Working Papers

FEDERAL RESERVE BANK OF BOSTON

No. 11-6

House Price Growth When Kids are Teenagers: A Path to Higher Intergenerational Achievement?

Daniel Cooper and María José Luengo-Prado

Abstract:
This paper examines whether rising house prices immediately prior to children entering their college years impacts their intergenerational earnings mobility and/or educational outcomes. Higher house prices provide homeowners, especially liquidity constrained ones, with additional funding to invest in their children's human capital. The results show that a 1 percentage point increase in house prices, when children are 17-years-old, results in roughly 0.8 percent *higher* annual income for the children of homeowners, and 1.2 percent *lower* annual income for the children of renters. Additional analysis shows that the children who benefit the most from rising house prices are those whose parents are liquidity constrained homeowners. Rising house prices also make homeowners' children more likely to graduate from college and have less noncollateralized debt when young adults. Both of these results are consistent with rising house prices enabling parents to invest more in their children.

JEL Classifications: E21, I22, I24

Keywords: intergenerational mobility, house prices, educational attainment

Daniel Cooper is an economist in the research department at the Federal Reserve Bank of Boston. His email address is daniel.cooper@bos.frb.org. María José Luengo-Prado is an associate professor of economics at Northeastern University. Her e-mail address is m.luengo@neu.edu.

The authors thank Chris Foote and Olga Gorbachev for very helpful comments and Kevin Todd for helpful research assistance.

This paper, which may be revised, is available on the web site of the Federal Reserve Bank of Boston at http://www.bostonfed.org /economic/wp/index.htm.

This version: June 23, 2011

1 Introduction

The United States has long been a country that promotes homeownership through the mortgage interest deduction, Federal Housing Administration loans, and the non-taxability of imputed rental income. Encouraging homeownership is often viewed as a public policy mechanism for improving economic stability, generating increased community investment, and propelling households to attain more stable living standards. For example, homeowners can use the accumulated equity in their homes as collateral for loans (or lines of credit) to finance home improvements or other needed expenditures. Buiter (2008), Cooper (2009), Hryshko, Luengo-Prado, and Sorensen (2010) and Lovenheim (Forthcoming), among others, consider the role of housing wealth as borrowing collateral. Indeed, how fluctuating house values impact consumer behavior has become an important topic for economists, especially given the recent housing boom and bust.

This paper investigates whether house price changes just before children graduate from high school impact their future earnings ability. The idea is that house price appreciation raises owners' housing equity and in turn their ability to borrow against their homes to finance desired expenditures. House price gains immediately before children enter college (teenage year house price growth) potentially increase homeowners' ability to invest in their children's human capital.[1]

Children who start college following a run-up in house prices therefore may have greater educational opportunities than the children of renters or children of homeowners who start college following a period of flat or falling housing prices. With additional parental financing, college students potentially need to work less to help pay for their studies and/or are able to attend a better quality institution—an outcome that is considered by Lovenheim and Reynolds (2010). Better educational opportunities for children often translate into higher lifetime earnings. Rising house prices are likely to be particularly beneficial for the children of homeowners who are otherwise financially constrained.

We analyze whether house price fluctuations when kids are 17-years-old impact their adult earnings by using data from the Panel Study of Income Dynamics (PSID), a dataset that allows

[1] According to the Department of Education, home equity was included in federal need analysis until the Higher Education Amendments of 1992 eliminated home equity from the federal aid calculations beginning in the 1993-94 academic year. Schools are still allowed to incorporate home equity in calculating students' eligibility for non-federal financial aid programs. A number of leading institutions, however, eliminated home equity from their private financial aid calculations in the early 2000s. Our results are robust to controlling for the change in the federal financial aid calculations.

us to track parents and their offspring over time. The PSID includes earnings, education, location, and a wealth of other demographic and financial data for both parents and their children. We also have access to restricted geographic identifiers for the PSID that enable us to use house price growth for the Metropolitan Statistical Area (MSA) in which households lived when their kids were age 17. We can therefore investigate the exogenous impact of house price gains during the teenage years on offsprings' future earnings by holding the intergenerational earnings transmission channel and other factors fixed.

Our results show that house price appreciation during children's teenage years has an effect on their future earnings conditional on parental income and other demographic factors. House price growth is beneficial for the children of homeowners but not for the children of renters living in similar locations. In particular, when children are 17-years-old a 1 percentage point increase in house prices results in roughly 0.8 percent *higher* average annual income for owners' children (later in life) and 1.2 percent *lower* income for renters' children. Further analysis suggests that house price growth boosted the earnings of children whose parents were homeowners but had limited non-housing financial resources with which to finance education beyond high school. If homeowning parents with below median non-housing wealth experience house price growth of 1 percentage point, their children's annual income is raised by about 1.6 percent. This finding is consistent with house price growth during children's teenage years helping liquidity constrained parents to invest in their children's human capital, which in turn opens up greater earning opportunities when they are adults.

The impact of house price growth on the future adult earnings of children whose parents are homeowners persists even after controlling for the standard channels such as education, marital status, and occupation that are believed to influence lifetime earnings. Our results are generally robust to additional controls and alternative measures of income and house price growth. We also find that the children of liquidity constrained homeowners are more likely to get an undergraduate or higher degree when house prices increase around the time of college matriculation. These children also tend to have lower non-collateralized (student loans, credit card, and other) debt as adults than similar children whose parents did not experience house price growth when their children were 17-years-old. All of these results are consistent with homeowning parents being able to invest more in their children's human capital when house prices rise.

We contribute to the literature by examining an additional avenue by which changing house prices can impact household decision-making as well as differences that go beyond the standard channels in explaining income differences between parents and their children. To our knowledge no one has looked at the impact house price growth during children's teen years has on their future adult earnings. Our analysis is aided by use of the PSID which allows our analysis to exploit variation in house prices by location and over time, as well as exploit differences in parents' housing tenure choice and financial resources.

There has been much research on intergenerational (earnings) mobility as well as separate studies that consider the impact that various factors have on educational outcomes. A paper closely related to this one is Boehn and Schlottmann (1999), which examines the relationship between parental homeownership and children's education. It finds, on average, that the children of homeowners are more likely to have higher educational achievement than are the children of renters. The analysis focuses primarily on parents' housing tenure choice.[2] The authors do not, however, consider whether changing house prices have an impact on kids' achievement beyond their parents' homeownership status, nor do they investigate whether housing has a differential effect for the children of liquidity constrained parents.

Another closely related paper is Lovenheim (Forthcoming), which looks at how changing house prices during their teenage years impact children's college enrollment decisions. The motivation behind this line of research is similar to ours—that is, Lovenheim argues that rising house prices increase homeowners' equity and thus parents have an additional source of funds they can tap to help pay for their children's college education. He finds that after 2000 house price growth raised college attendance among households with limited financial resources. Lovenheim's research, however, does not consider the longer-term impact that house price growth has on children's earnings mobility when they are adults.

Dynarski (2003) looks at the relationship between parents' financial liquidity and children's college attendance. In particular, she exploits a rule change in 1992 that exempted parents' home equity from being considered in financial aid need calculations, which made many students newly eligible for federal college loan programs. Unlike the aforementioned authors who use PSID data, Dynarski uses data from the Current Population Survey and the Survey of Income and Program

[2]The authors do control for parents' average self-reported house values calculated over the seven years prior to their children leaving the household.

Participation and finds that students eligible for loans are more likely to go to college. There is also a shift among these students toward attending four-year institutions. Brown, Scholz, and Seshadri (2009) also consider the college financial aid market and show theoretically that parents tend to underinvest in their children's education (as measured by the FAFSA expected family contribution) when there is uncertainty about whether their children will succeed in college.[3] The authors find empirical evidence of parental underinvestment consistent with their model.

The related literature also includes Carneiro and Heckman (2002), who find that credit constraints are not sufficient to explain the gaps in college attendance across income groups. Belley and Lochner (2007) look at the effect of cognitive ability and parental income on children's educational attainment and find that credit constraints matter for explaining poorer families' educational attainment. In comparison, Cameron and Taber (2004) provide evidence against credit constraints playing a role in educational attainment. Other papers that consider the relationship between parental income and children's achievement include Plug and Vijverberg (2005) and Shea (2000). Overall, these papers focus on the role of parental income and other controls in explaining children's education and ability, but they do not consider the potential additional effect of changing house prices.

Finally, there is the early intergenerational earnings mobility research by Solon (1992) and Zimmerman (1992), along with the more recent work by Aughinbaugh (2000). Other papers that look at different aspects of intergenerational mobility include Charles et al. (2010), Charles and Hurst (2003), Engelhardt and Mayer (1998), Bhattacharya and Mazumder (2007) Hrung (2004), and Hrung (2002). The latter paper studies the relationship between parents' housing wealth and children's consumption.

The remainder of the paper proceeds as follows. Section 2 discusses our empirical approach and Section 3 describes the data. Section 4 presents our results and Section 5 concludes with some suggestions for future work based on this paper's findings.

[3]FAFSA is the federal form that is used to determine students' eligibility for financial aid and their family's expected contribution to their education.

2 Empirical Approach

This paper bridges aspects of two existing literatures—the intergenerational mobility literature and the educational achievement literature—to consider the impact that changing house prices have on 17-year-olds making decisions about college and how these choices may affect their future earnings as adults. Our approach is based on the intergenerational mobility literature that estimates, among other things, the correlation between parents' earnings and children's earnings. Solon (1992), Zimmerman (1992) and others estimate intergenerational earnings mobility using econometric variations of the following basic empirical setup:

$$y^{i,c} = \alpha_0 + \alpha_1 y^{i,p} + e_i \,, \tag{1}$$

where $y^{i,c}$ is a child's (log) earnings and $y_t^{i,p}$ is his or her parent's (log) earnings. The constant term, α_0, captures how a generation's average income evolves over time (members of a given generation will typically have incomes higher than their parents). However, the parameter of interest in most studies is α_1, which is the estimate of the intergenerational income elasticity between parents and children. An estimated elasticity close to one means that there is a direct relationship between parent's earnings and children's earnings and that there is no intergenerational mobility. Estimated elasticities closer to zero suggest that children's incomes are not tied to their parents' income, thus indicating a high degree of intergenerational mobility. Charles and Hurst (2003) examine intergenerational wealth correlations using an approach very similar to equation (1). They also include controls for the age and family size of parents and their children to capture any life-cycle factors that might influence the observed intergenerational relationship. We incorporate these controls as well in our analysis.

