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Abstract

This report examines the effects of young adults' race, education, income, and wealth on their homeownership attainment, independent of the socioeconomic status of their parents. Interactions between race and education are analyzed to determine if associations between education and homeownership differ across racial groups. This report extends our previous research by analyzing how the associations between these factors and homeownership differ before and after the Great Recession. It also introduces several additional factors that might be associated with young-adult homeownership attainment, including presence of children in the household, average homeownership rates in the areas where young adults and their parents live, and the relative cost of owning compared to renting in the young adult's residential location. We use longitudinal data from the Panel Study of Income Dynamics (PSID), which includes information on the resources of both the young adults and their parents over the years 1999 to 2013. We restrict our sample to young adults aged 25 to 34 to more closely approximate determinants of homeownership for households who made tenure choices during the pre- and post-recession periods.

We find that non-Hispanic blacks are less likely to be homeowners than non-Hispanic whites before the recession, and that this relationship persists to a similar degree after the recession. There is no statistical difference in the likelihood of homeownership between Hispanics and non-Hispanic whites in

either period, although this result might be attributable to a PSID sample that does not represent the entire Hispanic population. Educational attainment is not associated with homeownership before the Great Recession but is positively associated with homeownership in the post-recession period. The positive association between educational attainment and homeownership in the post-recession years is present for blacks and non-Hispanic whites but not Hispanics. Income and wealth are positively associated with homeownership before and after the Great Recession. However, the positive association between the homeownership status of young adults and that of their parents is slightly diminished after the recession. We find that regional housing market characteristics are important. A higher ratio of house values relative to rents is associated with a decrease in the likelihood of young-adult homeownership, whereas a higher local homeownership rate is associated with an increase in the probability of young-adult homeownership. The magnitude of these market-context effects is constant across pre- and post-recession periods.

INTRODUCTION

This is the third in a series of reports examining the factors associated with young-adult homeownership. We examine the effects of young adults' race, education, income, and wealth on their homeownership attainment, independent of the socioeconomic status of their parents. Interactions between race and education are analyzed to determine if associations between education and homeownership differ across racial groups. This report extends our previous research on this topic by analyzing how the associations between these factors and homeownership differ before and after the Great Recession. It also introduces several additional factors that might be associated with young-adult homeownership attainment, including presence of children in the household, average homeownership rates in the areas where young adults and their parents live, and the relative cost of owning compared to renting in the young adult's residential location. The analysis is made possible by longitudinal data that contain detailed information on homeownership status, demographic characteristics, education, and economic status of generations of family members.

The first report in the series (Myers, Painter, and Zissimopoulos, 2016a) examined the role of parental financial assistance in home buying using two rich longitudinal data sets with data on both parents and their adult children: the Panel Study of Income Dynamics (PSID) and the Health and Retirement Survey (HRS). 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 parents' wealth, homeownership, and other characteristics associated with both financial transfers and their children's homeownership.

In the second report (Myers, Painter, and Zissimopoulos, 2016b), we examined homeownership status *at a point in time*, a cumulated status built from home buying across years. Our focus was on the central role of education. We found that the positive association between the young adults' education and their homeownership status persisted even after controlling for parental resources. Parents' economic resources may support homeownership directly through financial transfers and assistance in qualifying for a mortgage and indirectly through college completion, which influences a child's earnings and wealth. The result demonstrated that education was not solely a proxy for parental resources, but that higher education may independently lead to higher homeownership rates for young adults.

The relationship between education, parental resources, and homeownership that we documented in the second report was based on the 2013 wave of the PSID, which reflected conditions five years after the beginning of the Great Recession and more than three years after its official end. Given the

dramatically changing macroeconomic environment in recent years, we asked whether the determinants of homeownership, including the relationship between education and homeownership, that we found using the 2013 PSID data might reflect the distinct time period following the Great Recession. For example, in the years following the financial crisis and recession, access to mortgage credit was sharply reduced. This post-recession era may have increased the importance of a household's own education and income in determining its homeownership status. It may also have magnified the role of parental resources in homeownership, as young households might have needed to rely to a greater extent on parental wealth to meet more stringent mortgage qualification requirements imposed after the housing bust.

In this report, we use data on young adults aged 25 to 34 and their parents from waves 1999 to 2013 of the PSID to estimate how the determinants of homeownership vary over time. We pool waves of data for 1999-2007 (pre-recession) and for 2009-2013 (post-recession) and run common models of homeownership status for these two time periods. Our models include a rich set of demographic and socioeconomic characteristics for young adults and information on their parents' economic status. We also add geographical controls, particularly the relative cost of owning versus renting in the young adult's metropolitan statistical area (MSA) of residence, as well as the average homeownership prevalence in the area of residence of both the young adults and their parents.

BACKGROUND

The Great Recession, which began in December 2007 and ended in June 2009 (National Bureau of Economic Research, 2010), had a profound impact on economic wellbeing. Average unemployment rose to over 10 percent (Bureau of Labor Statistics, 2016), while stock markets plummeted, as did house values in many areas. These changes resulted in significant decreases in wealth and income for many Americans (Federal Reserve Board, 2015). The losses reduced household expenditures and consumption (Christelis, Georgarakos, & Jappelli, 2015; Hurd & Rohwedder, 2011). The Great Recession also had much broader effects. Individuals and families delayed household formation (Lee & Painter, 2013), buying homes (Myers & Lee, 2016), having children (Astone, Martin, & Peters, 2015; Cherlin, Cumberworth, Morgan, & Wimer, 2013), and retiring (McFall, 2011). Young adults may have been particularly hard hit by the recession. The

unemployment rate for young adults aged 25 to 34 was 9.9 percent in 2009, compared to an overall rate of 9.3 percent.¹

The Great Recession impacted household income and wealth, both important factors in homeownership. Well-established literature consistently demonstrates 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 (early studies include Haurin et al, 1996; Linneman et al. 1997).

For most households, income is derived primarily from employment, and the Great Recession had a severe labor market impact. During the recession, the unemployment rate approximately doubled, rising from just over 5 percent in 2005 to close to 10 percent in 2009. The rate remained above 8 percent through 2012 and fell more rapidly in 2013 (U.S. Bureau of Labor Statistics, 2016). By 2015, the unemployment rate was 5.3 percent, close to the pre-recession level.

