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Education and the Intergenerational Transmission of Homeownership

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Abstract

This report examines the linkages between educational attainment and homeownership attainment. Given that parents play a role both in supporting their children's education and in helping them buy homes, the question is how important is parental background compared to individual resources, including education, in the achievement of homeownership. If education has an effect that is independent of parents, it would suggest that public policies to promote higher education could have the added benefit of also promoting greater homeownership attainment. The study uses data from the Panel Study of Income Dynamics (PSID), which includes information on the resources of both parents and their grown children. PSID results are compared to those from the American Community Survey (ACS), which lacks parental data.

Our findings are, first, that the effects of education on homeownership are very similar in the ACS and the PSID when estimated for models that exclude parental data. Second, in the PSID, parental income, wealth, and own education are strongly supportive of higher education for their children. Third, education of children is strongly supportive of child homeownership attainment prior to incorporating information on parental resources. Fourth, after parental factors are added, education effects on child homeownership attainment are little changed, indicating a non-spurious effect and suggesting that education benefits are independent of how a person achieved higher education. Fifth, after incorporating income, wealth, and other economic attributes of the child households, the education effect is greatly reduced, but remains significant. Sixth, racial disparities in homeownership are reduced by controlling for education differences and are further reduced by additional controls; however, attainment of a bachelor's degree remains especially important for achieving homeownership among black households, even after all other factors are held constant. Finally, all other factors equal among children and parents, young adults whose parents are homeowners are 6 percentage points more likely

to be homeowners themselves. Overall, the findings suggest that parental background has a strong effect on children's chances for both higher education and homeownership, but education maintains an independent effect on homeownership attainment that could help reduce disparities in access.

INTRODUCTION

This is the second in a series of reports examining factors associated with home buying and achieving homeownership status among young adults. A central contribution of the overall study is an analysis of the independent effects of young adults' education and income, as well as their parents' socioeconomic status and any financial assistance parents may provide, on home buying and homeownership. The study also examines how these factors may be changing over time and how they vary across racial and ethnic groups. This "unpacking" of factors is made possible by the use of several data sources that contain detailed information on family members connected across generations.

The first report examined the role of parental financial assistance in home buying by using two rich longitudinal data sets with data on both parents and children: the Panel Study of Income Dynamics (PSID) and the Health and Retirement Survey (HRS).¹ We found that parental financial assistance increased the probability of their adult children buying a home over the next one to two years, independent of the effects of parental wealth, homeownership, and other characteristics associated with both financial transfers and their children's likelihood of homeownership.

In this report, we move from examining transitions into homeownership, that is, home buying, to analyzing homeowner status at a point in time, a cumulated status built of home buying across years. Our focus is on the central role of education, a pivotal endowment positioned between the parent and child generations. Parental wealth enhances children's chances for homeownership through the channel of direct financial assistance around the time of home purchase; but prior to that, family economic resources might also support college attendance by the children. In turn, higher education supports higher earnings and is a strong predictor of chances for achieving homeownership. Without knowledge of parental resources, children's educational attainment might assume an exaggerated importance in homeownership achievement, because it not only increases children's earnings and chances of mortgage qualification, but it also reflects parental economic resources that might be used to directly or indirectly support home buying activity.

The practical question is how much the chances for homeownership might be increased if children's educational attainment were elevated, while parental background factors remained constant. For this analysis, we disentangle the impact of children's own economic status and sociodemographic

¹ The report by Myers, Painter and Zissimopoulos (2016) describes these data resources, assesses the prevalence of parental support, and estimates the effect of financial assistance on home buying by young adults. We found based on the HRS analysis that the unconditional probability of transitioning to homeownership is increased by 23.0 percent among adult children who have received a transfer of at least \$5,000 for any purpose from their parents in the past two years. Even after controlling for parental wealth and other parent and child characteristics, the probability of transitioning to homeownership still increases by 13.1 percent with receipt of a transfer.

characteristics from the impacts of financial resources of their parents. By analyzing these factors in a series of models, we can quantify the independent effects of education and income on homeownership and quantify how much of that effect remains after accounting for parental resources. Certainly, a large literature has consistently documented intergenerational correlations of economic status across parents and children, and this empirical fact emphasizes the need for analyses that unpack the pathways in which education, income, and parental resources impact homeownership.

The primary reason that research has not determined the independent impacts of education and parental wealth is that most data sources lack information needed to link parental resources to children's homeownership. In this paper, we use data on young adults and their parents from the Panel Study of Income Dynamics (PSID) to estimate the relationship between education, parental resources, and homeownership. We also draw on data from a commonly used source in the study of homeownership, the American Community Survey (ACS). We compare empirical estimates of the effect of young adults' education and income on homeownership across the two data sets and then use the PSID's intergenerational data to quantify how much of the effect of education and income is accounted for by parental resources (unavailable in the ACS).

An added indicator of parental resources that we include in this study is the homeownership status of parents. Parents who are homeowners may have greater knowledge about the costs and benefits of homeownership and about the process by which it is attained. Parental homeownership could reflect parent preference for owning a home over other investments or it could reflect the collateral benefits of owning a home, such as greater residential stability or access to home equity credit to finance a child's education. It is also possible that co-residence in the same region with higher or lower homeownership could support a positive correlation between status of parents and children. Because of all these channels, we expect there is a positive correlation between the homeownership status of parents and children, although it is not known if that positive correlation persists once parental wealth and other controls are included in the model.

BACKGROUND

A well-established relationship exists in the housing literature between homeownership and household income and wealth (e.g., Haurin et al., 1996). Because not all data sources record household wealth, significant attention has focused on down payment constraints (Linneman et al. 1997 among others) that presumably proxy for household wealth and other credit constraints. This literature has drawn consistent conclusions that permanent income is positively related to homeownership and that down payment constraints, either in the form of a lack of assets or in terms of other credit constraints, reduce homeownership.