Our empirical approach considers whether house price gains during children's teenage years impact their earnings beyond the standard intergenerational earnings transmission channel. In a world without frictions parents should be able to invest optimally in the human capital of their child, and in principle the child should reach his or her full potential based on that investment. In reality, college tuition costs are a large financial burden, and prevent some parents from investing optimally in their offspring's human capital.[4] Changing house prices may therefore impact children's earnings

[4]See Becker (1962) for a general discussion of human capital investments, and Mulligan (1997) for a discussion of parental investment in their children.

conditional on parental income because rising home values increase housing equity. Such equity can serve as borrowing collateral to finance educational expenses at relatively low costs.

Ever since the elimination of Regulation Q in the early 1980s, and the ensuing liberalization of the credit markets, U.S. households have increasingly been able to borrow against their home equity to finance expenditures.[5] In particular, the attractiveness of home-equity related borrowing markedly increased in 1986 when as part of the 1986 Tax Reform Act Congress made the interest on up to $100,000 of home-equity borrowing tax deductible while eliminating the interest deduction for non-collateralized (credit card) borrowing. To the extent that parental housing wealth impacts their ability to invest in their children's education, we would expect that house price growth during children's teenage years will help predict their earnings relative to their parents. In particular, house price increases should result in higher earnings for the children of homeowners—especially those children with potentially liquidity constrained parents. This group includes parents with low levels of non-housing financial wealth and/or those with low current income relative to their future income. If our house price story holds, then the adult earnings of children whose parents were renters should not necessarily benefit from rising house prices and may even be hurt by housing appreciation. That is, higher house prices typically translate into higher rents, which reduce parents' available financial resources for other expenditures, including their children's education. This situation would result in a negative relationship between house prices and earnings for renters' children.

Our baseline specification is a modified version of equation (1):

$$y^{i,c} = \beta_0 + \beta_1 y^{i,p} + \beta_2 g^{h,17} + \beta_3 g^{h,17} \times d^{i,p} + e_i \ , \tag{2}$$

where $g^{h,17}$ is real house price growth in the MSA in which the parents and child lived over the two years prior to the child turning 17, and $d^{i,p}$ is an indicator variable that takes a value of one if the parent(s) is (are) likely liquidity constrained and zero otherwise. The remaining variables were defined above.[6] The data, including how we identify parent-child pairs, are discussed in more detail in the next section.

[5]Regulation Q limited the interest rates banks were able to pay on deposits and forbade them from paying interest on checking account balances. See Gerardi, Rosen, and Willen (2010) for a further discussion of Regulation Q and its effect on limiting household credit.

[6]MSA-level house price data come from the Federal Home Finance Agency (formerly OFHEO).

When we estimate equation (2), we split the sample into parents who are either owners or renters since renters do not necessarily benefit from house price increases. All else equal, the impact of house prices on children's earnings, β_2, should be positive for the children of owners and zero or negative for the children of renters. If our conjecture regarding financially constrained parents is valid, house price growth should have a differentially larger effect on kids' earnings when homeowners are liquidity constrained, $\beta_3 > 0$. As part of our robustness checks we also include additional parental and demographic controls to check that house price growth is not simply picking up other socioeconomic factors that might impact children's earnings relative to their parents' earnings.

There are two additional margins on which homeowners' children might benefit if house price growth influences their educational attainment. First, we would expect the number of college graduates to increase with house price appreciation and the number of children who achieve less than a college education to fall. With additional household resources, more children should have the financial means to complete college. In addition, the children of parents that finance more of their college education through home-equity borrowing should, all else equal, have less non-collateralized debt holdings as adults. Less debt is a result of these children potentially taking out fewer college loans themselves to pay for their education.[7] We analyze these outcomes as a further test of our claims about the relationship between house price growth and children's future earnings when adults.

3 The Data

We use data from the PSID which in 1968 started interviewing about $4,800$ households. Sixty percent of the initial households belong to a cross-national sample from the 48 contiguous states, while the other portion is a national sample of low-income families from the Survey of Economic Opportunity. The PSID conducts annual interviews (biennial since 1997), thereby creating a panel dataset with extensive socioeconomic information. What makes this dataset very useful for studying intergenerational linkages in the United States is that over time the PSID follows the original households and the households started by their offspring.

[7] College loans, like credit cards, are classified as non-collateralized debt because this borrowing is unsecured.

To construct our matched sample of parents and children, we proceed as follows. We start in 2007, the latest year for which family income data is available, and keep individuals aged 25–65 years who are heads of households—we refer to these individuals as children although they are adults when we collect their income information.[8] The PSID contains identifiers to link children with their parents (we link a child to his/her father and if not possible to his/her mother). There is also data on children's birth year, so we can compile data on family or parental variables around the time their children were 17-years-old assuming they still lived at home (more details below). We keep respondents from both the representative sample and the low-income sample since our focus is on the effect of credit constraints on human capital investment, and credit constraints could affect low-income families to a greater extent.

The PSID maintains Geocode Match Files which contain the identifiers necessary to link the main PSID data to other datasets with information on the characteristics of respondents' neighborhoods, cities, or states.[9] In our case, we identify the MSA children lived in during the year they turned 17 and add in the relevant MSA house price appreciation data at that time from the Federal Housing Finance Agency (FHFA). We focus on MSA house price appreciation because it arguably provides exogenous shocks to homeowners' wealth and borrowing collateral as opposed to self-reported house price appreciation that might be contaminated by homeowners' improvements to the property and other factors. Since MSA house price indices from FHFA start in the late 1970s our final sample contains 913 "child" respondents who turned 17-years-old between 1979 and 1999 (the median year is 1990, and the respondents are 25–45-years-old in 2007), and live in 126 different MSAs.[10] There is great variation in house price growth in our sample: the two-year mean real growth is 2 percent, with a 9 percent standard variation. The maximum price decline over a two-year period is 28 percent and occurs in the Eugene-Springfield MSA in 1981, while the maximum appreciation, 39 percent, took place in the Boston MSA in 1986.[11]

Along with several socioeconomic variables for children from the 2007 survey, we collect parental

[8]When studying intergenerational income correlations it is standard to restrict the sample to individuals who are below the typical retirement age, and who are most likely to have completed their education. We employ the same age restrictions for parents.

[9]The Geocode Match data are highly sensitive (usually pinpointing the census tract in which families live), and are available only under special contractual conditions designed to protect the anonymity of respondents.

[10]Roughly 43 percent of the children have siblings in the sample. Clustering our standard errors by family, if anything, reduces standard errors' magnitude slightly.

[11]We use the all-item-less-housing CPI to deflate house prices.

and family variables around the time the child was 17-years-old. Summary statistics (non-weighted) are presented in Table 1.[12] Parental age when children are age 17 ranges from 32–65 years (the median age is 44), so they are on average older than the children we observe as heads of households in 2007 who range in age from 25–45 years (the median age is 33). The median family size for the parents is four, while it is three for their children. When calculating intergenerational income elasticities, we control for these differences by including a third-degree polynomial for children's and parent's ages as well as a second-degree polynomial for parent's and children's family sizes. A smaller share of children (44 percent) are homeowners compared to their parents (65 percent) due to the fact that children are on average ten years younger when we observe their resources. In addition, 44 percent of the heads of households in the parental generation are black, 78 percent are male, 16 percent have a bachelor's degree or higher, and the average number of completed years of schooling is 12.97.[13] In comparison, 43 percent of children are black, 41 percent are married, 30 percent have at least a college degree, and on average they have 13.29 years of completed education. Since in some instances we restrict the sample to children whose parents were homeowners when they were 17-years-old, Table 2 presents summary statistics for this sub-sample of roughly 590 children. Overall, the demographic variables are similar between the two samples, although the individual members comprising the owners' sample not surprisingly have, on average, higher income, wealth, and years of schooling.

In our benchmark regressions, we start by computing an intergenerational family income elasticity. Family income in the PSID is the sum of head of household (and spouse) taxable income (earnings, asset income, net profit and business income), head of household (and spouse) transfer income, head of household (and spouse) social security income, plus taxable income, transfer income and social security income from other family members.[14] We follow Solon (1992) and Zimmerman (1992) by averaging parental family income over a five-year period centered around the year their child turns 17 to alleviate the downward bias from measurement error pointed out in the intergenerational mobility literature.[15] For children, we average family income for the survey years

[12] Weighted statistics are similar.

[13] In the PSID, although old-fashioned, the head of household is preferably the adult male head.

[14] We also use head (and spouse) labor income or just head labor income as a robustness check and the results were qualitatively similar.

[15] For example, for a child who turns 17 in 1988, we use parental income for 1986 to 1990. Note however, that for younger children, the number of observations used to calculate average family income may be as low as three because the PSID becomes biennial after 1997.

2005 and 2007.[16] Average parental family income is roughly $63,000, and is about $10,000 higher than children's average family income.[17] This difference is explained by the fact that parents are on average older than the sample of children when we measure their resources.