Meanwhile, mortgage credit availability expanded substantially during the mid-2000s before contracting sharply. Credit constraints, while improving after 2010, still remain much tighter in 2016 than in 2002, a benchmark year prior to the onset of looser underwriting and the easy credit access of the housing bubble.²

Another important factor associated with homeownership is education of the household head. Education is an indicator of earnings potential and 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, including knowledge of credit markets and of behaviors that increase the chances for homeownership. Prior literature found a strong positive association between education and homeownership (e.g., Coulson, 1999; Gyourko and Linneman, 1996) that exists across all racial groups (Painter, Gabriel, and Myers 2001). 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,

¹ U.S. Bureau of Labor Statistics, retrieved from FRED, Federal Reserve Bank of St. Louis <<https://fred.stlouisfed.org>>

² The Urban Institute and CoreLogic both use 2001-2002 as baseline years for comparison, referring to the period as “reasonable lending standards” and “benchmark,” respectively. The Urban Institute’s Housing Credit Availability Index (HCAI) measures “the percentage of homes that are most likely to default,” with lower percentages equating to less risky lending behavior and more restricted access to credit (Urban Institute, 2016). The index spiked beginning in 2007 and declined after 2009 to below the baseline years, where it remained through 2015. CoreLogic’s Housing Credit Index (HCI) is a more inclusive measure that reflects loan-to-value ratio, average credit score of borrowers, and required documentation. According to the HCI, credit availability peaked in 2005-2007, dropped significantly by 2011 and remained low (relative to 2000-2002) through 2015 (Pradhan, 2016). Both indices indicate a slight increase in credit availability by the end of 2015, but the overall level is still much lower than the baseline. For example, the HCAI was 5.4 at the end of 2015, compared to a range of about 11-13 during the baseline years.

Herbert, Wilson & Clay, 2007). Hilber and Liu (2008) found that high school and college completion have a positive impact on homeownership, but the effect of college diminishes when (own) wealth is added to the model. Our own previous research confirmed these findings (Myers, Painter, and Zissimopoulos, 2016b). Aside from our prior work, the sole study (Charles and Hurst, 2002) that includes parental wealth found that it affected the probability of applying for a mortgage more than an individual's educational attainment.

A challenge in estimating the impact of education on homeownership is unobserved parental economic resources. Parental resources are associated with educational attainment but may also impact homeownership directly if used to help children meet down payment requirements or qualify for a mortgage in other ways (e.g., cosigning on the loan). Given the direct role of parental resources in supporting homeownership, 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 exclude parental resources.

Our second project report focused extensively on these causal linkages as observed in 2013, several years after the end of the Great Recession (Myers, Painter, and Zissimopoulos, 2016b). As noted above, the economic well-being of young adults and the mortgage credit environment differed substantially in the pre- and post-recession periods. In addition, the Great Recession also impacted the income and wealth of young adults' parents, which may in turn affect the homeownership of their children through the mechanisms we described.

In the remainder of this report, we examine factors associated with homeownership pre- and post-recession, with a focus on a comparison of estimates of the influence of education on young-adult homeownership, net of parental resources. We control for important local housing market conditions that might be associated with young-adult homeownership and that are different in the pre- and post-recession years, including house values, rents, and local homeownership rates. Although we do not estimate the impact of the Great Recession on home buying *per se*, we restrict our analysis for this report to adults aged 25 to 34 because the homeownership status of these households likely reflects recent homeownership choices that were influenced by contemporary conditions.

DATA AND METHOD

We utilize data from the 1999 through 2013 survey waves of the PSID. The PSID is the longest running panel dataset in the U.S. It has followed the original respondents and their descendants since 1968. The PSID's longitudinal nature and its Family Identification Mapping System (FIMS) connect data across generations, thus allowing for analyses that control for parental socioeconomic factors.

We first describe homeownership rate trends by age between 1999 and 2013. Next, we estimate linear probability models of homeownership, first pooling all waves between 1999 and 2013, and then estimating models separately for the years before the recession (1999-2007)³ and after (2009-2013).⁴ Our primary analytical sample contains individuals aged 25 to 34.⁵ This age restriction allows us to better approximate new homebuyers in the pre- and post-recession time periods.

We model the effects on homeownership of sex, race, marital status, presence and age of children, education, wealth and income, parents' socioeconomic status (education, income, and wealth), and regional housing market characteristics. We examine variation across race and ethnicity in the association between education and homeownership by including interactions between race and education. Wealth and income are included as quartiles, with quartile thresholds defined based on the 2013 distribution of income and wealth in our sample. We use PSID geocode data to identify the metropolitan area (or state in non-metropolitan areas) of the young adults' residence and their parents' residence. Regional housing market characteristics include housing prices, measured as a value-to-rent ratio⁶ for the young adult's area of residence (the presumed locale for potential home purchase), and the homeownership rate for the young adult's area of residence. We also account for the influence of homeownership trends in the parents' location by including the homeownership rate of the parent's area of residence. We also estimate a fully interacted model to test for statistically significant differences of estimated covariates of interest.

³ According to the NBER, the U.S. was in a short recession from March 2001 to November 2001.

⁴ An Appendix table provides results from a sensitivity analysis that excludes the year 2009 from the post-recession time period, given the June 2009 end date of the Great Recession.

⁵ An Appendix table shows results for those aged 20 to 49 for comparison to models estimated in earlier reports.

⁶ The value-to-rent ratio represents the relative price incentive of owning rather than renting. It is measured as the ratio of the lower-quartile house price in the child's region of residence (a proxy for the cost of homes more likely to be selected by first-time home buyers) to the median rent (annualized). Home values are adjusted by the FHFA House Price Index, and the median gross rents are adjusted by the Carrillo-Early-Olsen rental housing price index to use constant-quality house prices (Carrillo, Early, and Olsen, 2013).