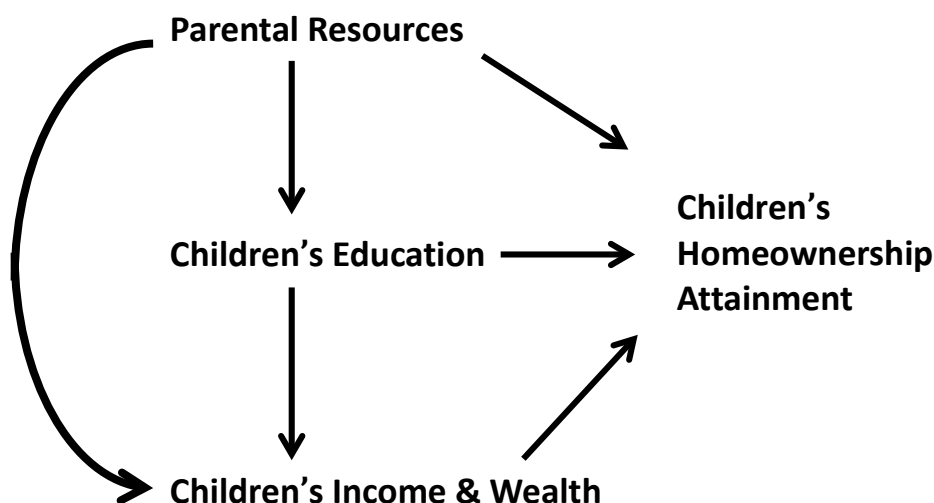
A variable that is often included in housing tenure choice models is education of the household head. Education may advance the chances for homeownership in a variety of ways. Researchers

(Painter et al., 2001; Gyourko and Linneman, 1996) note that education, as an indicator of earnings potential, may proxy for permanent income, or it could be an indicator for parental resources. In addition, net of these other factors, education may have independent effects as a proxy for financial skills, such as knowledge of credit markets, which would increase the chances for homeownership. Each of these mechanisms linking education to homeownership holds different implications.

Of particular interest, education is a policy variable that is influenced by public and private programs to promote college attendance. In addition to its benefits for workforce preparation, given education's positive association with homeownership, increasing education also may have potential to increase the attainment of homeownership. This could be particularly important among groups that have historically lower levels of educational attainment and also lower access to homeownership. However, to estimate the homeownership benefits accrued from raising education levels, it is essential to distinguish between the different mechanisms that link education to homeownership.

A primary concern is that the estimated positive impact of education on homeownership attainment is simply due to unobserved parental resources that increased the education of the child. To what degree might the apparent effects of education on homeownership attainment be spurious? As Figure 1 suggests, the same parental resources that increase educational attainment could also increase the chances of home buying in numerous ways. The various channels include helping with down payments, co-signing loans, or providing other financial support. Indeed, our prior research has already estimated the degree to which parental financial transfers increase the probability of home buying among adult children. Because of these other channels by which parental resources might support their children's home purchases, policies that simply focus on increasing educational attainment may not increase homeownership or may not increase it to the extent predicted by models of homeownership that do not account for the unobserved effects of parental resources.

Figure 1. Relationships among parental and children’s resources in the determination of children’s homeownership attainment: Education’s pivotal role between the generations.



Parental Resources and Educational Attainment

Much empirical literature documents a positive association between parents’ socioeconomic status and their children’s educational attainment. Consistent with a theoretical framework in which parents invest in their children (Becker and Tomes, 1976), the more resources parents have, the more they can devote to children’s needs, including their education. Highly educated parents seem particularly likely to invest in their children’s education. Research consistently demonstrates a positive relationship between parent’s income, wealth, and education and their children’s educational outcomes (e.g., Chevalier, 2004; Clark-Kaufman et al., 2003; Haveman and Wolfe, 1995; Taubman, 1989). Having established the intergenerational association between parents’ socioeconomic status and their children’s education, most current literature focuses on assessing the causal link between the two.

What remains under debate are the channels through which parental influences may occur. Parental income, wealth, and education are likely correlated with each other and may also relate to underlying unobserved factors that impact their children’s educational attainment. Thus, questions remain about whether genetic or environmental factors are driving the differences in children’s educational attainment (Chevalier, 2004). Wealthy, highly educated parents may provide a nurturing environment that promotes their children’s education. Alternatively, these parents could be passing on genetic material that helps children succeed in school. Most studies find a causal link between parents’ income and education and children’s educational attainment. For example, using changes in the distribution of wages in the U.S. as an instrument for family income, Acemoglu and Pischke (2001) find that a 10% increase in family income is associated with a 1.4% increase in children attending a four-year

college. Similarly, using changes in parents' compulsory schooling as an instrument, Oreopoulos et al. (2006) find that one additional year of parental education leads to a 2 to 4 percentage point decrease in the likelihood that a child repeats a grade. Notably, several of these studies find a larger effect of mothers' education on their children, particularly their sons (Black et al., 2005). In a study on the effect of parental income and education on children's schooling in the United Kingdom, Chevalier et al. (2013) attempt to address the two endogenous variables simultaneously. Their instrumental variable models reveal that parents' permanent income is important to their children's educational attainment, but the parents' "education does not have an independent effect" (p.23). Taken together, these studies suggest a strong link between parental characteristics, often including their education, and their children's educational attainment.

Homeownership, Education, and Parental Wealth

For this study, our primary interest lies in uncovering how education influences homeownership. In doing so, it is important to bear in mind the large role children's own resources, which at least partially are derived from their parents, play in their educational attainment, which, in turn, may influence their housing tenure decisions. The literature indicates a strong association between education and homeownership. As a variable of interest, educational attainment is typically positive and significant in models estimating homeownership likelihood (e.g., Coulson, 1999; Gyourko and Linneman, 1996). Further, this relationship exists across all racial groups. Painter et al. (2001) find that receiving a four-year college degree is associated with a 4.1 percentage point higher probability of homeownership among movers. In samples stratified by race, the size of the effect is consistent among White, Black, and Hispanic households (3.4 to 3.9 percentage points), but significantly higher for Asian households (6.3 percentage points). Education has also been shown to reduce some of the racial differences in homeownership, such as the gap between Hispanics and non-Hispanic Whites (Cortes, Herbert et al. 2007). The single study (Charles and Hurst, 2002) that includes parental wealth finds that it impacts the probability of applying for a mortgage more than does an individual's educational attainment. Similarly, Hilber and Liu (2008) find that high school and college completion exhibit a positive impact on homeownership, but the effect of college diminishes when (own) wealth is added to the model.