We identify children with possibly liquidity constrained parents in different ways. First, we consider parents' non-housing wealth (wealth excluding home equity) using data from the PSID wealth supplements. The PSID started collecting wealth data in 1984 at five-year intervals up to 1999 and biennially afterwards. We use the parental (non-housing) wealth observation closest to, and if possible before, the year the child turns 17.[18] Mean non-housing wealth is approximately $171,000 while at around $45,000 the median is much lower. Second, we construct a measure of liquid wealth as the sum of balances in stocks, bonds, and cash-related accounts using additional information from the wealth supplements. Mean parental liquid wealth is roughly $49,000 in our sample, while median liquid wealth is $3,768.[19] Third, to avoid possible measurement error problems arising from the infrequency of the wealth supplements, we consider an alternative wealth measure constructed from regularly collected data on households' asset income (dividends, interest, and rental income).[20] Parents with higher asset income likely have higher wealth holdings. We use the value of households' asset income in the year their child turns 17—mean asset income is $1,317 while the median is zero. Finally, we identify parents with low current income relative to future income by calculating four-year (annualized) family income growth beginning in the year the child turns 17. This measure of potential liquidity constraints also relies on data from the regular PSID surveys as opposed to the wealth supplements. Average parental income growth is 3 percent with a 13 percent standard deviation. In the case of non-housing wealth, liquid wealth, and asset income, we classify a family as liquidity constrained if its holdings are at or below the median of the variable in question. When using income growth, we say the family is potentially

[16] We make sure children are heads in both 2005 and 2007. Measurement error is a less important issue when the variable is on the left-hand side, and the results are similar if we only use children's 2007 income.

[17] Values are in constant 2000 dollars.

[18] We prefer to use parental wealth before the child turns 17 as non-housing wealth may appear low when using a forward observation if parents have already paid for college with non-housing related assets. For kids who turn 17 before 1984 (about 18 percent of the sample), using prior wealth data for their parents is not possible, so we use these parents' 1984 wealth information instead. Our results are similar when we omit these parent/child pairs from our sample.

[19] The number of observations is lower for this variable than for the non-housing wealth measure because the PSID imputes missing observations for comprehensive wealth measures using additional information from the regular family surveys, but it does not do the same for individual wealth components.

[20] The exact variable definitions vary over the survey years, but we construct as consistent a measure of asset income as possible.

liquidity constrained if income growth is above or at the median.

As explained in Section 2, we interact the liquidity constraint dummy variables with (real) house price growth in the MSA where children lived at age 17 to examine the differential effect of house price growth on children's earnings for potentially financially constrained versus unconstrained families. We use two-year house price growth in our analysis of equation (2) as a benchmark but also discuss results for house price growth measured at different frequencies.

4 Main Findings

We start our analysis by estimating an intergenerational (family) income elasticity. In particular, we regress the logarithm of children's income on the logarithm of parental income (averaged over a five-year period) as described in equation (1).[21] Since we observe parents and children at different stages of their life-cycles, we include age and family size controls for both parents and children. The estimated elasticity, column (1) of Table 4, is 0.43, which is within the range of previous studies. In the next specification, we include controls for the state children lived in at age 17 and dummies for children's (five-year) birth cohorts. These controls are not necessarily standard in the intergenerational mobility literature, and are introduced to aid in our interpretation of the estimates where we include house price growth. Our hypothesis is that house prices affect kid's income conditional on parental income because rising home values create additional education financing opportunities for homeowners who have children. The constraints faced by residents of states with good-quality, state-run higher education with relatively low tuition, however, might be different from the constraints faced by residents of other states. Also, our sample contains children who turn age 17 over the period 1979 to 1999 and home-equity extraction may have become easier over time. That is, credit became increasingly available over this time horizon and following the 1986 Tax Reform Act accessing the equity in one's home was more attractive from a tax perspective. Including children's birth cohorts helps control for this effect. With these additional controls, the estimated income elasticity, is just slightly lower, 0.402, than without them—column (2).

In column (3), we include the two-year (real) house price appreciation (measured in percents) in the MSA where the children lived at age 17. The estimated coefficient is positive, but it is not

[21] The estimates allow for heteroscedasticity of an unknown form.

precisely estimated. We do not interact house price growth and parental income because intergenerational elasticities are well-known to be nonlinear. Additional education opportunities for the income-poor would translate into a lower intergenerational income elasticity for this group, but additional opportunities for income-rich families would translate into higher income elasticities. Since we expect a differential effect for owners and renters, we split our sample accordingly. Columns (4) and (5) present the results for renters and owners, respectively. The intergenerational elasticity for renters, 0.24, is significantly lower than the estimated elasticity for owners.[22] This finding may just reflect the fact that homeowners tend to have higher incomes than do renters.

Our goal, however, is not to explain the different income elasticities between owners and renters but rather to study the effect that house price growth has on children's income. We further find that house price growth at age 17 decreases adult income for renters' children and increases adult income for owners' children. According to our estimates, a 1 percentage point increase in housing appreciation results in 1.2 percent lower (annual) income for renters' children and 0.8 percent higher income for owners' children. This translates to roughly $364 of additional earnings for owners' children and $354 less income for renters children based on the median earnings for the two groups.[23] These findings are consistent with the expectation that the children of homeowners benefit from their parents' higher housing wealth and collateral, and the children of renters are hurt by the higher rents that come with housing appreciation. We rule out that the difference between renters and owners is due to renters living in bad MSAs versus good MSAs (based on house prices and/or economic conditions) since as documented in in Table 5 there are no substantial differences in MSA level house price, income growth or unemployment rates across the two groups. The impact of fluctuating house prices on children's earnings is economically significant within the group of homeowners. Other things equal, the child of a homeowner in the 75th percentile of house price growth (growth around 6 percent) is predicted to have about 6.6 percent higher income than the child of a homeowner in the 25th percentile of house price growth (growth about –2.5 percent).

If financial constraints are important for the acquisition of higher education, we would expect house price growth for homeowners to have a larger effect on kids' income when parents are liquidity constrained. Thus, we estimate equation (2) which allows for an interaction of house price growth

[22]The p-value for a χ^2-test of equality of both elasticities is 0.013.

[23]Median income for owner's children is $45,471 and $29,534 for renter's children. The calculation assumes that house prices appreciate 1 percentage point and then applies the estimated effect for renters and owners to the relevant income measure.

and a dummy for (possibly) liquidity constrained parents. As discussed in Section 3, we identify liquidity constrained families in different ways: families with below median non-housing wealth, liquid wealth, or asset income, and families with above median future income growth. Columns (6) to (9) tell a very consistent story. The effect of house prices on income for homeowners seems to operate mainly through constrained families: a 1 percentage point increase in house price growth results in 1.2 to 1.6 percent higher annual income for the children of financially constrained parents.[24] The median income for the children of low-wealth parents is about $34,000, so 10 percent house price appreciation when these kids are 17-years-old would raise their future earnings by about $5,466. This finding suggests that house price growth during kids' teenage years has an economically meaningful impact on their future earnings. The implied earnings effect is essentially the same based on the alternative estimates of liquidity constraints in columns (7) to (9). Since our results are similar for the different measures of liquidity constraints, we primarily focus on the first measure, below median non-housing wealth, in the rest of our analysis. Although in the interest of brevity the results are not reported, we do not find significant differences in the effect of house price growth for potentially constrained versus unconstrained renters. Going forward we will focus on the outcomes for homeowner's children.

Table 6 controls for local economic conditions to check whether house prices are simply proxying for some households living in more favorable regions of the country (MSAs) than others. The first two columns in the table reproduce the baseline estimates from columns (5) and (6) in Table 4. Columns (3) and (4) include two-year per-capita MSA income growth that covers the same period as house price growth. The overall effect of house prices on children's earnings is somewhat larger than in the baseline case but the difference is not statistically significant. The effect of housing appreciation on kids' earnings continues to be differentially bigger for the children of liquidity constrained parents. The pattern of results are very similar when we include the MSA unemployment rate when kids are 17-years-old, columns (5) and (6), as well as MSA unemployment and income growth together, columns (7) and (8).[25] Overall, it does not appear that house price growth is proxying for the general economic conditions where households live when their children have their 17th birthdays.

[24]The p-values for F-tests for the equality of β_2 and β_3 are 0.03, 0.10, 0.04, and 0.01 in columns (6)–(9), respectively.

[25]MSA income growth and unemployment rate data come from the Bureau of Economic Analysis. The sample size in columns (5) to (8) is smaller because unemployment rates are not available for all MSAs.

Table 7 presents additional results that consider the robustness of our baseline specification to alternative approaches for estimating the standard error of the estimates. The results in columns (3) to (8) explore different ways of clustering the standard errors. Since house prices are measured at the MSA level there is less variation in the explanatory variables than there is in the dependent variable (children's earnings), which varies across all households. Failing to cluster the observations could potentially lead to incorrect standard errors and thus incorrect inferences. The results in columns (3) and (4) cluster the observations (errors) at the MSA level. The estimated standard errors are very similar to the baseline results, and hence our inference is little changed. Housing appreciation has a large and precisely estimated impact on the earnings of children with constrained parents. House prices may be correlated across MSAs that are located near one another so we also cluster the observations at the state level. This change also has little effect on our estimates. In addition, the data are set up linking a given child with his/her parents and do not take into account potential siblings. Therefore the estimates in columns (7) and (8) cluster the observations based on households rather than on individual parent-child matches. This approach also has little effect on our estimates. Overall, clustering the observations has little impact on our estimated standard errors and we will use "white" heteroscedasticity robust standard errors going forward.

Table 8 presents some robustness results where relative to the baseline specification we alter the definition of house price growth and introduce some additional controls. These estimates should be compared to columns (5) and (6) in Table 4. In columns (1) and (2), we use a dummy variable for house price growth instead of the continuous variable in the baseline regressions—the dummy takes the value of 1 if two-year house price growth is positive and is 0 otherwise. According to our results, a child's income is roughly 15 percent higher in adulthood if housing appreciated in the MSA where he/she lived at age 17. We do not find a differential effect between constrained and unconstrained families when using the dummy variable for house price growth, possibly because the variation in house prices is limited. Columns (3) and (4) use a measure of relative house price changes—MSA house price growth relative to the national average. Our estimates indicate that 1 percentage point housing appreciation above the national average is associated with roughly 1.1 percent higher income for kids. In this case, the estimated house price effect for constrained families, column (4), is much larger than the overall effect but not statistically different.

