our econometric model for estimating these educational and financing decisions in section 3.2 layout our measures of local housing and labor market conditions that we use as instruments in section 3.3, and present results for this analysis in section 3.4.

In Section 4, we examine how parental income and wealth affected the likelihood of their child graduating from college and whether they went on to attain post-BA education as well as look at whether parents' income and wealth affected the quality and type of school, using measures of the tuition costs of the school their child attended, whether it was a 4-year or a private institution, respectively, and, finally, on an index of the quality and ranking of the school they attended.

Finally, in Section 5, 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 5.1, how they vary by parents' and children's college education and financing decisions. We lay out estimating equations for this part of our analysis in section 5.2 and report on their estimates in section 5.3.

Carroll, Otsuka and Slacalek (2011) for analyses of the effects of changes in housing wealth on consumption. Though we do not use changes in housing wealth and income as explanatory variables, as we discuss below (Section 3.3), we do use changes in wealth and income from sources that are less likely to be endogenously determined as a way to identify the effects of housing wealth and income on college attendance and financing decisions. Unlike the literature on the effects of changes in wealth and income on consumption, which pays particular attention to distinguishing between permanent and transitory changes in wealth and income, we do not attempt to explicitly disentangle these effects in our analysis.

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).

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. Until 2013, the PSID had never asked these types of life-cycle transfer questions.

2.2 Samples

For all of our analyses, we restrict ourselves to those PSID households that completed the 2013 Roster and Transfers Module and to the adult children that are reported on in the Roster Module, since in the analyses below we require information about the transfers parents made to their adult children, as well as the information collected about those children, including their educational attainment. From this set of parents and their adult children, we interested in two points in the lives of these adult children: 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. Because we need to determine the parents' housing wealth (based on their reports on home values and mortgage balances) and household income at this point in the child's life, we also restrict our sample of parent-child "pairs" to parents that were present as a head or wife of the PSID in the year this child was age 18.[12] We also require that the year in which the child turned 18 was after 1997 (which corresponds to children in birth cohorts beginning in 1979) since some of the data elements we need in our analyses are only available starting in 1997.[13] We further restrict our sample to those parents who were homeowners when this child was age 18, because of our focus on the effects of parental housing wealth on children's college attendance and financing decisions.[14] Finally, as discussed below in Section 3.3, 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 $N = 2{,}868$ parent-child pairs with which to estimate the effect of parental wealth on college attendance and parental transfers for college.

As noted in the Introduction, we also examine the effects of parental wealth and income on whether their children completed college and obtained any post-baccalaureate education, as well as the tuition and measures of the "quality" of the college for each child that attended college. In the 2013 Roster and Transfer Module of the PSID, respondents report whether each child completed college, as well as any post-graduate work. After limiting our sample to children who turned 18 prior to 2009 to allow sufficient time for graduation from college by 2013, we are left with 1,324 parent-child pairs with attainment measures available.

[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.

[13] Specifically, the housing price measure we obtained from Zillow which we used to construct a measure for changes to local housing markets had inadequate geographic coverage prior to this period.

[14] This restriction reduces our sample by approximately 35%. While not included in the paper, we estimated versions of the empirical models described below that included parents who were not homeowners at the time their child(ren) were age 18, adjusting for the fact that we could not estimate the effects of their home equity but could estimate the effects of their income on the college and financing decisions for their children. The resulting estimates of the effects of parental income on these decisions when one included non-homeowning parents were similar to those we present below based on homeowning parents.

Heads and wives are asked in the main PSID interview to identify the college institution attended for all members of the household. Using these responses, we are able to link children who attend college to measures of college cost and quality available from the National Center for Education Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS) database to create several subsamples. For college cost we create a measure of tuition at college in the year the child turned 18 based on the child's residence.[15] For college quality we use three separate measures. First, for all college attendees we look at whether the institution grants 4-year degrees. Then, conditioning on attending a college with 4-year degree status, we look at the private/public status of the institution, and an index of college quality, the details of which can be found in Section 4. Conditioning on the child attending college, we obtain a sample of 799 parent-child pairs with cost measures and 797 with 4-year degree status. We have information on college type for 654 and from the college quality index for 653 children, both conditional on attending a 4-year college. For all such subsamples we include only children who turned 18 prior to 2009.

Finally, to analyze the consequences of the college attendance and financing decisions for later life indebtedness of both parents and their children, we need to measure parents' and their adult children's debt when the child is age 24.[16] 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 2425 of the parent-child pairs. We can similarly measure parental "other debt" for 2416 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

[15]We use in-state tuition if the parents resided in the same state as the institution in the year the child turned 18, and out-of-state tuition otherwise.

[16]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 22 and 27, depending on availability.

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 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 addition, heads and wives were not asked specifically about their student loan debt in the main PSID interview until 2011, further limiting the number of children for whom debt measures are available. In particular, we have information on other debt for 1,714 and student loan debt information for 1,233 of the 2,868 full sample of children.

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. We discuss several of the entries in this table below.

3 Effects of Parental Wealth & Income on Children's College Attendance and Its Financing

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 and summarizing the empirical distributions of these measures in our sample. We then describe our econometric

strategy for estimating the impact of 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 college-age child.

With respect to college enrollment, we consider a child to have enrolled in college if the parents report in the Roster and Transfers data 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:

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

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

and

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

where $EduFin0_{ij,18_j}+EduFin1_{ij,18_j}+EduFin2_{ij,18_j} = 1$. Finally, conditional on $EduFin2_{ij,18_j} = 1$, 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 $CollTrans_{ij,18_j}$. We measure this amount in 2013$.[17]

Table 2 shows the distribution of $EduFin$. In our sample, 45% of children do not enroll in college, 29% enroll but do not receive financial help from parents and 26% enroll in college with a transfer from a parent. The mean amount of the transfer is $7,800.

As noted above, we focus on how parental housing wealth and parental income influence

[17]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.

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) located in market m (which is in state s) 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* as:

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

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.

In Table 3 we display how parental housing wealth, $H_{imt_{18_j}}$, and annual income, $Y_{imt_{18_j}}$, differ by college attendance and parental financing decisions. The patterns of parental net equity and income across college attendance and financing decisions are predictable. The parents of children who attend college without financial support have \$22,200 [$= \$50,300 - \$28,100$] more in net home equity and \$21,000 [$= \$74,100 - \$53,100$] more in income when their child is age 18 compared to the parents of children who do not attend college. The parents of children who attend college with financial support have \$63,400 more in net home equity and \$54,000 more in income than those whose children attend college without parental financial help.

3.2 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 parents' housing wealth and household income. In our model, we examine how parental housing wealth and income affect parents' decisions to

finance their child's college education and what affect parental resources have on whether their child goes to college.

To model parental-child college and financing decisions, let the utility/payoff for $EduFink_{ij,18_j}$ be denoted by $U^*_{kijm,18_j}$ 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:

$$U_{kijm,18_j} = \lambda^U_{k0} + \lambda^U_{k1} H_{imt_{18_j}} + \lambda^U_{k2} Y_{imt_{18_j}} + \boldsymbol{\lambda}^U_{k3} \boldsymbol{X}_{ij} + \boldsymbol{\lambda}^U_{k4} \boldsymbol{M}_{mt_{18_j}} + \phi^U_{kt_{18_j}} + \delta^U_{ks} + \varepsilon^U_{kijm,18_j}, \quad (5)$$

for $k = 0, 1, 2$, where $H_{imt_{18_j}}$ and $Y_{imt_{18_j}}$ are defined in Section 3.1, $\boldsymbol{X}_{ij}$ is a vector of demographic characteristics of parents i and their j^{th} child, $\boldsymbol{M}_{mt_{18_j}}$ is a vector of time-varying characteristics of location m in year t_{18_j}, $\phi_{t_{18_j}}$ and δ_s are year and state-of-residence *fixed effects*, respectively, and $\varepsilon_{kijm,18_t}$ are choice-specific unobserved parent and child traits.