Because little of this literature contains adequate controls for parental resources in models of housing tenure choice, in our study we estimate reduced form models that will determine the associations between education and homeownership net of parental resources. Our aim is to compare estimates of education effects net of parental background factors to more prevalent estimates that are blind to intergenerational effects. The latter are the most common in practice due to data limitations, and it is important to learn how much omission of parental factors might bias conclusions about the effect of education on homeownership.

DATA AND METHOD

This report primarily relies on two nationally representative data sets: the Panel Study on Income Dynamics (PSID) and the American Community Survey (ACS). The PSID is the longest running panel data set in the U.S. It has followed the original respondents and their descendants since 1968. This longitudinal nature and the PSID's Family Identification Mapping System (FIMS) that connects data across generations of a family enable us to examine the relationship between education, homeownership, and parental resources. We use the most current wave of the PSID (2013) to examine the role of parental education, income, and wealth on the homeownership and educational attainment of children. The ACS, conducted by the Census Bureau, is the largest and most heavily used survey in the United States. With its rigorous survey design and substantial sample size, it arguably offers the most reliable information on individuals and households in the nation every year. The ACS data support analysis of tenure decisions absent any information about parents. We use the 2013 ACS 1-Year Public Use Microdata Sample (PUMS).

The analysis is staged in two parts, first addressing educational attainment and then homeownership attainment. Educational attainment is an individual-level process, and accordingly the unit of analysis for the educational attainment analysis is the individual. The unit of analysis for the tenure choice model, in contrast, is the household because homeownership rates are commonly reported at the household level and we wish to offer findings that are compatible with industry practice. We use ordinary least squares to estimate models of both educational attainment and homeownership. We model educational attainment as the probability of having a Bachelor's or higher degree. Key covariates of interest in the educational attainment model are sociodemographic variables, such as age, race, and gender of the household head, and parental resources. Key covariates in our models of homeownership are education, income, and parental resources (income, wealth, and homeownership), as well as the above demographics.

RESULTS

Summary statistics

Our analysis uses PSID sample members ages 20 to 49 with data reported in 2013, the latest available wave. Education analysis is based on 9,967 individuals, whereas homeownership analysis is based on 5,526 household heads. For comparison, a sample is also drawn from the ACS consisting of 1,077,728 individuals for the education analysis and 492,407 householders for the homeownership analysis.

We display the summary statistics from the PSID sample of three key variables by race/ethnicity to highlight how variables such as education, homeownership, and wealth are highly correlated with each other and vary significantly by race/ethnicity (Table 1). Non-Hispanic whites aged 20 to 49 have the

highest levels of education, homeownership rates, and wealth. Both Hispanics and non-Hispanic Blacks have similar rates of education attainment, with 17-18% of 20-to 49-year-olds in each group receiving a bachelor's or higher degree. However, there are significant differences between Hispanics and non-Hispanic Blacks in their level of homeownership attainment in this age group. Hispanics in the PSID, which for sample history reasons might be a more advantaged group than average Hispanics in the population at large, have homeownership rates 15 percentage points higher than non-Hispanic blacks. It should be recognized that the Hispanic sample in the PSID is not reflective of families with recent immigrant histories, due to the roots of the PSID sample in an original sample of families surveyed in the 1960s.²

Table 1 shows significant differences in wealth across racial groups that may be related to differences in homeownership. The wealth gradients across races are even steeper for parents than for the young adults. Interestingly, the average household wealth of young black households is greater than the wealth of their parents. This is in contrast to whites and Hispanics, whose parents possess greater average wealth. The median wealth of young black households is very low, and more in line with the median wealth of their parents. The PSID finds the opposite for the Hispanic young adults in the sample, for whom median wealth is higher than their parents' median wealth.

Table 1: Education and Wealth by Race

	Bachelor's	Home	Household wealth		Parental wealth	
	degree +	ownership	Mean	Median	Mean	Median
Total (20 to 49)	32.3	43.9	110,587	12,010	428,997	40,000
NH-White	38.0	49.5	133,817	20,000	563,319	120,000
NH-Black	16.8	24.8	28,112	1,200	18,714	4,000
Hispanic	17.8	39.7	71,032	11,000	140,137	7,000

Note: The level of educational attainment is measured at the individual level, while the homeownership rate and wealth are measured at the family level. Sampling weights were used to generate nationally representative estimates of variables. Source: PSID 2013.

These differences in education and wealth suggest the importance of understanding the relative contribution of each characteristic in predicting homeownership. The models for understanding the role of wealth in educational attainment and homeownership are presented below. The overall strategy is to first model how educational attainment is shaped by parental and individual resources. Subsequently, we model how homeownership attainment is determined by those same factors.

² The PSID is designed to follow family members over time, tracing grown children as they split off and form their own families. Originally founded in the 1960s, the PSID began with very few immigrants because the numbers of foreign-born residents did not begin to increase until after the 1970s, with increases particularly rapid in the 1990s. As a result, the Hispanic members of the PSID sample are both relatively few in number and also composed of longer-settled, later generations of Americans who have higher economic status than average Hispanics.

Education

The first model estimates the likelihood of having a bachelor’s degree or higher as a function of a set of demographic characteristics that are available in both the ACS and PSID (Table 2: Model 1). In both data sets, attainment of a bachelor’s degree is estimated to be lower for African-Americans and Hispanics. As expected, attainment of a bachelor’s degree is higher for those older than age 24, because those who are younger may still be working on their degrees, but there is little change in the probability of having a bachelor’s degree after that age.