RESULTS

Summary statistics

We show homeownership rates by year and age group to highlight variation in the pre- and post-recession years (Table 1). In all years, the percentage of households owning a home is substantially greater in each successive age group. After 2005, homeownership declined for all age groups. The reduction in homeownership rate between 2005 and 2013 is especially pronounced for householders aged 25 to 34, who experienced a 16 percentage point decline. According to the U.S. Census Bureau, homeownership rates continued to fall through 2016.⁷

Table 1: Homeownership Rates by Age (20 to 49) and Year (1999 to 2013)

	1999	2001	2003	2005	2007	2009	2011	2013
All ages (20-49)	54.5	55.4	56.6	55.3	53.5	50.1	46.3	43.9
20-24	15.4	18.5	16.7	15.9	13.9	10.8	12.4	11.7
25-34	43.6	46.3	48.9	47.1	45.5	39.4	34.5	31.0
35-44	64.0	63.0	64.7	65.7	65.3	63.7	59.2	57.7
45-49	71.5	72.7	73.3	68.6	66.3	66.2	65.4	62.3

Source: 1999-2013 PSID

Note: Sampling weights were used to generate nationally representative estimates of variables

Model Estimations

Table 2 shows estimates from a linear probability model of young-adult homeownership status. Model 1 shows estimates from pooling all years of data and including an indicator for the post-recession period. Model 2 shows estimates separately for 1999 to 2007 and Model 3 for 2009 to 2013.⁸ Appendix Table A3 shows results of tests for statistical differences of all covariates pre- and post-recession.

The post-recession period is associated with a 3.5 percentage point lower likelihood of homeownership, after controlling for all other factors. Given the decline in homeownership rate among

⁷ U.S. Census Bureau, 2016

⁸ We test the sensitivity of Models 2 and 3 to the selection of the recession cutoff point by excluding 2009 (Appendix Table A2). The results and conclusions are similar to those generated by Models 2 and 3, which is our preferred specification.

25- to 34-year-olds from approximately 45 percent in the pre-recession period to about 35 percent in the post-recession period (Table 1), the estimated coefficient on the post-recession indicator variable shows that more than half of the decline in homeownership among young adults can be explained by individual, parental, and regional characteristics.

Models 2 and 3 shed some light on similarities and differences between the estimated coefficients in the pre- and post-recession periods. Controlling other factors, we find blacks are less likely to be homeowners compared to non-Hispanic whites in the years before and after the recession, while there is no statistical difference between homeownership rates of Hispanics⁹ and non-Hispanic whites in either time period.¹⁰ Married households and those with children present are substantially more likely to be homeowners in both the pre- and post-recession time periods. Of particular interest is the effect of educational attainment, which is positively associated with homeownership in Model 1, even after controlling for income and other factors. For example, having a bachelor's degree or higher is associated with a 6 percentage point increase in the likelihood of homeownership, compared with someone who lacks a high school diploma, when all years of data are considered. A key finding is that the effect of education appears to vary between the pre- and post-recession periods. Having a Bachelor's degree is associated with an increased likelihood of homeownership of 9 percentage points in the post-recession period, but the association is about half as large and only statistically significant at the 10 percent level in the pre-recession period. We tested whether the effects of educational attainment were jointly statistically different between pre- and post-recession periods and found that they were not statistically different at standard significance levels. Given that controls are included for parental economic status, so that education is not serving solely as a proxy for class status or financial resources that may support housing purchase, and given that income and wealth of children are also controlled, the residual net effect of education might be interpreted as a proxy for permanent income. This result suggests that permanent income has a positive association with homeownership that is additional to that of current income, all else being equal. Education might also proxy for financial literacy, which could help young households navigate the home purchase and mortgage finance processes.

⁹ As noted in Myers, Painter, and Zissimopoulos (2016b), results for Hispanics should be interpreted with caution. 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.

¹⁰ The statistical difference of factors between pre- and post-recession periods were examined by conducting a fully interacted regression model. The results from the interaction models are shown in Appendix Table A3.

In the post-recession period, the magnitudes of the estimated coefficients on wealth quartiles are smaller than in the pre-recession period and statistically different. The difference may reflect the decline in home values in the post-recession period because the wealth measure includes housing wealth. The effect of income on homeownership is positive in the pre- and post-recession time periods, with small differences in coefficients that are significant only at the 5 percent level or below. With respect to parental characteristics, parental homeownership is associated with a 4 percentage point increase in homeownership, (Model 1) but this association only exists in the pre-recession time period (Models 2, 3).

Table 2 Linear probability model of young-adult homeownership (25 to 34 years old)

	Model 1 (1999-2013)		Model 2 (1999-2007)		Model 3 (2009-2013)	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Post Recession (2009-2013)	-0.035	***				
Young Adult Characteristics						
<i>Race/ethnicity (ref. NH White)</i>						
Hispanic	-0.018		0.006		-0.037	
NH Black	-0.087	***	-0.091	***	-0.085	***
Other	-0.030		-0.042		-0.002	
<i>Education (ref less than HS)</i>						
High School Grad	0.022		0.004		0.052	**
Some College	0.049	**	0.020		0.092	***
BA plus	0.060	***	0.042	+	0.091	***
Missing	0.002		-0.018		-0.061	
<i>Age Group (ref. 25 to 29)</i>						
30 to 34	0.061	***	0.058	***	0.063	***
Female	0.010		0.019	+	-0.002	
<i>Marital status (ref. not married)</i>						
Married	0.162	***	0.156	***	0.168	***
Partnered	0.009		0.021		-0.004	
<i>Age of the oldest child (ref. no child)</i>						
Under 6 years old	0.065	***	0.055	***	0.077	***
6 to 17 years old	0.042	***	0.035	**	0.050	**
18 years and over	-0.041		-0.073		-0.010	
<i>Young-Adult Family Income Brackets (ref. less than \$26,000)</i>						
\$26,000 to \$52,000	0.052	***	0.062	***	0.042	**
\$52,000 to \$95,000	0.179	***	0.184	***	0.176	***
\$95,000 or greater	0.253	***	0.259	***	0.250	***
<i>Young-Adult Family Wealth Brackets (ref. less than \$2,850)</i>						
\$2,850 to \$55,000	0.151	***	0.191	***	0.107	***
\$55,000 to \$275,000	0.456	***	0.487	***	0.423	***
\$275,000 or greater	0.430	***	0.481	***	0.361	***
Parental Characteristics						