We include in $\boldsymbol{X}_{ij}$ a set of demographic characteristics including the age, marital status, race, and education of the parent. Also included are a set of variables describing the family structure of the child's household at age 18 including whether the household is headed by a single-female, the number of children in the household under age 16, whether there is a child in the household who is less than five years older than child j, whether there is a child in the household who is less than five years younger than child j, and the gender of child j.

We include in $\boldsymbol{M}_{mt_{18_j}}$ the average weekly wage and employment rate in market m in year t_{18_j}, where the latter variables are taken from the Quarterly Census of Employment and Wages (QCEW). We use a share-weighting approach to make the average weekly wage more accurately reflect the labor market teenage workers would face if they do not attend college. We use the Current Population Survey to calculate the composition of industries that teenagers are employed in nationally in each year and apply these weights to local industry-specific wages. 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, s, in which market m is located 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. We also

include the college - associate degree wage premium calculated as above but using individuals with an associate's degree as the comparison group. 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.

It follows that the optimal college/financing choice for child j, $k^{\dagger}$, is characterized by:

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

Assuming that the random variable, $\varepsilon^U_{kijm,18_j}$, 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, $\boldsymbol{X}_{ij}$ and $\boldsymbol{M}_{mt_{18_j}}$ in (5) and year and state-of-residence fixed effects, as well as a vector of instrumental variables, $\boldsymbol{Z}_{imt_{18_j}}$ (which we define in the next section) to account for the endogeniety of $H_{imt_{18_j}}$ and $Y_{imt_{18_j}}$. That is, these first-stage regressions are:

$$H_{imt_{18_j}} = \boldsymbol{\pi}_1^H \boldsymbol{Z}_{imt_{18_j}} + \boldsymbol{\pi}_2^H \boldsymbol{X}_{ij} + \boldsymbol{\pi}_3^H \boldsymbol{M}_{mt_{18_j}} + \phi^H_{t_{18_j}} + \delta^H_s + \nu^H_{imt_{18_j}}, \tag{7}$$

$$Y_{imt_{18_j}} = \boldsymbol{\pi}_1^Y \boldsymbol{Z}_{imt_{18_j}} + \boldsymbol{\pi}_2^Y \boldsymbol{X}_{ij} + \boldsymbol{\pi}_3^Y \boldsymbol{M}_{mt_{18_j}} + \phi^Y_{t_{18_j}} + \delta^Y_s + \nu^Y_{imt_{18_j}}, \tag{8}$$

One then retrieves the residuals from the regressions in (7), which we denote as $\widehat{\nu}^H_{imt_{18_j}}$ and $\widehat{\nu}^Y_{imt_{18_j}}$, respectively. In the second stage, we estimate a multinomial logit model where we include $\widehat{\nu}^H_{imt_{18_j}}$ and $\widehat{\nu}^Y_{imt_{18_j}}$ as additional regressors, with separate coefficients, in the payoff functions in (5). To

account for the estimation error in $\widehat{\nu}^{H}_{ijmt_{18_j}}$ and $\widehat{\nu}^{Y}_{ijmt_{18_j}}$ 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, $CollTrans_{imt_{18_j}}$. Mimicking the specification of payoffs in (5), we estimate the following OLS regression:

$$CollTrans_{imt_{18_j}} = \lambda_0^T + \lambda_1^T H_{imt_{18_j}} + \lambda_2^T Y_{imt_{18_j}} + \boldsymbol{\lambda}_3^T \boldsymbol{X}_{ij} + \boldsymbol{\lambda}_4^T \boldsymbol{M}_{mt_{18_j}} + \phi^T_{t_{18_j}} + \delta^T_m + \varepsilon^T_{imt_{18_j}} \quad (9)$$

where all of the control variables are the same as described above but we use MSA level fixed effects for urban residents and state level fixed effects for rural residents instead of state-level fixed effects. To account for the potential endogeneity of $H_{imt_{18_j}}$ and $Y_{imt_{18_j}}$ in (9), we employ an instrumental variables estimator (2SLS), using the same vector of instruments, $\boldsymbol{Z}_{imt_{18_j}}$, used in the control function estimator of the parameters in the payoff functions in (5).

3.3 Instrumental Variables: Changes in Local Housing Prices & Wages

As noted above, we seek to instrument for parent's housing wealth, $H_{imt_{18_j}}$, and income, $Y_{imt_{18_j}}$, 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 subsequent educational outcomes described in Section 4. 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 parents 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 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, 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 housing price index constructed by the Federal Housing Finance Agency (FHFA) 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},

$$\frac{HPI_{mt_{18_j}} - HPI_{mt_{14_j}}}{HPI_{mt_{14_j}}}. \tag{10}$$

We note that by using percentage changes in housing price indices, HPI_{mt}, rather than simple changes, we minimize any problems of non-comparability of the Zillow and FHFA housing price indices.[18] We then "scale" this percentage change by the net home equity the parents report in year t_{16_t} to form our housing market instrument:

$$\Delta HPI_{mt_{18_j}} \equiv H_{imt_{16_j}} \left[\frac{HPI_{mt_{18_j}} - HPI_{mt_{14_j}}}{HPI_{mt_{14_j}}} \right]. \tag{11}$$

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 QCEW to obtain the average annual wages in each industry for each county, m, in each year, t. We then use data from the Current Population Survey (CPS) in each year t to estimate the shares of CPS respondents between age 40 and 55 in each industry nationally. We do so to roughly match the age of the parents in our sample. Using these shares, we create (share)-weighted average of industry-specific wages by county-of-residence of parents for the years around when their child was age 16, i.e., t_{16_j}. We denote these average wage measures by $\overline{W}^P_{mt}$. We then construct the percentage changes in these average wages, i.e.,

$$\frac{\overline{W}^P_{mt_{18_j}} - \overline{W}^P_{mt_{14_j}}}{\overline{W}^P_{mt_{14_j}}}, \tag{12}$$

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

$$\Delta W^P_{mt_{18_j}} \equiv Y_{imt_{16_j}} \left[\frac{\overline{W}^P_{mt_{18_j}} - \overline{W}^P_{mt_{14_j}}}{\overline{W}^P_{m,t_{14_j}}} \right]. \tag{13}$$

Thus, our vector of instruments is given by $\boldsymbol{Z}_{imt_{18_j}} \equiv (\Delta HPI_{mt_{18_j}}, \Delta W^P_{mt_{18_j}})$. The statistics for

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

tests of the joint significance of the instruments for both parental net equity and income are in Appendix Table A.1.) and indicate sufficiently strong instruments.

3.4 Empirical Results

Table 4 presents 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 amounts conditional on a transfer, (9), we show coefficients from the OLS and 2SLS regressions.

In Panel A of Table 4, we present results of the marginal effects of parents net (home) equity when their child was age 18 ($H_{imt_{18_j}}$) and parents' annual income at that age ($Y_{imt_{18_j}}$) for the unadjusted multinomial logit specification. A $10,000 increase in home equity decreases the likelihood that the child does not attend college by 0.38 percentage points, increases the likelihood that they attend college but with no parental transfer by 0.05 percentage points and increases the likelihood that they go to going college and their parents provide financial help by 0.33 percentage points, with the first and the last of these effects being statistically significant at least the 10% level. Similarly, a $10,000 increase in parents' annual income decreases the likelihood that the child does not attend college by 1.77 percentage points, increases the likelihood that they attend college but with no parental transfer by 0.74 percentage points and increases the likelihood of the child going college and receiving financial help from their parents by 1.03 percentage points, with all three of these effects being being statistically significant 1% level.