In Model 2 of Table 2, we include measures of parental economic resources and parental education. This model is only estimated in the PSID because parental economic resource measures are not available in the ACS. Consistent with the literature, we find higher education, income, and wealth of parents is associated with an increased probability of having a bachelor’s degree or higher. With the addition of parental variables in Model 2, the deficit in educational attainment for African-Americans and Hispanics is reduced by 40-50%; however, the achievement gap is still substantial.

In Model 3 we add an additional control for whether a parent is a homeowner. Parental homeownership is positively associated with attaining a bachelor’s degree or higher, elevating the child’s probability of being college-educated by 3.3 percentage points. This homeownership effect appears to be largely independent of other variables because the estimates of other coefficients of the model are virtually unchanged. The only exception is a slight decrease in the coefficient on the two upper wealth quartiles (by 17% and 10%). As discussed above, this importance of parental homeownership could reflect parent preference for investments, or it could reflect the collateral benefits of owning a home.

Table 2. Linear probability model of educational attainment (bachelor’s degree or higher)

	Model 1				Model 2		Model 3	
	2013 ACS Coef.	Sig.	PSID Coef.	Sig.	PSID Coef.	Sig.	PSID Coef.	Sig.
Child Characteristics								
<i>Race/ethnicity (ref. NH White)</i>								
Hispanic	-0.210	***	-0.186	***	-0.104	***	-0.105	***
NH Black	-0.157	***	-0.217	***	-0.120	***	-0.118	***
Other	0.100	***	-0.062	*	-0.012		-0.011	
<i>Age Group (ref. 35 to 44)</i>								
20 to 24	-0.188	***	-0.181	***	-0.172	***	-0.175	***
25 to 34	0.004	***	0.008		-0.010		-0.011	
45 to 49	-0.044	***	-0.028	+	-0.013		-0.012	
Female	0.055	***	0.060	***	0.065	***	0.065	***
Parental Characteristics								

No Information on Parental Characteristics			0.137 ***	0.142 ***
<i>Parental Education (ref less than HS)</i>				
High School Grad			-0.015	-0.016
Some College			0.076 ***	0.073 ***
Bachelor's plus			0.267 ***	0.265 ***
Missing			0.013	0.016
<i>Parent Income Quartiles (ref. 1st quartile)</i>				
2nd quartile			-0.019	-0.022
3rd quartile			0.013	0.010
4th quartile			0.077 ***	0.072 **
Missing income/wealth			0.021	0.017
<i>Parent Wealth Quartiles (ref. 1st quartile)</i>				
2nd quartile			0.015	-0.003
3rd quartile			0.124 ***	0.103 ***
4th quartile			0.210 ***	0.189 ***
Parent homeownership				0.033 **
Constant	0.373 ***	0.382 ***	0.192 ***	0.186 ***
R2	0.067	0.086	0.172	0.173
N	1,077,728	9,967	9,967	9,967

Note: *: $p < 0.10$, **: $p < 0.05$, ***: $p < 0.01$. Individuals are restricted to those aged 20 to 49. The sample excludes people in group quarters (ACS), and institutionalized, non-response, and died (PSID). The regressions are based on unweighted counts, and robust standard errors are used to correct for heteroscedasticity.

Homeownership

From the above, we learned how individual characteristics and family resources have shaped the education level of individuals. We next seek to understand how education and other factors work together to increase homeownership among young adults.

We estimate reduced form models of homeownership. Models 1 through 3 are estimated using both the PSID and ACS and include covariates common to both data sets (Table 3a). Consistent with many other studies, we find that African-Americans and Hispanics are less likely to be homeowners compared to non-Hispanic whites and that homeownership rises with age (Model 1). Model 2 adds education variables to the covariates in Model 1. As expected, higher levels of education are associated with higher rates of homeownership. The relationship in these models is monotonically increasing in education, with the highest homeownership rate associated with having a bachelor's degree. Also

evident in Model 2 is the fact that controlling for education reduced the homeownership disparities between whites and African-Americans or Hispanics.

Household income has a very direct effect on home buying, and when this variable is added as a covariate, the coefficients on education are reduced by one-half to two-thirds depending on the data set used (Model 3). The largest reduction in coefficients is for the households with a bachelor’s degree because of the correlation with higher incomes. With income controlled, in fact, there is little added gain in homeownership between high school graduates and those completing a bachelor’s degree. The differences between Models 2 and 3 in both data sets confirm the strong association between income and education.

Marital status in particular has a very strong association with homeownership, both before and after adding controls for education and income (Table 3-a). In the PSID, married households have homeownership rates 36 percentage points higher than unmarried householders (23 points after income controls), while in the ACS data the effects are somewhat lower (27 and 18 percentage points, respectively). The marital effect is even larger than that of a bachelor’s degree and it is less impacted by income controls. Further research, not shown, suggests that this is only partly related to the presence of children in the household. That factor increases likelihood of homeownership by 7 percentage points while weakening the effect of marital status by only 2 percentage points. Marital status thus is one of the largest and most consistently important factors shaping homeownership attainment.

It bears attention that the education effects are very similar in models estimated with the PSID and the ACS data, although other coefficients may vary somewhat between the two data sets. Although the ACS data have the widest geographic coverage and are most heavily used for local analysis, they can describe homeownership only with information about the adult children. Although we cannot know if estimates from the ACS data would change in the same manner as in the PSID when parent information is added, the similarity of education effects in the two data sets suggests that the proportional reduction in the education effect in the PSID could provide a rough guide to changes that might be anticipated after adding unobserved parent information to the ACS.