In the remaining columns of the table we revert to our original two-year continuous measure

of house price growth. In columns (5) and (6) we add a quadratic house price growth term to determine whether the interaction between house price changes and the constrained family indicator is simply picking up some nonlinearity in house price growth. The results suggest that this is not the case. The effect of house price growth on children's earnings is still much larger in magnitude for children with liquidity constrained parents. The estimated coefficients change enough, however, that the p-value for the test of equality between constrained and unconstrained families is 0.22. To ensure that we are not picking up the effect of the families living in areas with more valuable housing stock and hence with potentially higher quality schools, in columns (7) and (8) we include the logarithm of parents' house value when their child was 17-years-old. Parents' house values have a substantial and precisely estimated impact on children's earnings when adults, but the effect of house price growth persists along with the observed differences between constrained and unconstrained households. Lastly, in columns (9) and (10) we add controls for the year in which the child turned 17 instead of the five-year cohort dummies to make sure our results are not simply capturing good or bad economic events occurring at the time a child is 17-years-old. The results are, once again, qualitatively unchanged.

Table 9 considers alternative timing for measuring house price growth during children's adolescent years. Recall that our baseline specifications use two-year MSA house price growth at the time children are age 17. The results in columns (1) and (2) in the table use one-year house price growth instead. The overall effect of housing appreciation on children's earnings is similar to the baseline case. In particular, a 1 percentage point increase in house price growth during kids' teenage years leads to 1.3 percent higher income when they are adults. The income effect for the children of financially constrained parents who are homeowners continues to be differentially large; a 1 percentage point increase in house prices leads to roughly 3.7 percent higher annual income or about $1,250 evaluated at these children's median average earnings.[26] This result suggests that recent house price changes have a particularly large impact on the borrowing and spending ability of households with limited other financial resources. There also continues to be an economically meaningful effect of fluctuating house prices on children's adult earnings within the group of homeowners. For a homeowner in the 75th percentile of house price growth (growth around 3.1 percent), his or her child is predicted to have about 5.7 percentage points higher annual income than the

[26]If we annualize the baseline two-year house price growth, then the equivalent estimated income effects are 1.5 percent and 3.3 percent, respectively.

child of a homeowner in the 25th percentile of house price growth (growth about –1.4 percent), all else equal.

The next two columns of Table 9 use expected income growth as the measure of parents' borrowing needs rather than their financial (non-housing) wealth. House price growth during their offspring's teen years continues to have a noticeable impact on these children's adult income. The effect of housing appreciation on children's earnings is larger for the children of constrained parents but is not precisely estimated. The remaining columns in Table 9 use house price growth measured over a *longer* time horizon. In particular, columns (5) to (8) incorporate four-year house price growth and columns (9) to (12) look at cumulative housing appreciation since parents purchased their current home.[27] Housing appreciation over a longer period is arguably a better indicator of parents' total equity available for use as borrowing collateral. The results continue to show that house price growth has a positive impact on children's earnings. The main difference between these longer horizon house price growth results and the baseline ones is that housing appreciation only has a differential impact on children's income when parents' borrowing needs are measured by their expected income growth.

The fact that short-term house price fluctuations matter more for children with low-wealth parents while longer-term housing appreciation impacts children whose parents experience high-income growth suggests that we are identifying households that are constrained in different ways. In particular, low-wealth parents are likely financially poor relative to high-income growth parents, and thus house price fluctuations immediately around when the children of low-wealth parents go to college may be more important for financing their education. In contrast, parents with high expected income growth likely have less of an immediate borrowing need to fund college-related expenses and instead may wish to smooth their spending over time given the high cost of college and their higher expected future earnings. These parents' ability to finance their kids' education and hence their decision to borrow is therefore likely based on the accumulated equity in their home rather than house price gains immediately before their children's college matriculation. In terms of the magnitude of our estimated effects, accumulated housing equity has an economically different impact on children's earnings within the group of homeowners who experience high-income growth. The child of a homeowner in the 75th percentile of house price growth (growth around

[27]If house price indices were not available for the entire tenure period, the cumulative house price growth refers to the longest time period for which it can be calculated.

13.1 percent) is predicted to have about 7.9 percentage points higher average income than the child of a homeowner in the 25th percentile of house price growth (4.6 percent price *decline*) all else equal. Low-wealth households, however, are more likely to consume most of their earnings and may have recently borrowed against their home to finance other necessary expenditures. As a result, changes in low-wealth parents' housing equity immediately around the time their child enters college can determine whether these households can borrow against their home to finance their children's education.

Overall, the impact of house price growth during their teen years on children's future income is robust to additional controls and alternative data measurement. As in our baseline estimates, higher house price growth is associated with higher income later in life for the children of homeowners. However, in some cases we cannot reject the equality of the house price growth effect at conventional levels for financially constrained versus unconstrained families even though the effect remains quantitatively much larger for families who are potentially constrained absent their housing equity. However, the differential effect of house price growth for the adult income of children whose parents are liquidity constrained persists when we focus on the variation in house prices that most likely matters for these households (short-term, non-relative appreciation).

Table 10 considers possible asymmetries in the effect of house price growth on children's income by examining positive and negative house price growth values as separate regressors. For renters, the coefficient associated with housing depreciation is about five times larger than the coefficient for housing appreciation. That is, renters' children seem to derive greater benefits from house price depreciation than the loss they incur when housing prices rise. However, we cannot reject the null hypothesis of equality for the estimated coefficients at conventional levels (p-value 0.26). For homeowners, the coefficient on house price depreciation is about 1.8 times larger than for house price appreciation, but neither coefficient is precisely estimated and we cannot reject the null of equality for both coefficients at conventional levels (p-value 0.68). Overall, we do not find much evidence of house prices having an asymmetric effect on children's adult income, and thus we do not separate positive and negative house price values going forward. However, we want to point out that although we describe our findings in terms of housing appreciation increasing children's earnings, the reverse is also true—housing depreciation is associated with lower earnings for the children of homeowners who experience house price declines around the time their offspring

graduate from high school.

Channels

Table 11 also focuses on homeowners and considers the possible factors that we do not capture in our baseline specifications that may influence children's earnings as adults. To the extent these potential channels are positively correlated with house price growth or parental income, we would expect the estimated relationship between these variables and children's earnings to decline.[28] Any remaining correlation between house prices and children's adult earnings suggests that house price changes matter for children's earnings beyond the channels considered. This analytical approach is similar to that used in Charles and Hurst (2003) who investigate the factors that might explain intergenerational wealth correlations.

Column (1) reproduces the main finding from our baseline specification that a 1 percentage point increase in house price growth raises children's annual earnings by 0.8 percent. The estimated coefficients are a tad different from the equivalent results in column (5) of Table 4 because the sample size is a bit smaller in order to maintain the same sample across all the specifications. In Table 11, columns (2)–(5) control for additional factors that might affect children's earnings as adults. These channels include occupation and industry, the MSA in which the child currently lives, educational attainment, and marital status.[29] Wages are often heavily tied to one's industry and occupation as well as education, while differences in geographic locations may account for better (or worse) job opportunities or differences in income caused by compensating living differentials. In addition, marital status is a potential indicator of family stability and/or the need to maintain a good job to provide for others, as well as an indicator for potentially more earners in the family. Column (2) adds the education controls, column (3) adds marital status and column (4) adds industry and occupation dummies, while the final column (5) considers all the potential channels together.

The estimated income elasticity declines steadily with the introduction of the additional controls. This suggests that the standard factors thought to potentially influence earnings are correlated with parental income and explain a good portion of the observed intergenerational income

[28] Technically speaking, the estimated relationship could rise if one of the additional controls is positively (negatively) correlated with house price growth or parental income, but has a negative (positive) independent effect on children's earnings.

[29] The standard baseline controls are also included.

elasticity. In contrast, the coefficient on house price growth decreases only slightly between the baseline specification in column (1) with no additional controls and the specification that includes all the potential channels, column (5).[30] This lack of difference implies that the channels considered account for only a little of the raw correlation between house prices and children's adult income even though they explain about 20 percent more of the overall variation in children's earnings when adults. That is, parental house price growth impacts children's earnings beyond the standard explanations for earnings differences across individuals. This finding supports the idea that rising house prices relax liquidity constraints and enable parents to invest (or invest more) in their children's human capital. House price appreciation may not only allow children to attend college who otherwise would not, but also may permit some children to attend better quality institutions than they otherwise would have.[31] An additional benefit of children receiving more college financing from their parents is that they can likely devote more time to studying rather than working to help pay for their education. Alternatively, children may be better positioned to accept unpaid internships that serve as a stepping-stone to improved future employment and/or have more time to search for a quality spouse if their parents provide them with additional resources during college. All of these opportunities could result in higher future earnings when the child reaches full adulthood. Unfortunately, the PSID data do not allow us to explore these channels further.

The results in Table 12 extend the analysis in Table 11 and consider the relationship between the various explanatory channels for earnings differences across individuals and the differential impact that house prices have on the earnings of children whose parents are liquidity constrained. Our baseline results—reproduced in column (1)—show that house price growth principally affects the income of children whose parents had below median liquid wealth during their teenage years. This interaction effect is nearly eliminated after controlling for all of the considered channels, column (5). At the same time the direct effect of house price growth on children's earnings increases noticeably.

This finding is consistent with increased housing equity helping liquidity constrained parents finance their children's education. With an additional funding source, children complete college and/or otherwise achieve a higher level of education than they would have in the absence of the

[30] Adding some of the controls individually raises the estimated house price effect. The important comparison, however, is between the initial relationship and the one with the full set of controls.