No Information on Parental Characteristics	-0.009		-0.025		0.001
Parental homeownership	0.040	**	0.063	**	0.019
<i>Parental Education (ref less than HS)</i>					
High School Grad	0.013		0.004		0.021
Some College	0.007		-0.008		0.020
BA plus	-0.009		-0.006		-0.011
Missing	-0.005		-0.047		0.075 +
<i>Parent Income Brackets (ref. less than \$22,500)</i>					
\$22,500 to \$47,500	-0.014		0.013		-0.043 **
\$47,500 to \$90,000	-0.012		0.007		-0.030
\$90,000 or greater	-0.028	+	-0.006		-0.045 *
Missing	0.018		0.000		0.049
<i>Parent Wealth Brackets (ref. less than \$12,500)</i>					
\$12,500 to \$139,000	0.007		-0.016		0.024
\$139,000 to 500,000	0.011		-0.008		0.022
\$500,000 or greater	-0.009		-0.050	+	0.032
Regional Housing Market Characteristics					
Value-to-rent ratio	-0.009	***	-0.009	***	-0.010 ***
Homeownership rate (young adult MSA)	0.007	***	0.007	***	0.006 ***
Homeownership rate (parent MSA)	-0.000		-0.001		-0.000
Missing homeownership rate (parent MSA)	-0.011		0.012		-0.063
Constant	-0.333	***	-0.346	***	-0.354 ***
R2		0.422		0.428	0.407
N		15,746		8,706	7,040

Source: PSID 1999-2013

Note: + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001. All dollar figures are adjusted to 2015 dollars. Age is restricted to householders aged 25 to 34. Young-adult characteristics are based on the personal characteristics of the reference child who is from the PSID families. Income and wealth brackets are based on quartiles defined in 2013 and applied to earlier periods. The value-to-rent ratio is calculated as the ratio of lower quartile value to annualized median gross rent in a metropolitan statistical area for the young adult's location of residence. Standard errors are clustered at individual person level. Regressions are based on unweighted counts.

Regional effects are also evaluated in the models of Table 2. Indicators of regional housing market conditions have similar associations with young-adult homeownership status before and after the recession. The relative cost of owning compared to renting (value-to-rent ratio) is negatively associated with the likelihood of homeownership. In addition, we find a positive association between children's homeownership and the prevailing homeownership rate in their area of residence, but no association is found between children's homeownership and the prevailing rate in the area where their parents live. This result argues against the hypothesis that the intergenerational correlation between parents and children's homeownership may be due to co-residence in high or low homeownership regions.

Previous reports in this study found a modest intergenerational correlation of homeownership between parents and children. Here, we find that after all controls are added, parental homeownership remains positively associated with their children’s likelihood of homeownership, but only in the pre-recession period.¹¹ The explanation for the lack of association after the recession is not certain. One possibility is that during the housing boom parents who were themselves homeowners were more likely to encourage their young-adult children to participate in the housing boom. Perhaps the parents even used their accumulated home equity in this period to assist their children’s purchases. Subsequently, in the post-recession period, parents might have stopped encouraging their children to become homeowners or might have been less able to draw upon their home equity to assist their children’s home purchases.

Racial Variations in the Association Between Education and Homeownership

In this section, differences between racial/ethnic groups in the role of education in raising homeownership are examined by including interactions between race and educational attainment in our models. All other covariates are the same as those shown in Table 2. Models are estimated separately for the time periods before and after the Great Recession.

In the project’s second report, we demonstrated a positive association between education and homeownership for both non-Hispanic white and black households, independent of socioeconomic characteristics of the household or the resources of their parents (Myers, Painter, and Zissimopoulos, 2016b). The effect of a college degree was especially pronounced for black households. Here, we explore whether the recession influenced these patterns, with the results shown in Figure 1.¹²

Before the recession (Panel A of Figure 1), black householders with a bachelor’s degree or higher were 8.5 percentage points more likely to be homeowners compared to black householders with no high school

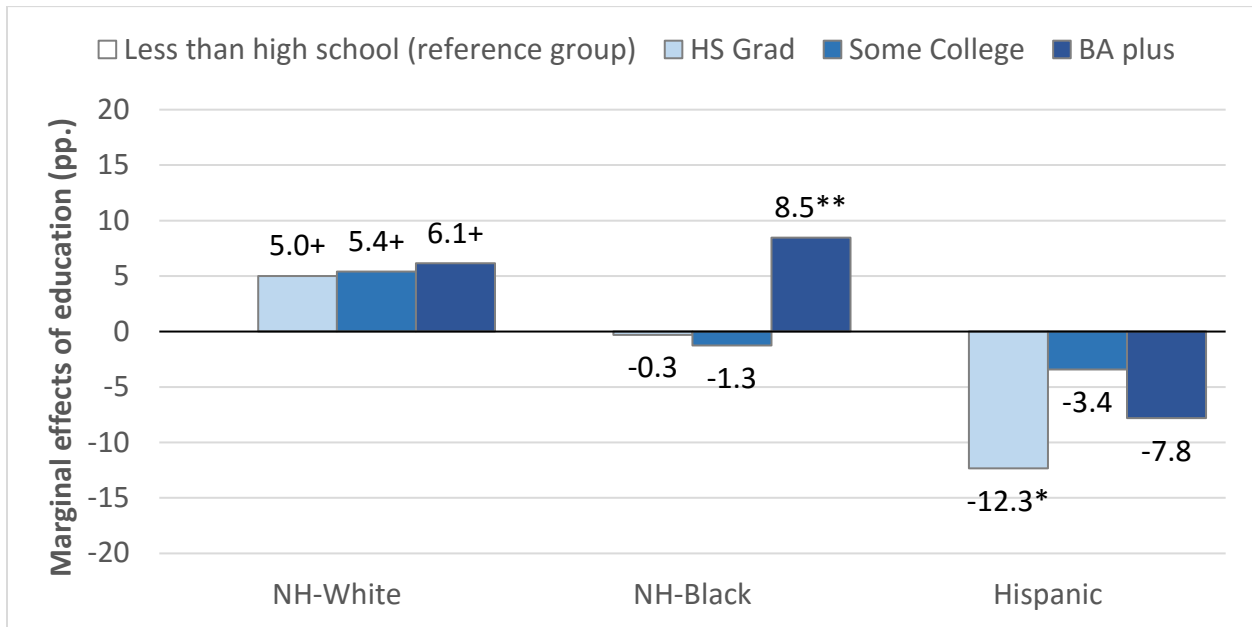
¹¹ The difference in effect between periods is marginally significant at $p < 10$ (see Table A3).