Table 3-a. Linear probability model of housing tenure choice (Models 1 to 3)

	Model 1				Model 2				Model 3			
	2013 ACS		PSID		2013 ACS		PSID		2013 ACS		PSID	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Child Characteristics												
<i>Race/ethnicity</i> (ref. NH White)												
Hispanic	-0.195	***	-0.130	***	-0.147	***	-0.096	***	-0.129	***	-0.073	***
NH Black	-0.222	***	-0.147	***	-0.203	***	-0.122	***	-0.163	***	-0.085	***
Other	-0.120	***	-0.036		-0.126	***	-0.020		-0.113	***	-0.005	
<i>Education</i> (ref less than HS)												
High School Grad					0.105	***	0.075	***	0.063	***	0.033	*
Some College					0.137	***	0.128	***	0.065	***	0.056	***

Bachelor's plus Missing			0.201 ***	0.190 ***	0.067 ***	0.055 ***
			0.000 ***	-0.013	0.000 ***	-0.047 ***
<i>Age Group (ref. 35 to 44)</i>						
20 to 24	-0.369 ***	-0.282 ***	-0.363 ***	-0.269 ***	-0.288 ***	-0.204 ***
25 to 34	-0.174 ***	-0.167 ***	-0.179 ***	-0.173 ***	-0.154 ***	-0.136 ***
45 to 49	0.080 ***	0.084 ***	0.086 ***	0.090 ***	0.076 ***	0.084 ***
Female	-0.009 ***	0.012	-0.014 ***	0.002	0.004 ***	0.011
<i>Marital status (ref. single never or formerly married)</i>						
Married	0.269 ***	0.364 ***	0.261 ***	0.350 ***	0.180 ***	0.233 ***
Living with a partner		0.066 ***		0.076 ***		0.005
<i>Child Family/Household Income Quartiles (ref. 1st quartile)</i>						
2nd quartile					0.114 ***	0.091 ***
3rd quartile					0.246 ***	0.230 ***
4th quartile					0.342 ***	0.363 ***
Constant	0.543 ***	0.394 ***	0.398 ***	0.273 ***	0.305 ***	0.200 ***
R2	0.216	0.272	0.228	0.285	0.271	0.327
N	492,407	5,526	492,407	5,526	492,407	5,526

Note: *: $p < 0.10$, **: $p < 0.05$, ***: $p < 0.01$. Households are restricted to those with householders aged 20 to 49. For the ACS, the child characteristics are based on the personal characteristics of householders. For the PSID, child characteristics are based on the personal characteristics of the reference child who is from the PSID families. The regressions are based on unweighted counts, and robust standard errors are used to correct for heteroscedasticity.

The next series of models introduces measures of parental economic resources and characteristics, drawing on the richness of the PSID to estimate the impact of a child's education, income, and wealth on homeownership independent of the effects of parental background. Model 4 displays the impact of parental resources without including the child's income or education (Table 3b). As expected, children whose parents have wealth in the highest quartile have a greater likelihood of homeownership.

The most notable result in this analysis is that the independent impact of the child's education on homeownership is maintained after controlling for the impact of parental resources. The coefficients on educational attainment in Models 2 (without parental factors) and 5 (with parental factors) are essentially identical, as are those after adding child's income in Models 3 (without parental factors) and 6 (with parental factors). This suggests that the estimated impact of education is not simply a proxy for parental resources, but that higher education may independently lead to higher rates of homeownership.

In Model 7 of Table 3b, we include a child's own wealth as a covariate, spotlighting a variable not available in the widely used ACS. Two notable findings emerge. First, the additional benefit of having a high school diploma is eliminated, and the remaining benefit of attending some college is reduced.

However, the larger change in this model is evidenced in the fact that, once a child’s wealth is accounted for, parental wealth controls are no longer predictive of a child’s homeownership. As noted in Figure 1 above, one of the mechanisms by which parental resources can influence a child’s homeownership is through a child’s wealth. These models suggest that intergenerational wealth transmission is very important. In fact, the wealth effects dominate in the determinants of homeownership. Wealth of children is substantially more important than their income, and with wealth of parents included, the effect of parental income on children’s homeownership is negative, as is the effect of college education by parents.

Addition of parental homeownership in Model 8 (Table 3b), after accounting for all other factors, yields a positive impact on the homeownership of children, raising the probability by 6.5 percentage points. This effect is independent of and additional to the resources of parents and children. The other coefficients of the model remain unchanged, although the parental income effect turns slightly more negative. This combination of negative parent income and positive homeownership effect on child’s homeownership is consistent with location in a region with lower incomes and higher homeownership, but future research will identify if place of residence is the determining factor for this particular pattern of results. The parental homeownership coefficient may also be capturing an intergenerational taste for homeownership parameter net of wealth as accounted for in the specification for Model 7.

Table 3-b. Linear probability model of housing tenure choice (Models 4 to 8)

	Model 4		Model 5		Model 6		Model 7		Model 8	
	PSID Coef.	Sig.	PSID Coef.	Sig.	PSID Coef.	Sig.	PSID Coef.	Sig.	PSID Coef.	Sig.
Child Characteristics										
<i>Race/ethnicity (ref. NH White)</i>										
Hispanic	-0.090	***	-0.080	***	-0.070	***	-0.069	***	-0.068	***
NH Black	-0.105	***	-0.102	***	-0.080	***	-0.056	***	-0.053	***
Other	-0.014		-0.010		-0.004		-0.022		-0.018	
<i>Education (ref less than HS)</i>										
High School Grad			0.074	***	0.037	*	0.025		0.024	
Some College			0.124	***	0.063	***	0.035	**	0.034	*
Bachelor’s plus			0.175	***	0.061	***	0.056	***	0.054	***
Missing			-0.013		-0.040		-0.041		-0.041	
<i>Age Group (ref. 35 to 44)</i>										
20 to 24	-0.261	***	-0.247	***	-0.183	***	-0.158	***	-0.154	***
25 to 34	-0.166	***	-0.166	***	-0.127	***	-0.097	***	-0.096	***
45 to 49	0.081	***	0.082	***	0.073	***	0.038	**	0.038	**
Female	0.015		0.004		0.010		0.019	*	0.019	*
<i>Marital status (ref. single never or formerly married)</i>										
Married	0.359	***	0.349	***	0.235	***	0.195	***	0.194	***
Living with a partner	0.070	***	0.076	***	0.006		-0.002		-0.002	
<i>Child Family/Household Income Quartiles (ref. 1st quartile)</i>										