[31] See Lovenheim and Reynolds (2010) for a study on house price growth and college choice.

house price appreciation. Attending college and/or obtaining a better education improves these children's earnings potential. That is, increased schooling allows them to live in better locations and/or work in better jobs than would have been possible otherwise. Therefore, after controlling for the additional opportunities afforded to college graduates, children's future earnings no longer depend on whether their parents were liquidity constrained homeowners or not at the time they were finishing high school. In other words, these controls capture the channels through which liquidity constraints impact future adult incomes, and house price growth for liquidity constrained parents no longer explains their children's future earnings. Notice as well that the direct effect of housing appreciation on children's earnings gets larger when the additional explanatory variables are taken into account. This robust result suggests that house prices during children's teens still have a direct effect on their adult income for reasons other than the standard channels controlled for in Tables 11 or 12 and/or through house prices relaxing households' liquidity constraints.

Direct Exploration of Children's Other Outcomes

We also consider the direct effect that house price growth has on educational attainment for the children of homeowners. In particular, children are classified into three broad educational categories—high school graduate or less, some college, and BA-BS degree or higher. We then investigate whether housing appreciation can predict college attendance (some college) and college completion (BA-BS degree or higher) using simple probit specifications. To facilitate the interpretation, we first use the two-year house price appreciation dummy from the previous section as a measure of house price growth, and then use the continuous variable second. Other explanatory variables include family income at age 17 and two measures of family wealth: a dummy for having below median non-housing wealth and parents' self-reported home value when their child was 17 (higher local property values tend to be associated with better primary and secondary schools). We also interact house price appreciation with low wealth to mimic our previous specifications. We include as additional controls a dummy for the household head having completed college, gender, race, the unemployment rate in the MSA where the child lived at age 17, cohort dummies, and state dummies for the child's residency when 17-years-old. Table 13 reports marginal effects for the relevant explanatory variables on children's educational attainment evaluated at the mean of all the other independent variables.[32]

[32]The number of observations is slightly lower than in our previous specifications because we do not have unem-

The results using the house price growth dummy variable are shown in columns (1)–(3). Higher parental income and wealth are associated with a higher probability of college completion and a lower probability of not continuing formal education beyond high school. The children of college graduates are also more likely to be college graduates themselves. The MSA unemployment rate is also a significant predictor of college completion, perhaps suggesting that students stick with their college education longer when their outside (employment) options are limited. Focusing on our variable of interest, children are 12.7 percent more likely to have completed some college if their 17th birthday occurred during a period of house price appreciation. Also, although children from low-wealth households are about 22.4 percent less likely to have a college degree than children from high-wealth households, they are about 27.5 percent more likely to obtain a college degree when house prices are appreciating. In other words, the children of low-wealth parents are about as likely as the children of high-wealth parents to graduate from college when house values appreciate. These findings are further consistent with house price growth helping parents to invest more in their children's human capital. The results in Table 13, columns (4)–(6), using the continuous measure of house price growth are qualitatively consistent with the results using the dummy variable for house price growth. The only difference is that the direct effect of house price growth on college graduation is negative and *precisely* estimated. The direct effect is negative in column (3) as well but with a larger standard error. This finding could be the result of housing prices being positively correlated with unobserved outside options for children (instead of college) that are not well-captured by the unemployment rate variable.

We also explore whether house price growth during children's teen years affected their financial liabilities as of 2007 to determine if housing appreciation for homeowners is associated with lower debt levels for young adults who are college graduates. In particular, we focus on a variable the PSID labels "other debt" that records households' non-collateralized debt such as "credit card charges, student loans, medical or legal bills, or loans from relatives."[33] Table 14 summarizes the results. Children who attend college have higher non-collateralized debt on average as adults, which is consistent with students' common need to take out unsecured loans to finance their higher education. Since many of these loans can be repaid over a 30-year period after college graduation, it makes sense that those individuals who attended college would have greater unsecured debt

ployment rates for all MSAs in our PSID dataset.

[33]Information on student loans separate from other non-collateralized debt is not available from PSID.

even as adults. Debt is lower for college attendees, however, if house prices appreciated in the year they turned 17. This finding suggests that when house prices rise, financing sources other than student loans were available to pay for children's education—a result that is consistent with our claim that rising house prices allow parents to invest more in their children's human capital. Overall, the results in Table 13 and Table 14 show that house price growth is associated with higher educational attainment for the children of homeowners and less debt for those children who are college graduates.

More on Mobility

In the intergenerational mobility literature, it is standard to report transition matrices which are simple cross-tabulations of parents' and children's economic status after their status has been ranked into a finite number of groups. The elements of a transition matrix measure the probability of a child's economic position conditional on his/her parent's position. To further explore the role of house prices on income mobility we construct transition matrices as well. Since our sample size is small, we divide parents and children into the quartiles of their respective income distributions. Given that in our data parents and children are observed at different stages of the life-cycle, we first regress log family income on second-degree polynomials for age and family size (separately for parents and children) and classify children and parents into four quartiles based on the residuals from these regressions.[34] The results are reported in Table 15 (for homeowners) and Table 16 (for renters).

The diagonal elements in a given matrix measure the probability of a child being in the same income quartile as his/her parent(s). Interpreting the off-diagonal elements of the matrices is similar. For example, the second entry in the first row of a given matrix tells us the probability of a child being in the second quartile of the income distribution conditional on his/her parent being in the bottom quartile. The fourth row of the first column reports the probability of a child ending up in the bottom income quartile conditional on his/her parents being at the top of the income distribution on so on. The standard errors for these conditional probabilities are shown in

[34]The quartiles are calculated using the PSID family weights.

parentheses.[35]

Since we are interested in the effect of house price growth on intergenerational mobility, we report transition matrices after splitting the sample into two groups based on whether house price growth was above or below the national average when the children were 17-years-old. We use relative house prices because the cross-tabulations do not control for state of residence or cohort effects. The top panel in Table 15 shows the transition matrix for the full sample of homeowners, the middle panel shows parent/child pairs with house price growth above the national average, and the bottom panel shows households with below average house price growth.

As extensively documented, the persistence of economic status is greatest for the top and the bottom income quartiles. Our full sample results are consistent with this pattern. Children with parents in the first income quartile have a 43 percent probability of being in the first income quartile themselves. Similarly, children with parents in the top income quartile have a 38 percent probability of being in the top income quartile themselves. The probability of children remaining in the second or third quartiles is lower, 24 percent and 35 percent respectively. Examining the split between households that experience favorable versus unfavorable house price changes yields some interesting results. In particular, the probability of children ending up in the highest income quartile is lower for all parent income quartiles when house price growth in the MSA the child was living in at age 17 is below the national average than when growth is above the national average. Children who at age 17 reside in MSAs that experience good house price growth have a 47 percent probability of remaining in the top income quartile conditional on their parents being in the top income quartile as compared to only a 27 percent probability for similar children who at age 17 live in areas that experience below average house price growth. This difference across income groups is statistically significant (t-statistic 11.7).[36] The result is especially interesting given that the children of high-income parents, other things equal, are more likely to attend college. The

[35]The standard errors are calculated using the following formula:

$$\hat{\sigma}_{jk} = \sqrt{\frac{p_{jk} \times (1 - p_{jk})}{n_j}} \ , \tag{3}$$

where p_{jk} is the probability of a household starting in position j and ending up in position k, and n_j is the number of households in position j. In our case, n_j is the number of parents who are in a given quartile of the income distribution, and p_{jk} is the probability of a child ending up in a given part of the earnings distribution conditional on the position of their parents when they were age 17. For additional details on this approach for calculating standard errors go to http://fedc.wiwi.hu-berlin.de/xplore/tutorials/xfghtmlnode32.html.

[36]This inference is based on a difference of means test with unequal variance. There are 28 degrees of freedom.

probability of children ending up in the lowest income quartile conditional on their parents being in a higher income group is also greater in the below average house price growth sample.

Unlike the sample of homeowners, house price growth does not appear to have a consistent influence on economic mobility for the sample of renters. Children living in areas of above average house price growth are slightly more likely to remain at the top of the income distribution than similar children living in areas of lower than average house price growth, conditional on their renter parents being at the top of the distribution. In contrast, children whose renter parents start in the first or third income quartiles are more likely to move to the top of the income distribution if they live in areas where house price growth was below average. A similarly varied pattern emerges if you consider children's downward mobility by location. House prices therefore do not seem to have much impact on the economic mobility of the children whose parents rented rather than owned a home, which is what we would expect if our story about house prices and children's future achievement is valid. Overall, although the cross-tabulation results are only suggestive given the small sample sizes, these results nevertheless tell a story consistent with our previous results about the effect that housing prices have on intergenerational economic mobility.

5 Conclusion

This paper's goal is to study how house price growth experienced during children's teenage years impacts their earnings as adults conditional on their parents' income. We find that house price appreciation has a positive impact on the earnings of children whose parents were homeowners even after controlling for the standard channels that help explain the earnings gap across individuals. House price growth has a particularly strong impact on the earnings of children whose parents are potentially liquidity constrained homeowners. We further found that house price growth increases the likelihood of children obtaining a college degree and results in lower unsecured (college-related) debt holdings when they are adults. Overall, our results are consistent with rising house prices providing parents with an additional resource (borrowing collateral) to invest in their children's human capital.

Our estimated effects are also economically meaningful. Within the sample of homeowners, the children from households that experience house price growth in the top quartile of the distribution

have over 6 percent higher annual earnings as adults than the children whose families experience house price changes in the bottom quartile of the distribution. Our findings are robust to a number of alternative specifications and are consistent with anecdotal evidence on the benefits of home equity-related household borrowing.