As can be seen in Panel B of Table 4, once we account for the potential endogeneity of parental home equity and income on these choices, only the effects of parental income remain statistically significant. In particular, a $10,000 increase in parents' annual income reduces the likelihood of the child not attending college by 1.98 percentage points while it increases the likelihood that the child goes to college and receives financial help from their parents by 2.44 percentage points, with both of these effects being precisely estimated. In contrast to our results in Panel A, we find that the effects of parents' home equity are not precisely estimated once one accounts for the endogeneity of this form of parental wealth.

In order to compare the effects of parents' net home equity and income on "comparable" terms, we use the estimates to calculate elasticities. For our preferred control function estimates, the elasticity of parental income with respect to not going to college is -0.343 and for going to college and receiving financial help is 0.729. As noted, the effects of parents' net housing equity are not statistically significant and their corresponding elasticities for their child not attending college and attending with parental financial support are an order of magnitude smaller than those for annual parental income (-0.035 and 0.064, respectively).[19] In short, after one adjusts for the endogeneity, our findings in Panel B indicate that parental income is more important for determining their children's college attendance decisions and parental financing of it than is parental housing wealth.

Finally, we consider the effect of parental home equity and parental income on the amount of parental transfers for their children's college education. Ordinary least squares (OLS) and 2SLS estimates of these effects are found in Panel C of Table 4. Ignoring the endogeneity of parental home equity and income, the OLS results indicate that a $10,000 increase in net home equity would increase the amount of parental financial support by an average of $268, while a comparable increase in parents' income would increase the average amount transferred by $630. In our preferred 2SLS specification, we find that a $10,000 increase in home equity increases parental transfers by only $115 and this effect is no longer statistically significant. However, we find that increases in parental income now have a much larger effect on the amount of parental transfers, with a $10,000 increase in parental income resulting in an average increase in parental transfers $1,470, with the latter effect being precisely estimated. Translating these effects of parental home equity and income on parental financial support for their children going to college to elasticities, we again find that the elasticity for net home equity is fairly small (0.083) while the elasticity with respect to parental income is sizable (1.466).

Taken together these results strongly suggest that parental income is important in determining both the likelihood of their children attending college and, importantly, their parents helping to finance it. In contrast, our preferred estimates indicate parents' home equity plays a lesser role in these decisions. Taken literally, these findings suggest that parents' finance their

[19] These elasticities are evaluated at the means of both the probabilities of $EduFin0$ and $EduFin2$ and $Y_{imt_{18_j}}$ and $H_{imt_{18_j}}$ found in Table 2.

children's education out of current income and not out of their home equity. But, such an interpretation is, in our view, too strong of a conclusion to draw from our results.

We are somewhat cautious in our conclusions because our findings contrast with previous work with the PSID emphasizing the importance of parental housing wealth in the child's decision to enroll in college Lovenheim (2011). One important difference between our work and prior work is simply the time period that we analyze. Lovenheim (2011) focused on the years between 2000 and 2005 when house prices were growing rapidly and home equity lines of credit were plentiful. In contrast, we include both an earlier period (1997 - 1999), and, more importantly, the later period (2006 - 2013) in which house prices fell or were largely stagnant and home equity lines of credit became increasingly difficult to obtain. There is some evidence to support this view in Lovenheim (2011) who notes that the period under consideration matters in his analysis and finds small and largely insignificant effects of housing wealth on college attendance in the period before 2000.

Larger increases in home equity, especially if parents believe them to reflect permanent changes in wealth, may induce changes in consumption patterns with respect to college attendance and financing. But, smaller changes in parents' wealth, or declines in it, may not produce the same effect on consumption decisions; the effect of an increase in wealth may not be symmetric with the effect of a decrease in parental wealth on the likelihood of attending college and providing a financial transfer to children. Furthermore, changes in local housing values, defined in equation (10), were positive and sizable in the run-up to the Great Recession (2001-2008), but were negative thereafter. As a result, following the Great Recession parents may not have viewed changes in home equity as a reflection of a permanent change to their resources. Insofar as parents viewed fluctuations in their home equity position as transitory, one might not expect changes in parents' net equity to translate into changes in parental college financing choices.

Changes in the ability to access home equity lines of credit also have played a role in explaining the relative importance of income in college attendance and financing decisions. Lovenheim (2011) finds that the impact of increases in housing wealth is largest for lower income families which he attributes to evidence of the existence of credit constraints in the college attendance and financing decision. When home equity lines of credit become more difficult to access, paren-

tal income may have become a more likely source for financing large consumption expenses like thier children's college educations. It is also possible that family income became more important in the ability to access credit in the aftermath of the Great Recession which would exacerbate the importance of income for being able to provide financial assistance for college. We return to this issue in the Conclusion of the paper.

4 Effects of Parental Wealth & Income on College Graduation and Costs & Quality of Colleges Attended

In the preceding section, we found that parental income, more so than parental home equity, increased the likelihood that children children attend college and that this effect is largely driven by the fact that parental income increases the likelihood and amount of financial help parents provide for sending their children to college.

4.1 Measuring College Attainment, Costs & Quality

As noted in Section 2.1, we use information on years of schooling completed that was reported in the 2013 PSID Roster and Transfers Module to form measures of whether each child j of parent i that attended college at age 18 graduated from college – which we denote by dummy variable $Grad_{ij,18_j}$ – and whether they enrolled in any post-baccalaureate education – denoted by the dummy variable $PostGrad_{ij,18_j}$. We measure college graduation by a parental report that the child's highest level of educational attainment is college graduate or more. We measure enrollment in post-baccalaureate education by whether the child was reported by their parents to have done post-graduate work.

We use data from main PSID interview and from the Transition to Adulthood study to link children to the college that they attended (see Section 2.2). We then obtain the annual tuition costs for a full-time student at that institution in the year they would have started college — which we denote by the variable $Tuition_{ij,18_j}$. In doing so we use the state of residence of the parent at that time to determine whether children would have paid in-state or out-of-state tuition at any public institutions. We also measure whether the institution was a 4-year college

or university – denoted by the variable $4YrColl_{ij,18_j}$ – and whether it was a private institution – denoted by the dummy variable $Private_{ij,18_j}$.

To measure the quality of colleges that the children attended, denoted by $Quality_{ij,18_j}$, we use the college quality index constructed and used in Black and Smith (2004), Black, Smith and Daniel (2005), Black and Smith (2006), Dillon and Smith (2017*a*), and Dillon and Smith (2017*b*).[20] The index 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 Dillon and Smith (2017*a*,*b*); it ranges in value from -10 to 10. As described above, we link this quality index to the data for children who attended college in our sample, using information on the college attended 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.

In Table 5, we display the mean values for these measures of the college attributes described above. One can see that all of the measures of college attainment and quality are greater for children attending college with parental financial support compared to those attending without it. This is especially true for the college quality index ($Quality_{ij,18_j}$), which increases from 0.06 for college attended by children who did not receive financial help from their parents to 0.53 for those that did.[21]

4.2 Modeling Children's College Attainment & Quality

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

[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.