¹² Each marginal effect is computed through summation of a unique combination of the coefficients for education and race X education. For example, to calculate the marginal effect of a BA degree for blacks in the pre-recession period, as illustrated in Figure 1, panel A, we add two numbers – one the coefficient for education alone and the other the coefficient for the race X education term: $0.0614 + 0.0233 = 0.0847 = 8.5$ 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 BA for the non-Hispanic white reference group is indicated solely by the education coefficient (0.0614), because there is no additional interaction effect. (Meanwhile, the main effect of race 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 1 is derived through the `lincom` command of Stata/SE 11.2.

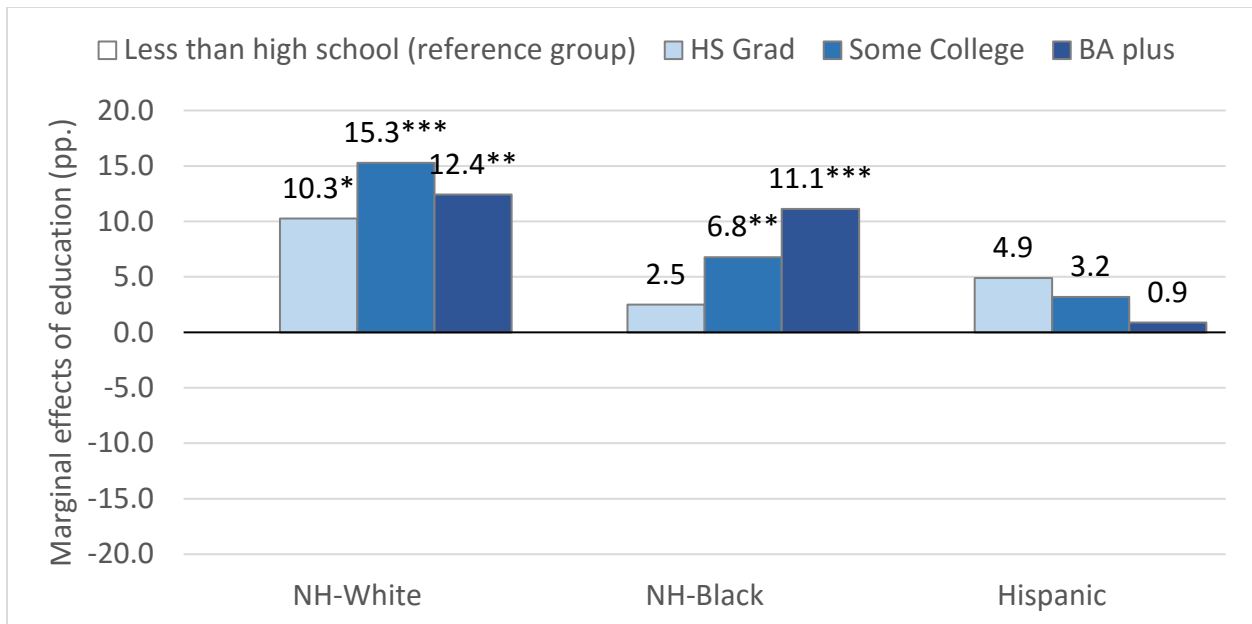
diploma. However, the association of a college education and homeownership in the pre-recession period is not statistically different than zero at the 5 percent level for Hispanics or non-Hispanic whites.

Figure 1: Marginal effects of educational attainment on homeownership by race/ethnicity before and after the Great Recession

Panel A: Marginal effects of education by race/ethnicity in pre-recession period (1999-2007)



Panel B: Marginal effects of education by race/ethnicity in post-recession period (2009-2013)



Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The estimates are based on the regression model with interaction terms between race/ethnicity and education 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.

After the recession (Panel B of Figure 1), a positive association exists between homeownership and education for both non-Hispanic whites and blacks. Compared to non-Hispanic white households with less than a high school diploma, the likelihood of homeownership increases by 10.3 percentage points for non-Hispanic whites with a high school diploma, 15.3 percentage points for those with at least some college, and 12.4 percentage points for those with at least a bachelor's degree. Black households experience a stepwise increase in the probability of homeownership at each level of education, culminating in a 11.1 percentage point higher likelihood of being a homeowner for black households headed by a college graduate compared with blacks who have less than a high school diploma.

CONCLUDING COMMENTS AND POLICY IMPLICATIONS

This report examines the factors associated with young-adult homeownership status before and after the Great Recession. It builds on our prior research, which, using 2013 data, showed that a young adult's educational attainment was positively associated with homeownership, independent of parental socioeconomic status, and that the education effect was particularly strong for black households (Myers, Painter, and Zissimopoulos, 2016b). The findings of this earlier research are significant because they suggest that policies to promote higher education will not only improve labor market outcomes but might also broaden access to homeownership, irrespective of parental background and especially for groups that have been relatively disadvantaged in the past.

As in the prior research, this paper uses data from the Panel Study of Income Dynamics (PSID) to analyze the effects on homeownership status of race, education, income, and wealth, independent of parental socioeconomic status. However, we extend our prior work by examining differences in these effects in the pre- and post-recession periods. We also introduce several additional factors that might affect young-adult homeownership attainment: presence of children, the average homeownership rate in the areas where the young adults and their parents live, and the relative cost of owning compared to renting in the young adult's region of residence. We restrict our sample to young adults aged 25 to 34 to more closely approximate determinants of homeownership for households who made tenure choices that reflect economic and housing market conditions in the pre- and post-recession periods.

After controlling for the socioeconomic characteristics of young adults and their parents, we found that non-Hispanic blacks were less likely to be homeowners than non-Hispanic whites before the recession, and that this relationship persisted to a similar degree after the recession. We found no

statistical difference in the likelihood of homeownership between Hispanics and non-Hispanic whites after imposing socioeconomic controls, although this result might be attributable to a PSID sample that does not represent the entire Hispanic population.