The results in this paper also suggest some potential avenues for future research. One is to explore whether house price appreciation impacts children's college attendance (or completion) and also affects their college choice. Lovenheim and Reynolds (2010) explore the college choice aspect, but it would also be interesting to see whether the house price and college choice channel also has an impact on children's future earnings. Having data to explore whether children are indeed able to work less while enrolled in college if their parents can finance more of their education would also be interesting. Considering the direct effect house price growth during their teens has on children's college-related debt, and not just their overall unsecured debt, would also be worthwhile given the appropriate dataset, as it would be important to study if debt holdings affect job choices. There is also work to be done on how the great recession impacted children's college choices and future earnings once relevant data become available. Overall, this paper contributed to the earnings mobility and educational achievement literatures, but there is certainly interesting work to be done with additional data should it become available.

References

Aughinbaugh, Alison. 2000. "Reapplication and Extension: Intergenerational Mobility in the United States." *Labour Economics* 7(6): 785–796.

Becker, Gary. 1962. "Investment in Human Capital: A Theoretical Analysis." *Journal of Political Economy* 70(5): 9–49.

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

Bhattacharya, Debopam, and Bhashkar Mazumder. 2007. "A Nonparametric Analysis of Black-White Differences in Intergenerational Income Mobility in the United States." Working Paper 2007-12. Chicago, IL: Federal Reserve Bank of Chicago. Available at: http://www.chicagofed.org/webpages/publications/working_papers/2007/wp_12.cfm.

Boehn, Thomas P., and Alan M. Schlottmann. 1999. "Does Home Ownership by Parents Have an Economic Impact on Their Children?" *Journal of Housing Economics* 8(3): 217–232.

Brown, Meta, John Karl Scholz, and Ananth Seshadri. 2009. "A New Test of Borrowing Constraints for Education."

Buiter, Willem H. 2008. "Housing Wealth Isn't Wealth." Working Paper 14204. Cambridge, MA: National Bureau of Economic Research.

Cameron, Stephen V., and Christopher Taber. 2004. "Estimation of Educational Borrowing Constraints Using Returns to Schooling." *Journal of Political Economy* 112(1): 132–182.

Carneiro, Pedro, and James J. Heckman. 2002. "The Evidence on Credit Constraints in Post-Secondary Schooling." *The Economic Journal* 112(482): 705–734.

Charles, Kerwin Kofi, Sheldon Danziger, Geng Li, and Robert F. Schoeni. 2010. "New Expenditure Data in the Panel Study of Income Dynamics: Comparisons with the Consumer Expenditure Survey Data." *Monthly Labor Review* 133(2): 29–39.

Charles, Kerwin Kofi, and Erik Hurst. 2003. "The Correlation of Wealth across Generations." *Journal of Political Economy* 111(6): 1155–1182.

Cooper, Daniel. 2009. "Impending Spending Bust? The Role of Housing Wealth as Borrowing Collateral." Working paper 09-9. Boston, MA: Federal Reserve Bank of Boston. Available at: http://www.bos.frb.org/economic/ppdp/2009/ppdp0909.htm.

Dynarski, Susan. 2003. "Loans, Liquidity, and Schooling Decisions." Working Paper. Available at: http://www.nber.org/~dynarski/Dynarski_loans.pdf.

Engelhardt, Gary V., and Christopher J. Mayer. 1998. "Intergenerational Transfers, Borrowing Constraints, and Saving Behavior: Evidence from the Housing Market." *Journal of Urban Economics* 44(1): 135–157.

Gerardi, Kristopher S., Harvey S. Rosen, and Paul S. Willen. 2010. "The Impact of Deregulation and Financial Innovation on Consumers: The Case of the Mortgage Market." *Journal of Finance* 65(1): 333–360.

Hrung, Warren B. 2002. "Parental Housing Values and Children's Consumption." *Regional Science and Urban Economics* 32(4): 521–529.

Hrung, Warren B. 2004. "Parental Net Wealth and Personal Consumption." *Journal of Economic Behavior and Organization* 54(4): 551–560.

Hryshko, Dmytro, Maria J. Luengo-Prado, and Bent E. Sorensen. 2010. "House Prices and Risk Sharing." *Journal of Monetary Economics* 57(8): 975–987.

Lovenheim, Michael. Forthcoming. "Housing Wealth, Liquidity Constraints and College Enrollment." *Journal of Labor Economics*.

Lovenheim, Michael, and C. Lockwood Reynolds. 2010. "The Effect of Housing Wealth on College Choice: Evidence from the Housing Boom." Working Paper. Available at: http://www.human.cornell.edu/pam/people/upload/Housing-Wealth-and-College-Choice.pdf.

Mulligan, Casey. 1997. *Parental Priorities and Economic Inequality*. Chicago, IL: The University of Chicago Press.

Plug, Erik, and Wim Vijverberg. 2005. "Does Family Income Matter for Schooling Outcomes? Using Adoptees as a Natural Experiment." *The Economic Journal* 115(506): 879–906.

Shea, John. 2000. "Does Parents' Money Matter?" *Journal of Public Economics* 77(2): 177–184.

Solon, Gary. 1992. "Intergenerational Income Mobility in the United States." *American Economic Review* 82(3): 393–408.

Zimmerman, David. 1992. "Regression Toward Mediocrity in Economic Stature." *American Economic Review* 82(3): 409–429.

Table 1: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Parents					
Age	43.57	6.23	32	65	913
Family size	4.26	1.69	1	12	913
Homeowner	0.65	0.48	0	1	913
Years of schooling (completed)	12.97	2.57	3	17	913
College or higher degree	0.16	0.36	0	1	913
Male head of household	0.78	0.41	0	1	913
Black	0.44	0.5	0	1	912
Married	0.68	0.47	0	1	913
One-year house price growth, parent	0.01	0.05	-0.14	0.23	913
Two-year house price growth	0.02	0.09	–0.28	0.39	913
Two-year house price growth (dummy)	0.57	0.49	0	1	913
Two-year relative house price growth	0.01	0.08	–0.33	0.33	913
Four-year house price growth	0.04	0.15	–0.45	0.65	913
Four-year income growth (annualized)	0.03	0.13	–0.54	0.72	861
Cumulative house price growth, parent	0.04	0.16	-0.49	0.89	913
Family income	80,268	57,998	1,523	746,907	594
Liquid wealth	72,074	442,628	0	9,992,737	551
Non-housing wealth	250,355	740,014	–233,043	14,393,858	592
Asset income	1930	7,225	0	91,158	594
Below med. liq. wealth at age 17	0.49	0.5	0	1	847
Below med. liq. wealth × hp growth	0.01	0.06	–0.28	0.38	847
Below med. non-housing wealth at age 17	0.49	0.5	0	1	902
Below med. non-housing wealth × hp growth	0.01	0.06	–0.22	0.38	902
Below med. asset income	0.66	0.47	0	1	913
Below med. asset income × hp growth	0.01	0.07	–0.22	0.38	913
High income growth	0.5	0.5	0	1	861
High income growth × hp growth.	0.01	0.07	–0.28	0.39	861
Children					
Age	33.88	5.46	25	45	913
Family size	2.74	1.53	1	9	913
Homeowner	0.44	0.5	0	1	913
Years of schooling (completed)	13.29	2.52	0	17	913
College or higher degree	0.3	0.46	0	1	913
Male head of household	0.62	0.49	0	1	913
Black	0.43	0.5	0	1	908
Married	0.41	0.49	0	1	913
Family income	52,927	51,467	554	634,092	913
Labor income	44,903	44,325	0	376,400	913

Notes: Income and wealth figures in real 2000 U.S. dollars.

Table 2: Summary statistics. Sub-sample of Parents Homeowners

Variable	Mean	Std. Dev.	Min.	Max.	N
Parents					
Age	44.57	5.55	33	65	594
Family size	4.26	1.31	1	10	594
Homeowner	1	0	1	1	594
Years of schooling (completed)	13.51	2.51	3	17	594
College or higher degree	0.21	0.41	0	1	594
Male head of household	0.92	0.27	0	1	594
Black	0.27	0.44	0	1	593
Married	0.86	0.35	0	1	594
One-year house price growth	0.01	0.05	-0.14	0.23	594
Two-year house price growth	0.02	0.09	–0.28	0.39	594
Two-year house price growth (dummy)	0.57	0.5	0	1	594
Two-year relative house price growth	0.01	0.09	–0.33	0.33	594
Four-year house price growth	0.04	0.16	–0.45	0.65	594
Four-year income growth (annualized)	0.03	0.1	–0.47	0.44	567
Family income	80,268	57,998	1,523	746,907	594
Liquid wealth	72,074	442,628	0	9,992,737	551
Non-housing wealth	250,355	740,014	–233,043	14,393,858	592
Asset income	1930	7,225	0	91,158	594
Cumulative house price growth	0.05	0.19	-0.49	0.89	594
Below med. liq. wealth at age 17	0.32	0.47	0	1	551
Below med. liq. wealth × hp growth	0	0.05	–0.28	0.38	551
Below med. non-housing wealth at age 17	0.33	0.47	0	1	592
Below med. non-housing wealth × hp growth	0	0.05	–0.2	0.38	592
Below med. asset income	0.53	0.5	0	1	594
Below med. asset income × hp growth	0.01	0.06	–0.2	0.38	594
High income growth	0.52	0.5	0	1	567
High income growth × hp growth.	0.02	0.07	–0.28	0.39	567
Children					
Age	33.61	5.48	25	45	594
Family size	2.63	1.46	1	8	594
Homeowner	0.53	0.5	0	1	594
Years of schooling (completed)	13.69	2.63	0	17	594
College or higher degree	0.39	0.49	0	1	594
Male head of household	0.70	0.46	0	1	594
Black	0.26	0.44	0	1	590
Married	0.48	0.5	0	1	594
Family income	62,502	58,994	554	634,092	594
Labor income	53,345	50,193	0	376,400	594

Notes: Income and wealth figures in real 2000 U.S. dollars.