[21]The college quality index takes on values from -9 to $+9$ and is constructed to have a mean of 0 across all of the 4-year colleges and universities in the U.S. in 1981.

financing decisions in Section 3.4 estimating regressions of the following form:

$$CollOut_{qij,18_j} = \lambda^O_{q0} + \lambda^O_{q1} H_{imt_{18_j}} + \lambda^O_{q2} Y_{imt_{18_j}} + \boldsymbol{\lambda}^O_{q3} \boldsymbol{X}_{ij_{18_j}} + \boldsymbol{\lambda}^O_{q4} \boldsymbol{M}_{mt_{18_j}} + \phi^O_{qt_{18_j}} + \delta^O_{qm} + \varepsilon^q_{ij,18_j}, \quad (14)$$

for $CollOut_q = Grad$, $PostGrad$, $Tuition$, $4YrColl$, $Private$ and $Quality$ and where $\phi^O_{qt_{18_j}}$ and δ^O_{qm} are year and the parents' county fixed effects, respectively. The vector, $\boldsymbol{X}_{ij_{18_j}}$, used in (14) is the same as the one used in equations (5) and (7) through (9) except that also includes a dummy variable for whether the child has become a head or wife in a PSID household by age 24. This extra variable controls for the source of data from which college information is obtained (PSID main interview versus Transition to Adulthood).[22]

Finally, to account for the potential endogeneity of $H_{imt_{18_j}}$ and $Y_{imt_{18_j}}$ in (14), we again employ a 2SLS estimator for (14), using the two instruments, $\Delta HPI_{mt_{18_j}}$ and $\Delta W^P_{mt_{18_j}}$, that were defined in Section 3.3 and used in the control function estimation of college choices and parental financing decisions and the amount of parental financial support provided to their child.

4.3 Empirical Results

In Table 6 we present the estimates of the effects of parental net housing equity ($H_{imt_{18_j}}$) and income ($Y_{imt_{18_j}}$) on whether child j graduates from the college she/he attended and whether she/he attained any post-baccalaureate education. We present OLS estimates in columns (1) and (3) and 2SLS estimates in columns (2) and (4) for these two outcomes. With respect to whether the child graduated from college, we find little evidence that parent's net equity at the time of the college decision affected the probability that their child actually graduated from college. This is true whether one ignores the potential endogeneity of housing equity and parental income or attempts to account for it using our instruments of changes in local market housing prices or labor market income.

[22] As noted in Section 2.2, if adult children have become a head or wife of a PSID household by age 24, their data can be drawn from the PSID main interview and is, in principle, available for all of the years, t_{24_j}, that we analyze. In contrast, if adult child j does not become a head of wife of a PSID household by 2013 – the year of the last wave of the PSID used in our analyses – we use data about the characteristics of the college child j attended from the PSID Transition to Adulthood sample. But this latter sample is only available for more recent (calendar) years. Thus, including this extra dummy variable in (14) allows us to account potential differences across these two different sources of data used to determine the dependent variables, $Tuition_{ij,18_j}$, $4YrColl_{ij,18_j}$, $Private_{ij,18_j}$ and $Quality_{ij,18_j}$.

But, once again, we find that parental income, measured when their child was age 18, does affect this outcome. In particular, a $10,000 increase in parental income increases the probability of their child graduating from college by 0.4 percentage points based on the OLS estimates and 1.50 percentage points when the effects of parental net equity and parental income are instrumented (2SLS). Given that probability of a student graduating from college, conditional on attending college, is 0.39, the implied elasticity of parental income on the graduation probability is 0.299. We note that the first stage estimates for both parental net equity and income for this outcome indicate that our instruments are fairly strong by conventional levels. The statistics for tests of the joint significance of the instruments for both parental net equity and income are large relative to conventional cutoffs of 10 that are typically used for detecting weak instruments (see Appendix Table A.1.)

With respect to post-baccalaureate educational attainment, we again find no evidence that the level of parents' net housing equity has any effect on this outcome, but do find that it is affected by parents' income when the child entered college. A $10,000 increase in parental income increases the probability of their child attending post-baccalaureate education by 0.3 percentage points based on the OLS estimates and 0.8 percentage points when the effects of parental net equity and parental income are instrumented (2SLS). Given that probability of a student attains some post-baccalaureate schooling, conditional on attending college at age 18, is 0.12, the implied elasticity of parental income on the graduation probability is 0.566. Again we find that the first stage estimates for both parental net equity and income are good for the quality of instruments in the 2SLS estimation, as the F-test statistics for the test of weak instruments are well above the conventional cutoff (see Appendix Table A.1.)

In Table 7, we present OLS and 2SLS estimates of the effects of parental net equity and income on the various attributes of the college the children attended, starting at age 18. Looking first at the effects of parental home equity on the various attributes and types of colleges attended, we find the effects to be very small. For example, a $10,000 increase in parental net equity would result in the child going to a college that is only slightly more expensive, ranging from $39 based on OLS estimates to $89 based on the 2SLS estimates. (Recall from Table 5 that the average annual tuition of college attended is $9,682.) Similarly, a $10,000 increase in parents'

home equity would increase the probability of attending a private college 0.1 percentage points (based on OLS) and would reduce it by 0.8 percentage points (based on 2SLS). Furthermore, none of the effects of parental home equity are precisely estimated.

With respect to the effects of parental income on the tuition, types and quality of the college attended, none of the other estimated effects of parental are precisely estimated, with the exception of the OLS estimated effects on full-time tuition and the quality of college children attended. Furthermore, increases in parental income seem to have relatively negligible effects whether their children go to a more expensive school, one that is private or one that is of higher quality.

The lack of precision in the estimates of the effects of parental home equity and precision may be due, in part, to the smaller sample sizes used to estimate the effects found in Table 7 compared the likelihood of graduation and attaining some post-BA education in Table 6. The samples used to estimate the effects presented in Table 7 are almost half of those used to estimate the effects in Table 6. These smaller sample sizes also may account for the less decisive rejections of weak instruments found in Appendix Table A.1, although we do note that the results for parental income are slightly above the conventional cutoff value.

In summary, it does appear that increases in parental income do result in statistically significant but increases the likelihood that children actually will graduate from college and attain additional education beyond baccalaureate degrees, whereas we find little evidence that greater parental wealth affects either either. Our finding for the likelihood of graduation is notable, since Cooper and Luengo-Prado (2015) did not detect any effects of parental housing wealth on college graduation, despite the fact that parental housing wealth appears to increase the labor earnings of their adult children. At the same time, our findings do not clearly indicate that greater parental income (or housing wealth) decidedly alters the indicators that typically characterize more elite and higher quality colleges, although the smaller sample sizes used to estimate these effects may have contributed to latter null findings.

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

Finally, we examine the consequences of decisions parents and children make to attend and finance college for levels of debt after the college years. In what follows we consider debt levels from the perspective of both the parent and the child and consider whether parental financial support for college appears to substitute for student debt.

5.1 Measuring Subsequent Indebtedness of Parents & their 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 when child j is age age a. We choose $a = 24$ as six-years after enrollment decisions and when financing for higher education is largely complete. We consider several forms of indebtedness for both parents and their children. For parents, we consider mortgage debt ($MortBal_{it_{24_j}}$), i.e., the sum of all their primary and secondary mortgages along with home equity loans, and all other non-housing debt ($OthDebt_{it_{24_j}}$), including outstanding credit card and medical debt, as well as other outstanding loans, both measured when the child is age 24 (t_{24_j}). For children, we examine debt in the form of outstanding student loans ($StudentDebt_{jt_{24_j}}$), as well as other non-housing debt ($OthDebt_{jt_{24_j}}$) measured in t_{24_j}.

In Table 8, we display the mean values of mortgage and other non-housing debt for parents and student loan and other non-housing debt for children at age 24. Parents, on average, have \$71,600 in mortgage debt and \$13,900 in other debt when their child is age 24. Parents whose child did not attend college had much lower levels of debt: \$46,700 in mortgage debt and only \$8,800 in other debt. Parents of children who did attend college but did not provide financial help held higher debt balances: \$61,000 in mortgage debt and \$14,000 in other debt. Finally, parents who did help finance their child's college educations had much higher amounts of both types of debt: \$102,200 in outstanding mortgage debt and \$18,200 in other debt.