2nd quartile			0.091 ***	0.058 ***	0.058 ***
3rd quartile			0.229 ***	0.145 ***	0.145 ***
4th quartile			0.359 ***	0.181 ***	0.182 ***
<i>Child Family/Household Wealth</i>					
<i>Quartiles (ref. 1st quartile)</i>					
2nd quartile				0.126 ***	0.127 ***
3rd quartile				0.477 ***	0.477 ***
4th quartile				0.432 ***	0.434 ***
Parental Characteristics					
No Information on Parental Characteristics	0.040	0.030	0.009	0.013	0.023
<i>Parental Education (ref less than HS)</i>					
High School Grad	0.019	0.015	0.003	0.007	0.008
Some College	0.049 **	0.029	0.013	0.015	0.014
Bachelor's plus	0.024	-0.015	-0.038 *	-0.051 **	-0.049 **
Missing	-0.008	-0.006	-0.003	-0.008	-0.005
<i>Parent Income Quartiles (ref. 1st quartile)</i>					
2nd quartile	-0.072 ***	-0.075 ***	-0.072 ***	-0.050 ***	-0.059 ***
3rd quartile	-0.042 **	-0.050 **	-0.057 ***	-0.029	-0.039 **
4th quartile	-0.058 **	-0.070 ***	-0.083 ***	-0.045 **	-0.060 ***
Missing	0.011	0.001	-0.007	-0.009	-0.000
<i>Parent Wealth Quartiles (ref. 1st quartile)</i>					
2nd quartile	0.047 ***	0.038 **	0.034 **	0.016	-0.022
3rd quartile	0.115 ***	0.095 ***	0.072 ***	0.029	-0.013
4th quartile	0.182 ***	0.157 ***	0.124 ***	0.027	-0.014
Parental homeownership					0.065 ***
Constant	0.323 ***	0.248 ***	0.200 ***	0.121 ***	0.110 ***
R2	0.284	0.293	0.332	0.434	0.435
N	5,526	5,526	5,526	5,526	5,526

Note: *: p < 0.10, **: p < 0.05, ***: p < 0.01. Households are restricted to those with householders aged 20 to 49. For the ACS, the child characteristics are based on the personal characteristics of householders. For the PSID, child characteristics are based on the personal characteristics of the reference child who is from the PSID families. The regressions are based on unweighted counts, and robust standard errors are used to correct for heteroscedasticity.

Education Effects on Homeownership by Race

The above estimates for the association of race/Hispanic origin and homeownership are negative, expressed relative to the non-Hispanic white reference group. This signifies a disparity in homeownership attainment between whites and others. Comparisons across models reveal that this disparity grows progressively smaller as education and then other economic resources are introduced as controls. The disparity reduction for black households is especially noteworthy in Table 3-b.

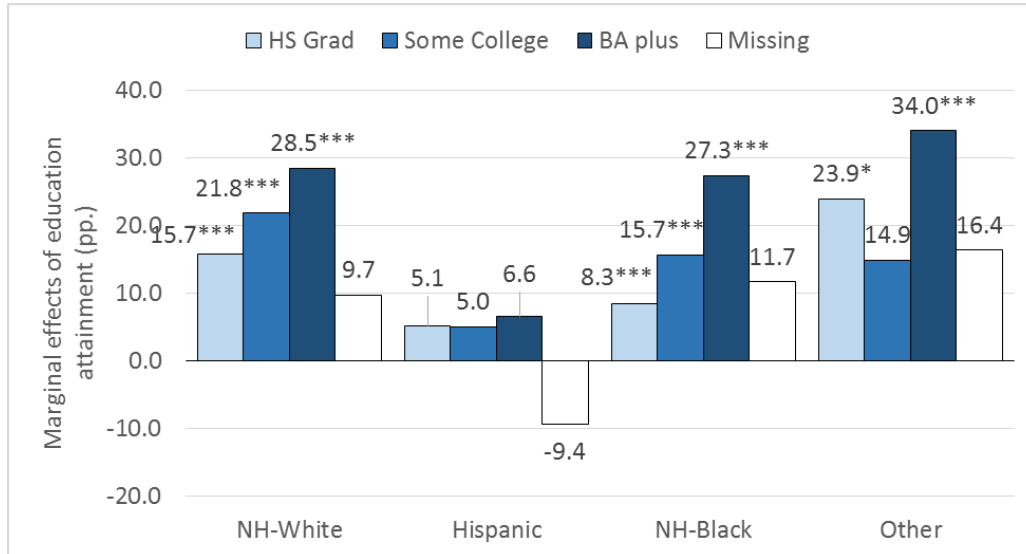
For this study, which focuses on the role of education, it is reasonable to ask if higher education provides an equivalent boost in homeownership for all racial groups, or whether education might have greater leverage for some groups than others. We test for any systematic differences in the estimated education coefficients by race through the introduction of interaction effects. The results are computed within each racial group as differences in expected values for homeownership probabilities, relative to the homeownership attainment of households with less than a high school degree within the same racial group. Results are displayed in Figure 2, drawing on estimates reported Models 9-1 and 9-2 in Appendix Table A-1.³

In the top panel of Figure 2, estimates include controls for parental resources but not for the household's own marital status, income, and wealth. This structure highlights education-related racial differences in homeownership after controlling for parental background factors but before controlling for the resources accumulated in young adulthood. No adjustment is made in the top panel for differences in household resources that result from or may be correlated with educational attainment and that also influence homeownership. A distinctly different pattern of education effects is noted among the racial groups. Among Hispanic households, we observe no statistically significant impact of education on homeownership attainment. For both white and black households, however, there is a clear positive association between increasing levels of education and homeownership. For white households, high school graduates are predicted to have a 15.7 percentage point higher rate of homeownership than those without a high school degree, and college graduates are predicted to have a 28.5 percentage point higher rate of homeownership. The effect of a college degree is almost the same for black and white households (27.3 vs. 28.5 percentage point increase, respectively), but the impact on homeownership is lower for black households at lower education levels. Among the much smaller "other" group, largely composed of Asian households, college graduates also gain a large increment in homeownership (34.0 percentage point increase).