Table 3: Cross-correlations

Variables	log.Child Income	Log.Parent Income	2-year hpg	4-year hpg	2-year hpg d.	College Degree	Some College	Married
Log. child income	1.00							
Log. parent income, five-yr average	0.44	1.00						
Two-year house price growth	0.05	0.08	1.00					
Two-year house price growth	0.05	0.09	0.84	1.00				
Two-year house price growth (dummy)	–0.05	–0.02	0.70	0.60	1.00			
College or higher degree	0.33	0.36	0.03	0.06	–0.02	1.00		
Some college	0.09	0.09	–0.01	–0.03	-0.00	–0.15	1.00	
Married	0.52	0.22	0.01	0.04	-0.00	0.07	0.05	1.00

Table 4: Children's Family Income and House Price Growth.

	All			Renters	Owners				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log. parent income, five-yr avg.	0.434***	0.402***	0.402***	0.237***	0.476***	0.445***	0.465***	0.483***	0.481***
	(0.045)	(0.046)	(0.046)	(0.069)	(0.077)	(0.083)	(0.087)	(0.079)	(0.081)
House price growth at age 17			0.228	–1.220**	0.757**	0.312	0.180	0.224	0.047
			(0.304)	(0.565)	(0.348)	(0.349)	(0.326)	(0.385)	(0.577)
Below med. non-housing wealth						–0.120*			
						(0.073)			
Below med. wealth × hp growth						1.646**			
						(0.825)			
Below med. liq. wealth							–0.044		
							(0.084)		
Below med. liq. w. × hp growth							1.628*		
							(0.919)		
Below med. asset income								0.003	
								(0.067)	
Below med. asset income × hp growth								1.212*	
								(0.674)	
High income growth									–0.039
									(0.064)
High inc. growth × hp growth									1.202*
									(0.700)
N	913	913	913	319	594	592	551	594	567
R-squared	0.32	0.34	0.34	0.21	0.35	0.36	0.35	0.36	0.36

Notes: Additional controls for columns (2)-(9) only: age, age squared and age cubed for child respondent and parent, family size and family size squared for respondent and parent, five-year cohort dummies for respondent and fixed-effects for the state where the respondent lived at age 17. Robust standard errors in parentheses. *** significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Table 5: MSA House Price Growth and Income Growth: (Parents) Owners vs. Renters

	mean	**p50**	**std. dev.**	**min**	**max**	**N**
			Parent Renter			
MSA house price growth	0.019	0.014	0.082	–0.217	0.361	319
MSA income growth	0.029	0.029	0.035	-0.084	0.126	319.000
MSA unemployment rate	0.058	0.054	0.020	0.023	0.157	269
			Parent Owner			
MSA house price growth	0.022	0.015	0.092	–0.280	0.391	594
MSA income growth	0.033	0.033	0.038	-0.090	0.143	594
MSA unemployment rate	0.058	0.053	0.023	0.022	0.208	467

Table 6: Children's Family Income and House Price Growth: Local Economic Conditions

	Owners							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log. parent income, five-yr avg.	0.476***	0.445***	0.478***	0.450***	0.466***	0.460***	0.465***	0.463***
	(0.077)	(0.083)	(0.077)	(0.084)	(0.087)	(0.092)	(0.087)	(0.093)
House price growth at age 17	0.757**	0.312	1.087***	0.632	0.624	–0.064	0.910*	0.230
	(0.348)	(0.349)	(0.419)	(0.406)	(0.477)	(0.451)	(0.515)	(0.487)
Below med. non-housing wealth		–0.120*		–0.110		–0.061		–0.049
		(0.073)		(0.074)		(0.078)		(0.079)
Below med. wealth × hp gr.		1.646**		1.620**		2.417**		2.319**
		(0.825)		(0.818)		(1.068)		(1.050)
MSA income growth at age 17			–1.810	–1.700			–2.330*	–2.143
			(1.200)	(1.194)			(1.361)	(1.341)
MSA unemployment Rate at age 17					–0.017	–0.010	–0.029	–0.022
					(0.022)	(0.021)	(0.023)	(0.022)
N	594	592	594	592	467	465	467	465
R-squared	0.35	0.36	0.36	0.36	0.31	0.31	0.31	0.32

Notes: Unemployment rate data are not available for all MSAs. Additional controls: age, age squared and age cubed for child respondent and parent, family size and family size squared for respondent and parent, five-year cohort dummies for respondent and fixed-effects for the state where the respondent lived at age 17. Robust standard errors in parentheses. *** significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Table 7: Children Family Income and House Price Growth. Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Baseline		Clustered Errors					
			MSA		State		Household	
Log. parent income, five-year avg.	0.476***	0.445***	0.476***	0.445***	0.476***	0.445***	0.476***	0.445***
	(0.077)	(0.083)	(0.101)	(0.105)	(0.084)	(0.086)	(0.079)	(0.085)
House price growth at ate 17	0.757**	0.312	0.757	0.312	0.757**	0.312	0.757**	0.312
	(0.348)	(0.349)	(0.486)	(0.382)	(0.369)	(0.299)	(0.348)	(0.358)
Below med. non-housing wealth		–0.120*		–0.120		–0.120		–0.120*
		(0.073)		(0.082)		(0.077)		(0.072)
Below med. wealth × hp growth		1.646**		1.646**		1.646**		1.646**
		(0.825)		(0.783)		(0.822)		(0.776)
N	594	592	594	592	594	592	594	592
R-squared	0.35	0.36	0.35	0.36	0.35	0.36	0.35	0.36

Notes: Additional controls age, age squared and age cubed for child respondent and parent, family size and family size squared for respondent and parent, fixed-effects for the state where the respondent lived at age 17 (except for columns (9)-(10) with MSA fixed effects) and five-year cohort dummies for respondent, except columns (9)-(10) with birth-year dummies instead. Robust standard errors in parentheses. *** significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Table 8: Children Family Income and House Price Growth. Robustness II

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Two-year dummy		Two-year relative		Two-year Squared term		House Value		Birth-year dummies	
Log. parent income, five-yr avg.	0.485***	0.454***	0.476***	0.443***	0.480***	0.446***	0.386***	0.372***	0.362***	0.349***
	(0.076)	(0.082)	(0.076)	(0.083)	(0.077)	(0.083)	(0.083)	(0.088)	(0.082)	(0.088)
House-price growth at age 17	0.140**	0.098	1.115***	0.672*	0.889**	0.407	0.950**	0.504	1.255***	0.761*
	(0.063)	(0.071)	(0.351)	(0.361)	(0.431)	(0.401)	(0.418)	(0.390)	(0.428)	(0.390)
Below med. non-housing wealth		–0.148		–0.090		–0.120*		–0.076		–0.073
		(0.107)		(0.072)		(0.073)		(0.072)		(0.075)
Below med. × hp gr.		0.101		1.693*		1.600**		1.503*		1.712**
		(0.138)		(0.927)		(0.804)		(0.789)		(0.811)
House-price growth sq.					–1.455	–0.948	–1.845	–1.331	–2.232	–1.672
					(1.858)	(1.626)	(1.802)	(1.592)	(1.892)	(1.675)
Log. parents' house value age 17							0.153***	0.144***	0.175***	0.167***
							(0.050)	(0.050)	(0.052)	(0.052)
N	592	592	592	592	592	592	592	592	592	592
R-squared	0.36	0.36	0.36	0.37	0.36	0.36	0.37	0.37	0.38	0.39

Notes: Additional controls: age, age squared and age cubed for child respondent and parent, family size and family size squared for respondent and parent, fixed-effects for the state where the respondent lived at age 17 and 5-year cohort dummies for respondent, except columns (9)-(10) with birth-year dummies instead. Robust standard errors in parentheses. *** significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Table 9: Children Family Income and House Price Growth. Robustness III

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	One-year Price Growth				Four-year Price Growth				Cumulative Price Growth			
	Low wealth		High Inc. gr.		Low wealth		High Inc. gr.		Low wealth		High Inc. gr.	
Log. parent income, five-yr avg.	0.480***	0.446***	0.470***	0.480***	0.479***	0.445***	0.470***	0.483***	0.478***	0.447***	0.467***	0.471***
	(0.077)	(0.083)	(0.078)	(0.081)	(0.077)	(0.084)	(0.078)	(0.080)	(0.077)	(0.083)	(0.078)	(0.079)
House-price growth at 17	1.267**	0.335	1.250*	0.250	0.398*	0.279	0.360*	–0.095	0.502***	0.458**	0.444**	0.043
	(0.633)	(0.641)	(0.651)	(1.065)	(0.206)	(0.225)	(0.209)	(0.353)	(0.178)	(0.189)	(0.181)	(0.322)
Constrained		–0.126*		–0.035		–0.106		–0.049		–0.089		–0.049
		(0.073)		(0.065)		(0.074)		(0.063)		(0.073)		(0.062)
Constrained × hp gr.		3.663**		1.766		0.334		0.847**		0.070		0.682*
		(1.499)		(1.296)		(0.462)		(0.413)		(0.399)		(0.368)
N	592	592	567	567	592	592	567	567	592	592	567	567
R-squared	0.35	0.36	0.36	0.35	0.35	0.35	0.35	0.36	0.36	0.36	0.36	0.36

Notes: Additional controls age, age squared and age cubed for child respondent and parent, family size and family size squared for respondent and parent, fixed-effects for the state where the respondent lived at age 17 and 5-year cohort dummies for respondent, except columns (9)-(10) with birth-year dummies instead. Robust standard errors in parentheses. *** significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Table 10: Children's Family Income and House Price Growth. Asymmetry

	Renters	Owners
	(1)	(2)
Log. parent income, five-yr avg.	0.240***	0.477***
	(0.069)	(0.077)
House price growth ≤ 0	–2.490**	1.048
	(1.255)	(0.862)
House price growth > 0	–0.542	0.584
	(0.826)	(0.465)
N	319	594
R-squared	0.21	0.35