At age 24, children, on average, hold \$12,700 in student debt and the same amount in other forms of debt. Those children who did not attend college, not surprisingly, held almost no

student loan debt, $2,100 (presumably because of other education-related expenses) and $8,400 in other debt. Children who attended college but received no help from their parents hold only somewhat more debt than the average child, but a good deal more than their counterparts who did not attend college: $15,300 in other debt and $17,000 in outstanding student loans. Finally, among those children who went to college and got financial help from their parents, their debt levels were slightly, but only slightly, lower than those who went to college without parental help: $13,700 in other debt and $17,000 in student debt, the same as those who had no help from parents.

These descriptive findings suggest that parents may shelter their college-going children from some, although not that much, post-college debt. At the same time, parents who helped finance their children's college education did end up with more debt. In the next section, we outline an estimation strategy to assess whether these latter descriptive results indeed are causal.

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

We examine the effect of whether a child went to college and whether parents helped finance college on the subsequent indebtedness of parents and their children. These specifications differ from those in Sections 3 and 4 because instead of examining the effect of parental income and housing wealth on debt levels, we examine the direct effect of college attendance and parental financing decisions. As we describe below, this requires some additional controls and a new set of instrumental variables to identify causal relationships.

More precisely, let $Attend_{ij}$ be an indicator variable equal to 1 if child j of parent i attends college and zero otherwise,[23] and define $AttendFin_{ij}$ to be the indicator variable equal to 1 if child j attends college and parent i provids funds to finance it and zero otherwise,[24] We are interested in the effects of these variables on parents' and children's debt when the child reaches age 24 in year t_{24_j}, net of other factors. More precisely, for parents we seek to estimate the

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

following specification for two sources of debt:

$$\begin{aligned} Debt_{hit_{24_j}} &= \beta^P_{nh0} + \beta^P_{h1} Attend_{ij} + \beta^P_{h2} AttendFin_{ij} + \beta^P_{h3} Y_{imt_{24_j}} \\ &\quad + \boldsymbol{\beta}^P_{h4} \boldsymbol{X}_{it_{24_j}} + \phi^P_{ht_{24_j}} + \delta^P_{hm} + u^P_{hit_{24_j}}. \end{aligned} \tag{15}$$

for $Debt_h = MortBal, OthDebt$, $Y_{imt_{24_j}}$ is the parents' income in year t_{24_j}, $\boldsymbol{X}_{it_{24_j}}$ is a vector of parent i's characteristics in that year, $\boldsymbol{M}_{mt_{24_j}}$ are the corresponding characteristics for parents' location m at t_{24_j} and $\phi^P_{t_{24_j}}$ and δ^P_s are year and the parents' county fixed effects, respectively. Included in $\boldsymbol{X}_{it_{24_j}}$ are the same characteristics described in Section 3.2 where all time-varying covariates are measured in year t_{24_j} instead of year t_{18_j}. In addition, we include non-housing wealth of the parent at age 24, the value of the home measured at age 18, and parental income at age 24.

Similarly, for the children at age 24, for parents we seek to estimate the following specification for their two sources of debt:

$$\begin{aligned} Debt_{hjt_{24_j}} &= \beta^C_{nh0} + \beta^C_{h1} Attend_{ij} + \beta^C_{h2} AttendFin_{ij} + \beta^C_{h3} Y_{jmt_{24_j}} \\ &\quad + \boldsymbol{\beta}^C_{h4} \boldsymbol{X}_{jt_{24_j}} + \phi^C_{ht_{24_j}} + \delta^C_{hm} + u^P_{hjt_{24_j}}. \end{aligned} \tag{16}$$

for $Debt_h = OthDebt, StudentDebt$, $Y_{jmt_{24_j}}$ is child j's income in in year t_{24_j}, $\boldsymbol{X}_{nt_{24_j}}$ is a vector of child j's characteristics at child age 24, and $\phi^C_{t_{24_j}}$ and δ^C_s are year and the child's state-of-residence fixed effects, respectively. Included in $\boldsymbol{X}_{nt_{24_j}}$ are all of the characteristics of the parent described in Section 3.2 where all time-varying covariates are measured in year t_{24_j} along with an indicator variable for coresidence with a parent, an indicator variable if the child is married in year t_{24_j}, an indicator variable for whether the child is a head of household in year t_{24_j}, and family income of the child at age 24.

While we estimate a version of the specifications in (15) and (16) using ordinary least squares (OLS), our previous analysis of parent-child choices about college attendance and parental

financing clearly suggests that both $Attend_{ij}$ and $AttendFin_{ij}$ are likely to be endogenous in these specifications. Furthermore, we allow that $Y_{imt_{24_j}}$ in (15) and $Y_{jmt_{24_j}}$ in (16) may be endogeous vis-a-vis the indebtedness measures in year t_{24_j} of parents and their children, respectively.

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 3.3 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 parameters in (15) and (16).

We include an additional instrument to which is a measure of the distance child j was from the nearest a four-year public college in their county m when child j of parent i was age 18. Using PSID geocode data on the location of their parents' residence at that age and geocoded data from IPEDS on the location of all public universities, we constructed the variable, $Dist4YrPub_{ijm}$, as the distance, in miles, to the nearest four-year public university. A comparable measure was used in Card (1995) and others as an instrument for schooling in the estimation of the returns to schooling.

Thus, the vector of instruments used for the parents' debt specifications is given by

$$\boldsymbol{Z}^P_{imt_{24_j}} \equiv (\Delta HPI_{mt_{18_j}}, \Delta W^P_{mt_{18_j}}, \Delta W^P_{mt_{24_j}}, Dist4YrPub_{ijm}),$$

where $\Delta W^P_{mt_{24_j}}$ is constructed in the same manner as $\Delta W^P_{mt_{18_j}}$ in (13) but where the reference year is t_{24_j} rather than t_{24_j} and the national industry weights are over the age groups 45 - 59, and for the child's debt is given by

$$\boldsymbol{Z}^C_{imt_{24_j}} \equiv (\Delta HPI_{mt_{18_j}}, \Delta W^P_{mt_{18_j}}, \Delta W^C_{mt_{24_j}}, Dist4YrPub_{ijm})$$

where $\Delta W^C_{mt_{24_j}}$ is defined as:

$$\Delta W^C_{mt_{24_j}} \equiv Y_{jmt_{22_j}} \left[\frac{\overline{W}^C_{jmt_{24_j}} - \overline{W}^C_{jmt_{20_j}}}{\overline{W}^C_{jm,t_{20_j}}} \right], \tag{17}$$

and $\overline{W}^{C}_{jmt_a}$ is the (share)-weighted average of industry-specific wages where the shares (constructed using CPS data) represent the distribution of individuals between 25 and 29 who are employed in those industries nationally.

5.3 Empirical Results

Table 9 shows the results of estimating equations (15) for parental debt. We show estimates from OLS specifications in which college attendance and financing is taken as exogenous and from 2SLS 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 2SLS specifications. With respect to parents mortgage debt, both the OLS and the 2SLS results indicate that providing children with a financial transfer for college increases parents' outstanding mortgage debt 6 years after their child entered college, i.e., when their child is age 24. The OLS estimates indicate that parents who helped finance their child's college attendance would have \$16,650 more mortgage debt, while the corresponding 2SLS is almost an order of magnitude higher at \$112,230. However, the latter estimate is very imprecisely estimated.

Table 9 also includes estimates of the effect of a child's college attendance and parental help with financing it on the amounts of "other" debt parents hold, including credit card and medical debt. In both the OLS and the 2SLS 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. However, with the exception of the OLS estimate of the effect of their child attending college without parental financial help, the corresponding 2SLS and both the OLS and 2SLS estimates of the effect of parents providing financial help with college are imprecisely estimated so that one cannot reject the hypothesis that this source of debt does not differ between parents who provide financial transfers to their children to attend college those who do not.