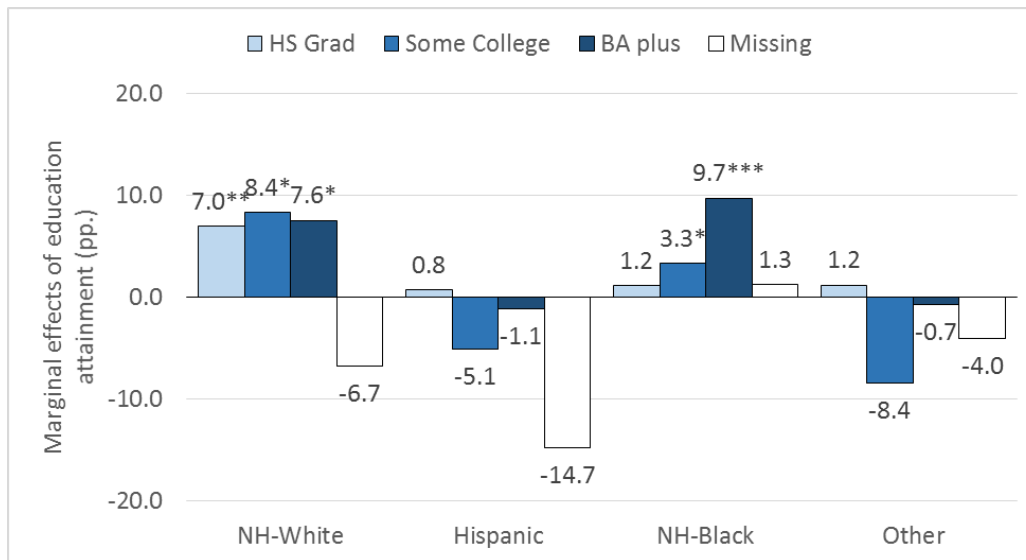
³ Each marginal effect is computed through summation of a unique combination of the coefficients for education and race X education in the tables. For example, to calculate the marginal effect of a bachelor's degree for blacks in Appendix Table A-1, Model 9-2, as illustrated in Figure 2, panel B, we add two numbers – one in the education section and another in the race X education section: $0.076 + 0.022 = 0.097 = 9.7$ percentage points. This is the comparison between black college grads and black high school dropouts, all other factors held equal at mean values of the sample. The benefit of a bachelor's degree for the white reference group is indicated solely by the

Figure 2. Marginal effects of educational attainment on homeownership by race, controlling for background effects of parental economic resources

Panel A. Marginal effects not controlling for a household’s own marital status, income, and wealth (Model 9-1 in Appendix Table A-1)



Panel B. Marginal effects after controlling for a household’s own marital status, income, and wealth (Model 9-2 in Appendix Table A-1)



education coefficient (0.076), because there is no additional interaction effect. (Meanwhile, the main effect of race at the top of the table represents differences among the high school drop-outs, the reference condition for the education effects.) Finally, the joint statistical significance displayed for each marginal effect in Figure 2 is derived through the lincom command of Stata/SE 11.2.

Note: *: $p < 0.10$, **: $p < 0.05$, ***: $p < 0.01$. The estimates are based on Models 9-1 and 9-2 in Table A-1 at the mean of the covariates other than race/ethnicity and education. Significance is reported between each educational group and the less than high school group within a race/ethnicity group.

In the bottom panel of Figure 2, we introduce controls for household marital status, income, and wealth of the young adults, after which the marginal effects of education on homeownership are substantially muted. As before, we observe no additional effect of education net of other factors for Hispanic households. However, among both white and black households, a clear difference in the probability of being a homeowner at different levels of education remains, even after controlling for the full range of other current household characteristics. For example, the difference in the probability of homeownership between those non-Hispanic white households without a high school diploma and those with a high school diploma is 7 percentage points. Interestingly, additional education beyond a high school diploma provides little additional benefit for white households (again, because income and wealth are held constant). However, among black households, a college degree is associated with a 9.7 percentage point increase in homeownership compared to black households with less than a high school education. The model estimates imply that while having some college education increases the probability of homeownership slightly for black households, obtaining a bachelor's degree has a much higher association with homeownership. Again, the estimates in panel A of Figure 2 are larger because they precede the controls for household income and other economic factors that are introduced in panel B. The college advantage for black homeownership is all the more impressive in panel B, because it shows that the benefits of a bachelor's degree for homeownership attainment of black households are substantial even after controlling for household marital status, income, and wealth.

CONCLUDING COMMENTS AND POLICY IMPLICATIONS

This report highlights the effect of education on homeownership. The first project report (Myers et al. 2016) focused on the likelihood of home buying in a two-year period and emphasized the important role of parental financial support for helping their adult children in that short period. The present work takes a longer view of accumulated homeownership status and adopts an intergenerational perspective through which parental resources promote children's homeownership over a much longer time horizon and in multiple ways. Among the most important ways is helping their children to achieve more advanced education, which in turn supports their higher earnings used to attain homeownership.

Education is a human capital investment that occurs between the parent's and child's generation. Our research shows that the chances for gaining a college degree are much greater if the parents command greater resources. We have seen that, net of all other factors, chances for obtaining a bachelor's degree are enhanced when one or more of the parents has a bachelor's degree (26.5 percentage points greater), when parents' income is in the top quartile (7.2 percentage points greater),

or when the parents' wealth is in the third (10.3 percentage points greater) or fourth (18.9 percentage points greater) quartile. Clearly, the child's education benefits from parental resources, and thus the child's education might serve as a proxy for parental wealth and other resources. All of these parental resources could also help with their children's home purchases when they are grown adults, which is why it is important to separate the factors.