Notes: Additional controls: age, age squared and age cubed for child respondent and parent, family size and family size squared for respondent and parent, 5-year cohort dummies for respondent and fixed-effects for the state where the respondent lived at age 17. Robust standard errors in parentheses. *** significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Table 11: Possible Channels. Owners

	(1)	(2)	(3)	(4)	(5)
Log. parent income, five-yr avg.	0.461***	0.367***	0.298***	0.197***	0.157**
	(0.082)	(0.081)	(0.075)	(0.063)	(0.078)
House price growth at age 17	0.754**	0.838**	0.709**	0.886***	0.694*
	(0.354)	(0.345)	(0.327)	(0.307)	(0.397)
Some college		0.097	0.118*	0.024	–0.024
		(0.073)	(0.065)	(0.064)	(0.086)
College or higher degree		0.399***	0.397***	0.215***	0.235***
		(0.070)	(0.064)	(0.061)	(0.083)
Married			0.692***	0.567***	0.614***
			(0.070)	(0.069)	(0.084)
Industry and occupation dummies	No	No	No	Yes	Yes
Current MSA dummies	No	No	No	No	Yes
N	544	544	544	544	544
R-squared	0.38	0.41	0.50	0.61	0.60

Notes: Additional controls: age, age squared and age cubed for child respondent and parent, family size and family size squared for respondent and parent, 5-year cohort dummies for respondent and fixed-effects for the state where the respondent lived at age 17. Robust standard errors in parentheses. *** significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Table 12: Possible Channels. Liquidity Constrained Owners

	(1)	(2)	(3)	(4)	(5)
Log. parent income, five-yr avg.	0.440***	0.362***	0.299***	0.189***	0.156*
	(0.089)	(0.088)	(0.081)	(0.070)	(0.087)
House price growth at age 17	0.296	0.442	0.376	0.665**	0.666
	(0.358)	(0.345)	(0.314)	(0.319)	(0.426)
Below med. no-housing wealth at age 17	–0.094	–0.054	–0.031	–0.042	–0.008
	(0.080)	(0.079)	(0.071)	(0.068)	(0.099)
Below med. wealth × hp growth	1.732**	1.515*	1.288	0.813	0.140
	(0.811)	(0.809)	(0.802)	(0.729)	(1.048)
Some college		0.095	0.115*	0.021	–0.025
		(0.073)	(0.065)	(0.064)	(0.086)
College or higher degree		0.388***	0.388***	0.209***	0.232***
		(0.070)	(0.064)	(0.061)	(0.084)
Married			0.685***	0.561***	0.612***
			(0.070)	(0.069)	(0.085)
Industry and occupation dummies	No	No	No	Yes	Yes
Current MSA dummies	No	No	No	No	Yes
N	543	543	543	543	543
R-squared	0.38	0.42	0.50	0.61	0.60

Notes: Additional controls: age, age squared and age cubed for child respondent and parent, family size and family size squared for respondent and parent, five-year cohort dummies for respondent and fixed-effects for the state where the respondent lived at age 17. Robust standard errors in parentheses. *** significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Table 13: House Price Growth and Education Attainment (Probits, Marginal Effects)

	House Price Growth Dummy			House Price Growth Continuous		
	High School or less	Some College	BA-BS or Higher	High School or less	Some College	BA-BS or Higher
	(1)	(2)	(3)	(4)	(5)	(6)
Parent head college dummy	–0.134	–0.011	0.168*	–0.156*	–0.028	0.187**
	(0.082)	(0.073)	(0.087)	(0.080)	(0.072)	(0.087)
Log. parent income, five-yr avg.	–0.131**	0.027	0.160**	–0.122**	0.014	0.157**
	(0.060)	(0.048)	(0.068)	(0.059)	(0.048)	(0.068)
House price growth at age 17	0.053	0.127**	–0.097	1.236***	0.309	–1.184**
	(0.070)	(0.063)	(0.069)	(0.451)	(0.381)	(0.469)
Low non-housing wealth dummy	0.167**	0.098	–0.224***	0.119*	0.006	–0.108*
	(0.081)	(0.079)	(0.077)	(0.062)	(0.058)	(0.061)
Low wealth × house price growth	–0.113	–0.137	0.275**	–0.201	–1.461**	1.957***
	(0.093)	(0.079)	(0.118)	(0.681)	(0.648)	(0.731)
Log. parents' house value at age 17	–0.102**	–0.021	0.114**	–0.091**	–0.018	0.102**
	(0.043)	(0.034)	(0.049)	(0.042)	(0.034)	(0.049)
Female	–0.047	–0.001	–0.057	–0.060	0.007	–0.052
	(0.058)	(0.052)	(0.057)	(0.058)	(0.051)	(0.057)
Black	0.059	–0.038	–0.168**	0.071	–0.047	–0.169**
	(0.075)	(0.068)	(0.069)	(0.075)	(0.067)	(0.069)
MSA unemployment rate at age 17	–0.006	–0.010	0.031**	0.010	–0.019	0.025
	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)	(0.016)
N	445	446	452	445	446	452
R-squared	0.19	0.10	0.25	0.20	0.10	0.26

Notes: Additional controls: five-year cohort dummies for respondents and fixed-effects for the state where the respondent lived at age 17. Robust standard errors in parentheses. *** significant at the 1 percent level, ** significant at the 5 percent level, *significant at the 10 percent level.

Table 14: Children's Other Debt, College and House Prices

	Level	Log
	(1)	(2)
Some college or more (dummy)	5,582**	1.71***
	(2,518)	(0.57)
House price growth at age 17 (dummy)	5,053	–0.22
	(3,487)	(0.63)
Some college or more × house price growth	–6,894*	–1.43*
	(4,053)	(0.75)
Log. parent Income, five-yr avgerage	3,491	0.18
	(2,248)	(0.36)
Female	–6,323**	–1.42**
	(3,062)	(0.56)
Black	5,022	–0.32
	(3,207)	(0.54)
Married	13,993***	2.85***
	(4,128)	(0.66)
N	582	582
R-squared	0.14	0.11

Notes: LHS is other debt in dollars for the level specification and log(1+debt) for the log specification. Additional controls: age, age squared, family size and family size squared, five-year cohort dummies for respondents and fixed-effects for the state where the respondent lived at age 17. Robust standard errors in parentheses. *** significant at the 1 percent level, ** significant at the 5 percent level, * significant at the 10 percent level.

Table 15: Children of Owners: Transition Matrices by house price Growth in MSA at Age 17

All
Sample size: 594

Parents' Income Quartile	Children's Income Quartile 1 %	2 %	3 %	4 %
1	43.3	30.3	16.3	10.1
	(3.7)	(3.4)	(2.8)	(2.3)
2	28.2	24.2	28.9	18.8
	(3.7)	(3.5)	(3.7)	(3.2)
3	22.2	19.3	34.8	23.7
	(3.6)	(3.4)	(4.1)	(3.7)
4	15.2	22.0	25.0	37.9
	(3.1)	(3.6)	(3.8)	(4.2)

house price growth higher than national average
Sample size: 309

Parents' Income Quartile	Children's Income Quartile 1 %	2 %	3 %	4 %
1	43.9	28.0	15.9	12.2
	(5.8)	(5.3)	(4.3)	(3.8)
2	23.0	24.1	32.2	20.7
	(4.9)	(5.0)	(5.4)	(4.7)
3	20.6	22.1	32.4	25.0
	(4.3)	(4.4)	(4.9)	(4.6)
4	13.9	16.7	22.2	47.2
	(3.7)	(4.0)	(4.5)	(5.4)

house price growth lower or at national average
Sample size: 285

Parents' Income Quartile	Children's Income Quartile 1 %	2 %	3 %	4 %
1	42.7	32.3	16.7	8.3
	(5.0)	(4.8)	(3.8)	(2.8)
2	35.5	24.2	24.2	16.1
	(6.1)	(5.4)	(5.4)	(4.7)
3	23.9	16.4	37.3	22.4
	(5.2)	(4.5)	(5.9)	(5.1)
4	16.7	28.3	28.3	26.7
	(4.8)	(5.8)	(5.8)	(5.7)

Table 16: Children of Renters: Transition Matrices by House-Price Growth in MSA at Age 17

All
Sample size: 319

Parents' Income Quartile	Children's Income Quartile 1 %	2 %	3 %	4 %
1	48.8	30.2	13.2	7.8
	(4.4)	(4.0)	(3.0)	(2.4)
2	37.2	25.6	23.1	14.1
	(5.5)	(4.9)	(4.8)	(3.9)
3	25.0	26.9	21.2	26.9
	(6.0)	(6.1)	(5.7)	(6.1)
4	18.3	28.3	30.0	23.3
	(5.0)	(5.8)	(5.9)	(5.5)

House-price growth higher than national average
Sample size: 180

Parents' Income Quartile	Children's Income Quartile 1 %	2 %	3 %	4 %
1	46.4	33.3	14.5	5.8
	(9.8)	(9.2)	(6.9)	(4.6)
2	37.0	28.3	19.6	15.2
	(6.1)	(5.7)	(5.0)	(4.5)
3	32.3	22.6	22.6	22.6
	(6.5)	(5.8)	(5.8)	(5.8)
4	23.5	26.5	23.5	26.5
	(6.8)	(7.1)	(6.8)	(7.1)

House-price growth lower or at national average
Sample size: 139

Parents' Income Quartile	Children's Income Quartile 1 %	2 %	3 %	4 %
1	51.7	26.7	11.7	10.0
	(6.5)	(5.7)	(4.1)	(3.9)
2	37.5	21.9	28.1	12.5
	(8.6)	(7.3)	(7.9)	(5.8)
3	14.3	33.3	19.0	33.3
	(7.6)	(10.3)	(8.6)	(10.3)
4	11.5	30.8	38.5	19.2
	(6.3)	(9.1)	(9.5)	(7.7)