In Table 10 we present estimates of the effects of college attendance and parental financial support on the debt levels held by the debt children at age 24. With respect to the OLS estimates

which do not account for the potential endogeneity of college attendance and parental financing, we find that children who attend college without parental help have $10,510 more "other" debt and $14,630 more in student debt that children who do not attend college, while having a parent help 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.[25] 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. At a minimum, the OLS results suggest that parental financing of college is not a panacea for the problem of student debt. And, the 2SLS results provide weak evidence that student debt and parental financing are complements rather than substitutes.

Finally, the statistics for tests of the joint significance of the instruments for both whether the child attends college (*Attend*) and they attend and parents help finance it (*AttendFin*) for the parents' and children's debt in t_{24_j} are found in Appendix Table A.2. (The table also includes the corresponding test statistics for the instrumenting for parents' or the child's income in that year.) Almost all of these statistics are around or below the traditional cutoff (10) for weak instruments and are less decisive with respect to the strength of the instruments in the 2SLS estimates for indebtedness relative to those for the 2SLS results of the effects of parental income and net equity on college attendance and parental financing decisions and those for graduation rates presented in Section 3.4.

6 Conclusion

This paper examines the influence of parental housing wealth and income on their children's college attendance and parents' financial support for it, college graduation rates and quality of college attended and whether parental financing affects the subsequent indebtedness of parents and 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.

[25]The coefficients on *Attend* and *AttendFin* also are not statistically different from one another.

We instrument for the potential endogeneity of parental housing wealth and income on these decisions with changes in parents' local housing and labor market conditions. We find that increases in parents' income increases the likelihood of their children attending college, largely because it increases parents' provision of financial support, while parental wealth does not appear to affect either. Parental income also increases the children's graduation rates, but little evidence that housing wealth does. We also find that neither parental income or wealth affects indicators of the quality of colleges children attend. Finally, we find little evidence that parental financing affects the indebtedness of parents or children later in life.

Our key finding concerning the importance of parental income relative to parental housing wealth for parents' financing of their children's college education and in the likelihood that their children graduate leads us to speculate on factors that may have generated this result. As we noted briefly at the end of Section 3.4, following the Great Recession parents may have perceived that their current income levels were more permanent than transitory compared to their levels of housing wealth. Asa result, such perceptions may have engendered a greater willingness to fund their children's college educations.

Such perceptions by parents also may have been shared by lenders making home equity and similar types of loans. Mian and Sufi (2010, 2011) have argued that the increasing share of households with high levels of mortgage indebtedness relative to income played a key role in both the onset and duration of the Great Recession in the U.S. In response, lenders tightened their lending requirements, requiring borrowers to have higher credit scores and lower loan-to-income and/or debt-to-income ratios (Dvorkin and Shell, 2016). Thus, both perceptions and lending requirements over the period we analyze may have played an important role in why parental income relative to housing wealth had a greater effect on parents' willing to help finance their children's education. While our current data sources do not lend themselves to addressing these possible explanations of our finding about the differential role of parental income versus wealth, pursuing them, with other data sources, would be a useful focus for future research.

As noted, we did not find clear evidence that parental financing of their children's college affect either their or, more importantly, their children's subsequent levels of indebtedness. Taken literally, this finding suggests that parental help with college does little to reduce their children's

student loan debt and, as a result, the growing burdens of such debt for young Americans noted in the Introduction. But our estimates are average effects for the population as a whole and may mask differences across groups in society in the relationships between parental financing and student debt as well as the links between parental resources and their ability to help finance such debt.

For example, there are important differences in the incidence of student loan debt by race and ethnicity, with minorities having more than triple the student loan debt held by non-Hispanic whites (Scott-Clayton and Li, 2016). And, Braga (2016) finds that while blacks are more likely than either Hispanic or non-Hispanic whites to borrow to finance their own college educations, black parents and grandparents are just as likely as whites to borrow to help finance that of their chldren and grandchildren. Braga speculates that this racial difference in loan-taking by children versus parents may be the result of racial differences in levels of parental wealth and income that can be used as collateral for loans parents may take to finance their children's education, such as home equity loans.[26] Following the approach taken in this paper to analyze the role of parental resources on the financing of their children's education and the subsequent indebtedness of both parents and their children may help to explain the racial differences in college-related loan-taking found by Braga (2016) and help to unpack the average effects of parental financing on indebtedness presented in this paper.

[26]Braga also suggests that because blacks tend to start their college educations at older ages, they may be more financially independent of their parents than are whites who start college earlier.

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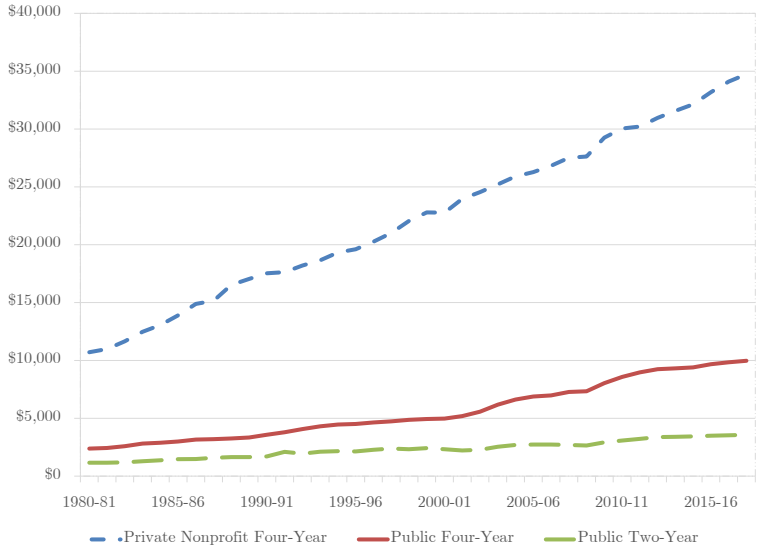
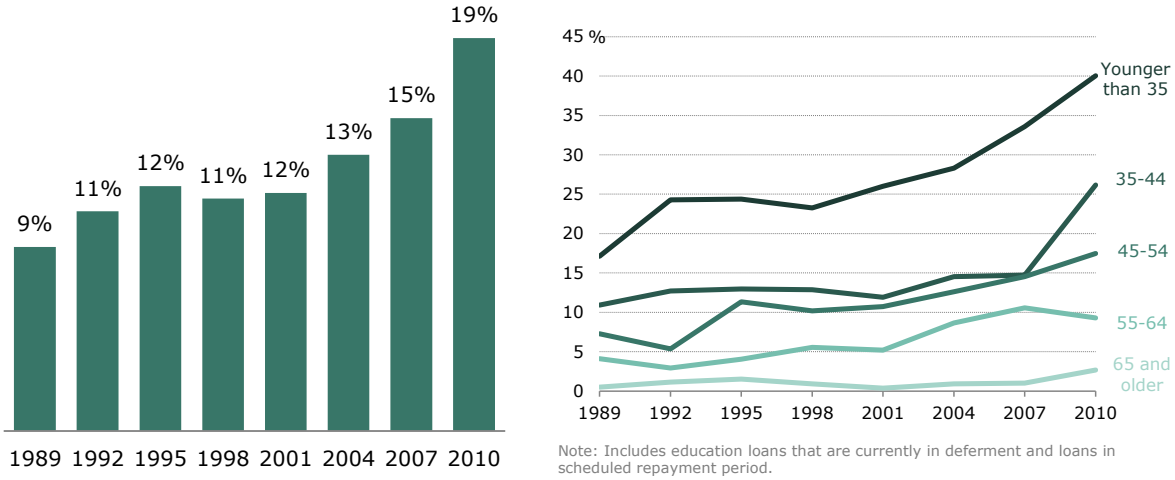
FIGURE 1. Trends in Costs of College in the U.S. (2017$)



Source: 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.