Another key finding is that educational attainment was not associated with homeownership status before the Great Recession, but having a college degree increased the likelihood of homeownership by 9 percentage points in the post-recession period. The positive association between educational attainment and homeownership in the post-recession years was found for blacks and non-Hispanic whites but not Hispanics. Education may be a proxy for permanent income and employment stability during economic downturns and, all else being equal, was increasingly important in the post-recession period with the tightening of credit markets. In other words, in the wake of the Great Recession and housing bust, lenders might have placed a higher premium on educational attainment – and the boost to expected lifetime wages and employment stability that it typically brings – in determining who received a mortgage. An alternative lender-based explanation is that lenders may be more sensitive post-crisis to applicants' employment stability and earnings history, which are *correlated with* educational attainment. Another potential explanation may be that education proxies for financial literacy, including a better understanding of the home buying and mortgage lending processes, which might have become increasingly important in the depressed home sales market and tight credit environment of the post-recession period. We do not test these hypotheses; however, we identify them as important areas for further research. Another key question for future study is why the association between education and homeownership is not present among Hispanics after the recession. Although the effect of education on homeownership in the pre- and post-recession periods was not statistically different, the increase in magnitude of the effect of education in the post-recession period compared to before the recession deserves further research.

Another finding of this analysis is that the intergenerational association between the likelihood of homeownership for young adults and for their parents is weaker after the recession than before. The stronger association of education and homeownership and the weaker association of parental homeownership and child homeownership after the recession compared to before may suggest that inherited inequality in homeownership is in modest remission, while education-based inequality may be growing. If research can confirm these findings and present causal evidence of the relationship between education and homeownership, then policies to increase attainment of a college education, especially for

groups experiencing past disparities, could prove valuable for promoting achievement of homeownership in the new post-recession economic climate.

REFERENCES

- Acemoglu, D., & Pischke, J.-S. (2001). Changes in the wage structure, family income and children's education. *European Economic Review, Papers and Proceedings*, 45 (4–6), 890–904.
- Astone, N. M., Martin, S., & Peters, H. E. (2015). Millennial Childbearing and the Recession.
- Black, S.E., Devereux, P.J., & Salvanes, K.G. (2005). Why the apple doesn't fall far: Understanding intergenerational transmission of education. *American Economic Review*, 95(1), 437–449.
- Carrillo, P.E., Early, D.W., & Olsen, E.O. (2013), A Panel of Interarea Price Indices for All Areas in the United States 1982-2012. Unpublished manuscript.
- Charles, K.K., & Hurst, E. (2002). The transition to home ownership and the Black-White wealth gap. *Review of Economics and Statistics*, 84(2), 281–297.
- Cherlin, A.J., Cumberworth, E., Morgan, S. P. and Wimer, C. (2013). The Effects of the Great Recession on Family Structure and Fertility. *Annals of the American Academy of Political and Social Science*, 650(1): 214-231.
- Chevalier, A. (2004). Parental education and child's education: A natural experiment. IZA Discussion Paper no. 1153.
- Chevalier, A., Harmon, C., O'Sullivan, V., & Walker, I. (2013). The impact of parental income and education on the schooling of their children. *IZA Journal of Labor Economics*, 2(1), 8.
- Christelis, D., Georgarakos, D., & Jappelli, T. (2015). Wealth shocks, unemployment shocks and consumption in the wake of the Great Recession. *Journal of Monetary Economics*, 72, 21-41.
- Clark-Kaufman, E., Duncan, G.J., & Morris, P. (2003). How welfare policies affect child and adolescent achievement. *American Economic Review*, 93(2), 299–303.
- Coulson, E. (1999). Why are Hispanic- and Asian-American homeownership rates so low? Immigration and other factors. *Journal of Urban Economics*, 45(2), 209–227.
- Cortes, A., Herbert, C.E., Wilson, E., & Clay, E. (2007). Factors affecting Hispanic homeownership: A review of the literature. *Cityscape: A Journal of Policy Development and Research*, 9(2), 53–92.
- Federal Reserve Board (2015). Report on the Economic Well-Being of U.S. Households in 2014.
- Gyourko, J., & Linneman, P. (1996). Analysis of the changing influences on traditional households' ownership patterns. *Journal of Urban Economics*, 39(3), 318–341.

- Haurin, D.R., Hendershott, P.H., & Wachter, S.M. (1996) Wealth accumulation and housing choices of young households. An exploratory investigation. *Journal of Housing Research*, 7(1), 33–57.
- Haveman, R., & Wolfe, B. (1995). The determinants of children’s attainments: A review of methods and findings. *Journal of Economic Literature*, 33(4), 1829–1878.
- Hilber, C.A.L., & Liu, Y. (2008). Explaining the black–white homeownership gap: the role of own wealth, parental externalities and locational preferences. *Journal of Housing Economics*, 17(2). 152–174.
- Hurd, M.D. and Rohwedder, S. (2011) Economic Preparation for Retirement. *NBER Working Paper No. 17203*. Retrieved from: <http://www.nber.org/papers/w17203>
- Lee, K. O., & Painter, G. (2013). What happens to household formation in a recession? *Journal of Urban Economics*, 76, 93-109.
- Linneman, P., Megbolugbe, I.F., Wachter, S.M., & Cho, M. (1997). Do borrowing constraints change U.S. homeownership rates? *Journal of Housing Economics*, 6(4), 313–333.
- McFall, B. H. (2011). Crash and wait? The impact of the great recession on retirement planning of older Americans. *The American Economic Review*, 101(3), 40.
- Myers, D., & Lee, H. (2016). Cohort momentum and future homeownership: The outlook to 2050. *CityScape*, 18(1), 131.
- Myers, D., Painter, G.D., and Zissimopoulos, J. (2016a). The Role of Parental Financial Assistance in the Transition to Homeownership by Young Adults. Working Paper (April). Fannie Mae, Washington, D.C.
- Myers, D., Painter, G.D., and Zissimopoulos, J. (2016b). Education and the Intergenerational Transmission of Homeownership. Working Paper (July). Fannie Mae, Washington, D.C.
- National Bureau of Economic Research (2010). Business Cycle Dating Committee. Retrieved from: <http://www.nber.org/cycles/sept2010.html>
- Oreopoulos, P., Page, M.E, & Stevens, A.H. (2006). The intergenerational effects of compulsory schooling. *Journal of Labor Economics*, 24(4), 729–760.
- Painter, G., Gabriel, S., & Myers, D. (2001). Race, immigrant status, and housing tenure choice. *Journal of Urban Economics*, 49(1), 150–167.