Past research was often not able to distinguish the mechanisms by which education might influence homeownership because it did not have adequate controls for a child's wealth and for parental income and wealth. As a result, this previous work was not able to rule out the possibility that a child's education, as it relates to homeownership attainment, was largely a proxy for the parental wealth that also supported children's homeownership. Using the PSID's rich income and wealth data for parents and children, we were able to account for these potential confounders of the education effect. After controlling for parental resources and all demographics, we find that having a bachelor's degree compared to not having a high school diploma increases homeownership attainment by 17.5 percentage points. Even after additional controls for children's current income and wealth, homeownership attainment remains 5.4 percentage points higher for the bachelor's degree holders. The positive education effect was largest among African-American households, ranging between 9.7 and 27.3 percentage points, depending on other controls. On the other hand, the level of education did not predict homeownership for Hispanic households. As previously discussed, the estimates for Hispanics are based on a very small sample and are not well representative of the Hispanic population currently residing in the U.S. That is because the PSID sample is designed to be intergenerational and is formed largely from the descendants of a sample chosen in the 1960s, a time preceding the large increases in immigration and major growth of the Hispanic population.

Despite the strong effect of parental resources on education, perhaps the most striking finding in this study is how little the education effect on homeownership is dampened when parental resources are controlled in Model 5 compared to Model 2 with the PSID data (17.5 percentage points greater homeownership with a bachelor's degree vs. 19.0 when parental resources are *not* controlled). The conclusion reached is that the educational assist to homeownership attainment is largely independent of the parental resources that may have helped increase education. Evidence in Figure 2 suggested that the education support for homeownership was very strong for all groups (except Hispanics), and after all controls were introduced it remained strongest for black households.

The implication of finding these independent effects of education is that homeownership attainment is potentially increased via policies that promote higher education and increase human capital. While we do not know specifically why higher education is associated with higher homeownership, some of the candidate reasons would include, foremost, the higher earnings and greater wealth that flow from greater human capital. Once children's income and wealth is controlled, the benefit of holding a bachelor's degree declines from 17.5 percentage point higher homeownership

(Model 5) to 5.6 percentage points (Model 7). Yet this evidence of an education effect that persists net of household income and wealth suggests that additional mechanisms are at work.

Higher education may also lead to greater financial fluency, including better understanding of and access to credit markets and better understanding of the steps necessary to buy a house. The association of higher education with greater chances for marriage also could prove powerful, given the very strong association that marriage has with homeownership. In addition, we also note the positive association of parental homeownership, which increased the child's homeownership probability by 6.5 percentage points, net of wealth and all other factors. This suggests that knowledge and familiarity with homeownership may be transmitted from parents to children. Our estimated education effects are net of this "family knowledge for home buying" factor as well. It should be noted, however, that the finding of a net positive association between parental and child homeownership is also consistent with parents and children living in areas with similar levels of higher or lower homeownership. Future research will need to carefully distinguish between the competing explanations.

Higher education is subject to policy stimulation, and policies to increase attainment of a college degree have well-known benefits in the labor market and for wealth accumulation by households. This report suggests that yet another benefit of providing broader access to higher education is improving access to homeownership, especially for groups that have been relatively disadvantaged in the past.

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APPENDIX

Table A-1. Linear probability model of housing tenure choice (Model 9 – Interaction between education and race/ethnicity)

	Model 9-1		Model 9-2	
	Coef.	Sig.	Coef.	Sig.
Child Characteristics				
<i>Race/ethnicity (ref. NH White)</i>				
Hispanic	0.065		0.012	
NH Black	-0.128	***	-0.021	
Other	-0.035		0.068	
<i>Education (ref less than HS)</i>				
High School Grad	0.157	***	0.070	*
Some College	0.218	***	0.084	**
Bachelor's plus	0.285	***	0.076	*
Missing	0.097		-0.067	
<i>Race/Ethnicity × Education</i>				
Hispanic				
High School Grad	-0.106		-0.062	
Some College	-0.168	**	-0.134	**
Bachelor's plus	-0.218	***	-0.087	
Missing	-0.191		-0.080	
NH Black				
High School Grad	-0.074		-0.058	
Some College	-0.062		-0.050	
Bachelor's plus	-0.011		0.022	
Missing	0.020		0.080	
Other				
High School Grad	0.082		-0.058	
Some College	-0.070		-0.167	
Bachelor's plus	0.055		-0.083	
Missing	0.066		0.027	
<i>Age Group (ref. 35 to 44)</i>				
20 to 24	-0.351	***	-0.153	***
25 to 34	-0.213	***	-0.095	***
45 to 49	0.083	***	0.037	**
Female	-0.020	*	0.019	*
<i>Marital status (ref. single never or formerly married)</i>				
Married			0.193	***
Living with a partner			-0.002	
<i>Child Family/Household Income Quartiles (ref. 1st quartile)</i>				
2nd quartile			0.056	***
3rd quartile			0.141	***
4th quartile			0.181	***
<i>Child Family/Household Wealth Quartiles (ref. 1st quartile)</i>				
2nd quartile			0.127	***
3rd quartile			0.478	***
4th quartile			0.439	***
Parental Characteristics				
No Information on Parental Characteristics	-0.017		0.017	

<i>Parental Education (ref less than HS)</i>			
High School Grad	0.015		0.006
Some College	0.011		0.012
Bachelor's plus	-0.033		-0.050 **
Missing	-0.038		-0.005
<i>Parent Income Quartiles (ref. 1st quartile)</i>			
2nd quartile	-0.064	***	-0.058 ***
3rd quartile	-0.039	*	-0.039 **
4th quartile	-0.070	***	-0.059 ***
Missing	0.024		-0.001
<i>Parent Wealth Quartiles (ref. 1st quartile)</i>			
2nd quartile	0.011		-0.022
3rd quartile	0.079	***	-0.011
4th quartile	0.146	***	-0.008
Parental homeownership	0.052	**	0.062 ***
Constant	0.372	***	0.077 **
R2		0.198	0.437
N		5,526	5,526

Note: *: $p < 0.10$, **: $p < 0.05$, ***: $p < 0.01$. Households are restricted to those with householders aged 20 to 49. For the ACS, the child characteristics are based on the personal characteristics of householders. For the PSID, child characteristics are based on the personal characteristics of the reference child who is from the PSID families. The regressions are based on unweighted counts, and robust standard errors are used to correct for heteroscedasticity.