TABLE 1. Sample Sizes

Samples	N
Parent-Child Pairs for Analyses of:	
Child's College Choices ($EduFin0$, $EduFin1$, $EduFin2$) & Amount of Transfer	2,868
Whether Child Graduated from College & Post-BA Attainment	1,324
College Tuition Costs, Conditional on Attending	799
Whether Child attended 4-year College, Conditional on on Attending	797
Whether attended Private College, Conditional on attending 4-Yr College	654
College Quality Index, Conditional on attending 4-Yr College	653
Parent-Child Pairs when Child at age 24 for Analyses of:[1]	
Parents' Mortgage Debt	2,425
Parents' 'Other' Debt	2,416
Children's 'Other' Debt	1,714
Children's Student Loan Debt	1,233

[1] 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[1]

Variable	Mean
College Enrollment and Parent Financing Choices:	
Child does not enroll ($EduFin0$)	0.45
Child enrolls, no transfer ($EduFin1$)	0.29
Child enrolls, transfer ($EduFin2$)	0.26
Amount of Transfer ($CollTrans$)	\$0.78
Parent Characteristics when Child was Age 18:	
Parents' Net Home Equity ($H_{imt_{18_j}}$)	\$5.66
Value of Parents' Home ($MktValue_{imt_{18_j}}$)	\$10.92
Parents' Income ($Y_{imt_{18_j}}$)	\$7.78
Parent married/cohabiting	0.69
Parent HH Headed by Male	0.81
Number of children under 16 in parent HH	0.87
Age of parent House Head	45.54
Other Parent Characteristics:	
Parents Non-White	0.30
Parent's Education:	
High school or less	0.21
Some College	0.51
College graduate	0.28
Child Characteristics:	
Sex of child (male=1)	0.48
Year child turned 18[2]	2004.46

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

[2] The range of years in which children turned age 18 is 1998–2015.

TABLE 3. Parents' Net Equity, Parental Income by College Attendance and Parental Financing when Child was Age 18[1]

	$EduFin0$ (No Coll)	$EduFin1$ (Coll, but No Transfer)	$EduFin2$ (Coll & Transfer)
Parents' Net Equity ($H_{imt_{18_j}}$)	\$2.81	\$5.03	\$11.37
Parents' Income ($Y_{imt_{18_j}}$)	\$5.31	\$7.41	\$12.81

[1] 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 & Financing Choices and Amount of Financing[1]

	College and Financing Choices:			*Amount of Transfer:*	
	$EduFin0$	$EduFin1$ (Coll, but	$EduFin2$ (Coll &		
	(No Coll)	No Transfer)	Transfer)	OLS	2SLS[2]
Variable	(1)	(2)	(3)	(4)	(5)
Panel A. Schooling and Financing Choice, Multinomial Logit					
$H_{imt_{18_j}}$	-0.0038*	0.0005	0.0033***		
	(0.0020)	(0.0014)	(0.0012)		
$Y_{imt_{18_j}}$	-0.0177***	0.0074***	0.0103***		
	(0.0027)	(0.0026)	(0.0021)		
N		2,645			
Panel B. Schooling and Financing Choice, Control Function					
$H_{imt_{18_j}}$	-0.0028	-0.0001	0.0029		
	(0.0050)	(0.0049)	(0.0034)		
$Y_{imt_{18_j}}$	-0.0198***	-0.0045	0.0244***		
	(0.0075)	(0.0077)	(0.0052)		
N		2,645			
Panel C. Transfer Amounts, OLS and 2SLS					
$H_{imt_{18_j}}$				0.0268***	0.0115
				(0.0102)	(0.0243)
$Y_{imt_{18_j}}$				0.0630***	0.1470***
				(0.0114)	(0.0370)
N				2,550	2,550

[1] Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
The explanatory variables included in these regressions are as follows: characteristics of parents when child was 18 (age, marital status, family structure, education, sex, race), sex of child, average weighted wage rates for young people, employment rate when the child was 18, the high school and college wage premium, year fixed effects, and state fixed effects.
[2] The variables $H_{imt_{18_j}}$ and $Y_{imt_{18_j}}$ were treated as endogenous in the control function and 2SLS specifications and were instrumented with $\Delta HPI_{mt_{18_j}}$ and $\Delta W^P_{mt_{18_j}}$. See Section 3.3 for a description of these instruments.

TABLE 5. College Graduation, Post-BA Attainment, Annual Tuition, Types of College and College Quality[1]

Variable	Full Sample	Attended College	$EduFin1$ (Coll, but No Transfer)	$EduFin2$ (Coll & Transfer)
Graduated from College ($Grad$)	0.26	0.39	0.36	0.42
Post-Graduate Attainment ($PostGrad$)	0.08	0.12	0.11	0.13
Annual Tuition $(Tuition)^2$		\$9,842	\$7,729	\$11,290
Attended 4-Year College $(4YrColl)^2$		0.82	0.75	0.87
Attended Private College $(Private)^3$		0.34	0.30	0.37
College Quality Index $(Quality)^3$		0.36	0.06	0.53

[1] Tuition amounts are in 2013\$. Weighted by PSID family weights.
[2] Conditional on those students who attended college at age 18.
[3] Conditional on those who attended a 4-year college at age 18.

TABLE 6. Effects of Parents' Home Equity and Family Income on Probability of Graduating from Coll & of Post-BA Attainment[1]

Variable	OLS (1)	2SLS[2] (2)	OLS (3)	2SLS[2] (4)
	Graduate from College:		*Post-BA Attainment:*	
$H_{imt_{18_j}}$	-0.0003	0.006	-0.0002	0.0008
	(0.002)	(0.006)	(0.001)	(0.003)
$Y_{imt_{18_j}}$	0.004***	0.015**	0.003***	0.008*
	(0.001)	(0.006)	(0.001)	(0.004)
R^2	0.295	0.246	0.252	0.232
N	1,324	1,324	1,324	1,324

[1] Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The explanatory variables included in these regressions are as follows: characteristics of parents when child was 18 (age, marital status, family structure, education, sex, race), sex of child, average weighted wage rates for young people, employment rate when the child was 18, whether the child is a head or wife at age 24, the high school and college wage premium, year fixed effects, and county fixed effects.

[2] The variables $H_{imt_{18_j}}$ and $Y_{imt_{18_j}}$ were treated as endogenous in the 2SLS specifications and were instrumented with $\Delta HPI_{mt_{18_j}}$ and $\Delta W^P_{mt_{18_j}}$. See Section 3.3 for a description of these instruments.