Pradhan, A. (2016). Credit Availability Trends: Underwriting Cautious but Loosening Slightly. CoreLogic. Retrieved from: http://www.corelogic.com/blog/authors/archana-pradhan/2016/03/credit-availability-trends.aspx#.V0NpZJMrl_U May 23, 2016

S&P Dow Jones Indices LLC, *Dow Jones Industrial Average*® [DJIA], retrieved from FRED, Federal Reserve Bank of St. Louis <https://research.stlouisfed.org/fred2/series/DJIA>, June 1, 2016a.

S & P Dow Jones Indices LLC, *S & P/Case Shiller U.S. National Home Price Index*, February 2006 to March 2016. Retrieved from: <http://us.spindices.com/indices/real-estate/sp-case-shiller-us-national-home-price-index>. June 1, 2016b.

Taubman, P. (1989). Role of parental income in educational attainment. *American Economic Review*, 79(2), 57–61.

U.S. Census Bureau. (2016). Housing Vacancies and Homeownership (CPS/HVS). *Table 14. Homeownership Rates for the U.S. and Regions, 1965 to Present*. Retrieved from: <http://www.census.gov/housing/hvs/data/histtabs.html>

U.S. Bureau of Labor Statistics. 2016. Labor Force Statistics from the Current Population Survey, Series ID LNS14000000, 1999-.2016 Retrieved from: <http://data.bls.gov/pdq/SurveyOutputServlet>

Urban Institute (2016, April 12). Housing Credit Availability Index: Index for April 12, 2016. Retrieved from: <http://www.urban.org/policy-centers/housing-finance-policy-center/projects/housing-credit-availability-index>. May 23, 2016.

APPENDIX

Table A1 Linear probability model of homeownership (20 to 49 years old)

	Model 1 (1999-2013)		Model 2 (1999-2007)		Model 3 (2009-2013)	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Child Characteristics						
<i>Race/ethnicity (ref. NH White)</i>						
Hispanic	-0.000		0.002		-0.002	
NH Black	-0.058	***	-0.052	***	-0.066	***
Other	-0.043	*	-0.060	**	-0.006	
<i>Age Group (ref. 35 to 44)</i>						
20 to 24	-0.153	***	-0.143	***	-0.161	***
25 to 34	-0.070	***	-0.053	***	-0.089	***
45 to 49	0.030	***	0.025	**	0.044	***
Female	0.021	**	0.024	***	0.013	
<i>Education (ref less than HS)</i>						
High School Grad	0.021	*	0.015		0.033	*
Some College	0.027	**	0.009		0.058	***
BA plus	0.045	***	0.029	*	0.069	***
Missing	0.002		-0.006		-0.047	
<i>Marital status (ref. not married)</i>						
Married	0.148	***	0.138	***	0.162	***
Partnered	0.010		0.017		0.006	
<i>Age of the oldest child living with (ref. No child/not living with)</i>						
Under 6 years old	0.055	***	0.051	***	0.060	***
6 to 17 years old	0.039	***	0.043	***	0.031	**
18 years and over	0.040	***	0.043	***	0.036	*
<i>Child 2013 Family Income Brackets (ref. less than \$26,000)</i>						
\$26,000 to \$52,000	0.060	***	0.061	***	0.053	***
\$52,000 to \$95,000	0.165	***	0.158	***	0.169	***
\$95,000 or greater	0.213	***	0.193	***	0.237	***
<i>Child 2013 Family Wealth Brackets (ref. less than \$2,850)</i>						
\$2,850 to \$55,000	0.179	***	0.226	***	0.120	***
\$55,000 to \$275,000	0.506	***	0.550	***	0.454	***
\$275,000 or greater	0.506	***	0.568	***	0.421	***
Parental Characteristics						
No Information on Parental Characteristics	0.035		0.081	+	-0.039	
Parental homeownership	0.036	***	0.046	***	0.024	+
<i>Parental Education (ref less than HS)</i>						
High School Grad	-0.007		-0.012		0.006	
Some College	-0.005		-0.014		0.010	
BA plus	-0.018		-0.010		-0.020	
Missing	-0.018		-0.033	+	0.014	
<i>Parent 2013 Income Brackets (ref. less than \$22,500)</i>						
\$22,500 to \$47,500	-0.027	**	-0.011		-0.051	***

\$47,500 to \$90,000	-0.018	*	-0.009		-0.037	**
\$90,000 or greater	-0.021	*	-0.005		-0.045	**
Missing	0.012		-0.005		0.044	+
<i>Parent 2013 Wealth Brackets (ref. less than \$12,500)</i>						
\$12,500 to \$139,000	0.004		-0.003		0.010	
\$139,000 to 500,000	0.002		-0.011		0.017	
\$500,000 or greater	-0.012		-0.031	+	0.011	
Regional Characteristics						
Value-to-rent ratio	-0.008	***	-0.009	***	-0.008	***
Homeownership rate in where a child is located	0.005	***	0.004	***	0.006	***
Homeownership rate in where parent are located	0.000		0.001		-0.001	
Missing homeownership rate in where parent are located	0.024		0.095	+	-0.103	+
Post Recession (2009-2013)	-0.014	**				
Constant	-0.181	***	-0.196	***	-0.181	**
R2		0.483		0.490		0.467
N		41,891		25,496		16,395

Source: PSID 1999-2013

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. All dollar figures are adjusted to 2015 dollars. Age is restricted to householders aged 25 to 34. Child characteristics are based on the personal characteristics of the reference child who is from the PSID families. The value to rent ratio is calculated as the ratio of lower quartile value to annualized median gross rent in a metropolitan statistical area for the child's location of residence. Standard errors are clustered at individual person level.