TABLE 7. Effects of Parents' Home Equity and Family Income on Child's Annual Tuition Costs, Attending 4-Year College, Attending Private College and Quality of College Attended, Conditional on Child Attending College at Age 18[1]

Variable	OLS (1)	2SLS[2] (2)	OLS (3)	2SLS[2] (4)
Panel A.	*Annual Tuition Costs*		*Attended 4-Year College*	
$H_{imt_{18_j}}$	39.264	88.574	0.002	-0.002
	(49.480)	(164.307)	(0.002)	(0.006)
$Y_{imt_{18_j}}$	56.472*	73.453	-0.0001	0.003
	(31.026)	(117.800)	(0.001)	(0.006)
R^2	0.401	0.398	0.288	0.279
N	792	792	797	797
Panel B.	*Attended Private College*[3]		*College Quality Index*[3]	
$H_{imt_{18_j}}$	0.001	-0.008	0.008	-0.015
	(0.003)	(0.011)	(0.008)	(0.026)
$Y_{imt_{18_j}}$	0.002	0.006	0.019***	0.011
	(0.002)	(0.007)	(0.006)	(0.023)
R^2	0.306	0.285	0.355	0.336
N	654	654	643	643

[1] Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Tuition amounts are in 2013$.
The explanatory variables included in these regressions are as follows: characteristics of parents when child was 18 (age, marital status, family structure, education, sex, race), sex of child, average weighted wage rates for young people, employment rate when the child was 18, whether the child is a head or wife at age 24, the high school and college wage premium, year fixed effects, and county fixed effects.
[2] The variables $H_{imt_{18_j}}$ and $Y_{imt_{18_j}}$ were treated as endogenous in the 2SLS specifications and were instrumented with $\Delta HPI_{mt_{18_j}}$ and $\Delta W^P_{mt_{18_j}}$. See Section 3.3 for a description of these instruments.
[3] Conditional on attending a 4-year college.

TABLE 8. Parents' & Child's Debt when Child Age 24, by College Attendance and Financing Decisions[1]

Variable	Full Sample	$EduFin0$ (No Coll)	$EduFin1$ (Coll, No Transfer)	$EduFin2$ (Coll & Transfer)
Parents' Debt:				
Mortgage Debt ($MortBal$)	\$7.16	\$4.67	\$6.10	\$10.22
Other Debt ($OthDebt$)	\$1.39	\$0.88	\$1.40	\$1.82
Child's Debt:				
Other Debt ($OthDebt$)	\$1.27	\$0.84	\$1.53	\$1.37
Student Debt ($StudentDebt$)	\$1.27	\$0.21	\$1.70	\$1.70

[1] All debt amounts are in 10K of 2013\$. Statistics weighted using PSID family weights.

TABLE 9. Effects of Child's College Attendance and Parental Financing on Parents' Indebtedness when Child is Age 24[1]

	Mortgage Debt		*Other Debt*	
	OLS	2SLS[2]	OLS	2SLS[2]
Variable	(1)	(2)	(3)	(4)
Attends College (*Attend*)	-0.638	-5.135	0.336**	3.146
	(0.428)	(4.024)	(0.166)	(2.570)
Attends with Financing (*AttendFin*)	1.665***	11.223	0.227	1.051
	(0.591)	(7.525)	(0.187)	(2.439)

[1] Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
The explanatory variables included in these regressions are as follows: characteristics of parents when child was 24 (age, marital status, family structure, education, sex, race), sex of child, non-equity wealth of the parent when the child is 24, value of home at 18, year fixed effects, and county fixed effects.
[2] The variables *Attend*, *AttendFin* and Parental Income in year t_{24_j} ($Y_{imt_{24,j}}$) were treated as endogenous in the 2SLS specifications and were instrumented with $\Delta HPI_{mt_{18_j}}$, $\Delta W^P_{mt_{18_j}}$, $\Delta W^P_{mt_{24_j}}$ and $Dist4YrPub_{ijm}$. See Sections 3.3 and 5.2 for descriptions of these instruments.

TABLE 10. Effects of Child's College Attendance and Parental Financing on Child's Indebtedness when Child is Age 24[1]

	Other Debt		*Student Loan Debt*	
	OLS	2SLS[2]	OLS	2SLS[2]
Variable	(1)	(2)	(3)	(4)
Attends College (*Attend*)	1.051***	-6.639	1.463***	-2.076
	(0.243)	(4.373)	(0.214)	(2.179)
Attends with Financing (*AttendFin*)	-0.262	4.010	-0.124	4.961
	(0.234)	(4.545)	(0.328)	(3.318)

[1] Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
The explanatory variables included in these regressions are as follows: characteristics of parents when child was 14 (age, marital status, family structure, education, sex, race), sex of child, whether the child is a head or wife at age 24, whether the child is married by 24, year fixed effects, and county fixed effects.

[2] The variables *Attend*, *AttendFin* and Child's Income in year t_{24_j} ($Y_{jmt_{24,j}}$) were treated as endogenous in the 2SLS specifications and were instrumented with $\Delta HPI_{mt_{18_j}}$, $\Delta W^P_{mt_{18_j}}$, $\Delta W^C_{mt_{24_j}}$ and $Dist4YrPub_{ijm}$. See Sections 3.3 and 5.2 for descriptions of these instruments.

Appendix A F-Tests for Weak Instruments in First-Stage Regressions for Control Function and IV Estimators

Below we provide statistics for F-tests of the joint significance of the instrumental variables in the first-stage regressions for the control function and 2SLS estimators used in the various analyses presented in the paper. In the Table below, we indicate the tables to which the test statistics of the first-stage regressions correspond and the instrumental variables used in these regressions. We note that F-test statistics with values less than 10 for first-stage regressions are considered evidence of weak instruments (Stock and Staiger, 1997).

TABLE A.1. F-Tests of Joint Significance of Instruments in First Stage Regressions[1]

Dependent Variable:	$Y_{imt_{18,j}}$	$H_{imt_{18,j}}$	$Y_{imt_{18,j}}$	$H_{imt_{18,j}}$
First Stage Regressions for Results in Table 4:				
	Coll. Choice & Financing		*Amt. Transferred*	
F-test	54.84	12.88	39.94	14.59
R^2	0.303	0.339	0.350	0.445
First Stage Regressions for Results in Table 6:				
	Graduate from College[2]		*Post-BA Attainment*[2]	
F-test	25.07	16.31	25.07	16.31
R^2	0.318	0.540	0.318	0.540
First Stage Regressions for Results in Table 7:				
	Annual Tuition Costs[2]		*Attended 4-Year College*[2]	
F-test	14.39	6.117	14.12	6.200
R^2	0.359	0.612	0.358	0.613
	Attended Private College[3]		*College Quality Index*[3]	
F-test	11.89	5.651	12.97	5.642
R^2	0.367	0.612	0.367	0.612

[1] The instruments used in all of these regressions and for which the F-tests apply are: $\Delta HPI_{mt_{18_j}}$ and $\Delta W^P_{mt_{18_j}}$.

[2] These regressions are for children who attended college at age 18.

[3] These regressions are for children who attended a 4-year college at age 18.

TABLE A.2. F-Tests of Joint Significance of Instruments in First Stage Regressions

Dependent Variable:	*Attend*	*AttendFin*	$Y_{nmt_{24}}$[1]
First Stage Regressions for Results in Table 9:[2]			
Parents' Mortgage Debt at t_{24_j}			
F-test	9.847	8.764	15.43
R^2	0.274	0.352	0.482
Parents' Other Debt at t_{24_j}			
F-test	9.260	9.362	15.40
R^2	0.274	0.353	0.482
First Stage Regressions for Results in Table 10:[3]			
Child's Other Debt at t_{24_j}			
F-test	5.801	14.32	9.424
R^2	0.309	0.407	0.447
Child's Student Loan Debt at t_{24_j}			
F-test	9.085	8.050	4.835
R^2	0.341	0.437	0.506

[1] The n subscript for $Y_{nmt_{24}} = i$ for parents and $= j$ for child.
[2] The instruments used in the parents' debt regressions and for which the F-tests apply are: $\Delta HPI_{mt_{18_j}}$, $\Delta W^P_{mt_{18_j}}$, $\Delta W^P_{mt_{24_j}}$ and $Dist4YrPub_{ijm}$.
[3] The instruments used in the child's debt regressions and for which the F-tests apply are: $\Delta HPI_{mt_{18_j}}$, $\Delta W^P_{mt_{18_j}}$, $\Delta W^C_{mt_{24_j}}$ and $Dist4YrPub_{ijm}$.