Table A2 Comparison of post-recession period definitions: Linear probability model of homeownership, 2009-2013 and 2011-2013 (25 to 34 years old)

	Model 3 (2009-2013)		Model 3a (2011-2013)	
	Coef.	Sig.	Coef.	Sig.
Child Characteristics				
<i>Race/ethnicity (ref. NH White)</i>				
Hispanic	-0.037		-0.042	+
NH Black	-0.085	***	-0.080	***
Other	-0.002		-0.020	
<i>Education (ref less than HS)</i>				
High School Grad	0.052	**	0.049	*
Some College	0.092	***	0.082	***
BA plus	0.091	***	0.094	***
Missing	-0.061		-0.073	
<i>Age Group (ref. 25 to 29)</i>				
30 to 34	0.063	***	0.064	***
Female	-0.002		-0.010	
<i>Marital status (ref. not married)</i>				
Married	0.168	***	0.167	***
Partnered	-0.004		-0.004	
<i>Age of the oldest child living with (ref. No child/not living with)</i>				
Under 6 years old	0.077	***	0.085	***
6 to 17 years old	0.050	**	0.056	**
18 years and over	-0.010		-0.001	
<i>Child 2013 Family Income Brackets (ref. less than \$26,000)</i>				
\$26,000 to \$52,000	0.042	**	0.038	**
\$52,000 to \$95,000	0.176	***	0.163	***
\$95,000 or greater	0.250	***	0.227	***
<i>Child 2013 Family Wealth Brackets (ref. less than \$2,850)</i>				
\$2,850 to \$55,000	0.107	***	0.106	***
\$55,000 to \$275,000	0.423	***	0.433	***
\$275,000 or greater	0.361	***	0.383	***
Parental Characteristics				
No Information on Parental Characteristics				
	0.001		0.001	
Parental homeownership				
	0.019		0.006	
<i>Parental Education (ref less than HS)</i>				
High School Grad	0.021		0.017	
Some College	0.020		0.013	
BA plus	-0.011		-0.027	
Missing	0.075	+	0.061	
<i>Parent 2013 Income Brackets (ref. less than \$22,500)</i>				
\$22,500 to \$47,500	-0.043	**	-0.050	**
\$47,500 to \$90,000	-0.030		-0.023	
\$90,000 or greater	-0.045	*	-0.040	+
Missing	0.049		0.036	

<i>Parent 2013 Wealth Brackets (ref. less than \$12,500)</i>			
\$12,500 to \$139,000	0.024		0.026
\$139,000 to 500,000	0.022		0.033
\$500,000 or greater	0.032		0.035
Regional Characteristics			
Value-to-rent ratio	-0.010	***	-0.010 ***
Homeownership rate in where a child is located	0.006	***	0.006 ***
Homeownership rate in where parent are located	-0.000		0.000
Missing homeownership rate in where parent are located	-0.063		-0.039
Constant	-0.354	***	-0.314 **
R2		0.407	0.397
N		7,040	4,815

Source: PSID 1999-2013

Note: + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001. All dollar figures are adjusted to 2015 dollars. Age is restricted to householders aged 25 to 34. Child characteristics are based on the personal characteristics of the reference child who is from the PSID families. The value to rent ratio is calculated as the ratio of lower quartile value to annualized median gross rent in a metropolitan statistical area for the child's location of residence. Standard errors are clustered at individual person level.

Table A3. Statistical test of differences pre- and post-recession: Linear probability model of homeownership, 2009-2013 (25 to 34 years old) with all covariates interacted with post-recession indicator

	Model 2 1999-2007	Model 3 2009-2013	Coeff. Diff.
Post Recession (2009-2013)			
Young Adult Characteristics			
<i>Race/ethnicity (ref. NH White)</i>			
Hispanic	0.006	-0.037	
NH Black	-0.091	-0.085	
Other	-0.042	-0.002	
<i>Education (ref less than HS)</i>			
High School Grad	0.004	0.052	
Some College	0.020	0.092	+
BA plus	0.042	0.091	
Missing	-0.018	-0.061	
<i>Age Group (ref. 25 to 29)</i>			
30 to 34	0.058	0.063	
Female	0.019	-0.002	
<i>Marital status (ref. not married)</i>			
Married	0.156	0.168	
Partnered	0.021	-0.004	
<i>Age of the oldest child (ref. no child)</i>			
Under 6 years old	0.055	0.077	
6 to 17 years old	0.035	0.050	
18 years and over	-0.073	-0.010	
<i>Young-Adult Family Income Brackets (ref. less than \$26,000)</i>			
\$26,000 to \$52,000	0.062	0.042	*
\$52,000 to \$95,000	0.184	0.176	+
\$95,000 or greater	0.259	0.250	+
<i>Young-Adult Family Wealth Brackets (ref. less than \$2,850)</i>			
\$2,850 to \$55,000	0.191	0.107	***
\$55,000 to \$275,000	0.487	0.423	**
\$275,000 or greater	0.481	0.361	***
Parental Characteristics			
No Information on Parental Characteristics	-0.025	0.001	
Parental homeownership	0.063	0.019	+
<i>Parental Education (ref less than HS)</i>			
High School Grad	0.004	0.021	
Some College	-0.008	0.020	
BA plus	-0.006	-0.011	
Missing	-0.047	0.075	*
<i>Parent Income Brackets (ref. less than \$22,500)</i>			

\$22,500 to \$47,500	0.013	-0.043	*
\$47,500 to \$90,000	0.007	-0.030	
\$90,000 or greater	-0.006	-0.045	+
Missing	0.000	0.049	
<i>Parent Wealth Brackets (ref. less than \$12,500)</i>			
\$12,500 to \$139,000	-0.016	0.024	
\$139,000 to 500,000	-0.008	0.022	
\$500,000 or greater	-0.050	0.032	
Regional Housing Market Characteristics			
Value-to-rent ratio	-0.009	-0.010	
Homeownership rate (young adult MSA)	0.007	0.006	
Homeownership rate (parent MSA)	-0.001	-0.000	
Missing homeownership rate (parent MSA)	0.012	-0.063	
Constant	-0.346	-0.354	
R2	0.428	0.407	
N	8,706	7,040	

Source: PSID 1999-2013

Note: + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001. All dollar figures are adjusted to 2015 dollars. Age is restricted to householders aged 25 to 34. Young-adult characteristics are based on the personal characteristics of the reference child who is from the PSID families. Income and wealth brackets are based on quartiles defined in 2013 and applied to earlier periods. The value to rent ratio is calculated as the ratio of lower quartile value to annualized median gross rent in a metropolitan statistical area for the young adult's location of residence. Standard errors are clustered at individual person level. Regressions are based on unweighted counts.