

## WEALTH AND EDUCATION<sup>‡</sup>

# The Impact of Parental Wealth on College Degree Attainment: Evidence from the Housing Boom and Bust<sup>†</sup>

By RUCKER C. JOHNSON\*

The past few decades have witnessed the emergence of substantial increases in both the costs of and returns to college, which have increased the demand for credit beyond the supply available from government programs. A long-standing policy goal of financial aid is to narrow, if not close, the parental income gap in children's subsequent educational attainment. Education is widely touted as the engine that leads to socioeconomic mobility, and equitable access to higher education the key to that ignition, in order to compress the rungs on the nation's economic ladder.

However, recent studies document growing parental socioeconomic status gaps in college entry, persistence, and graduation, and the college completion gap between children from high- and low-income families has grown by about 50 percent since the late 1980s (Bailey and Dynarski 2011). While more students are going to college than ever before, and the returns to college quality are arguably as high as they have ever been, currently only slightly more than half of those who begin college obtain a college degree within six years. College dropout rates are particularly high among black and Latino students and first-generation college goers. There remains considerable, spirited debate in the literature about whether the observed correlation between parental income/wealth and educational attainment has any causal element

and about the existence of financial constraints affecting postsecondary education decisions (Bound, Lovenheim, and Turner 2010). There exist differing interpretations of this empirical connection between parental wealth and schooling and the nature of this relationship, as some argue it is simply a reflection that higher income families place greater value on education. Yet, even after controlling for cognitive ability and family background, there exists a 30 percentage point difference in college attendance rates between children from families from the top parental income and wealth quartiles compared with those from the bottom quartiles (Lochner and Monge-Naranjo 2011). Large differences in college completion by parental income among those with similar test scores and the greater sensitivity of low-income youth to tuition differences are at least consistent with borrowing constraints.

Although a voluminous body of research has investigated the effects of changes in financial aid policy and parental economic resources on children's postsecondary outcomes, this literature has largely overlooked the importance of wealth shocks arising from the housing market (Lovenheim 2011 and Charles, Hurst, and Notowidigdo 2018 are notable exceptions). Housing wealth has become an increasingly important component of the college enrollment decision over the past 20 years. In particular, there has been a marked increase in the preponderance of parents refinancing their homes in the years immediately preceding their children reaching college age. This behavioral response by parents is driven by the need to help finance higher education expenses amid rising college tuitions. Eighty-five percent of college attendees come from families who own a home, and those whose children are enrolled in college are

<sup>‡</sup>*Discussants:* Ngina Chiteji, New York University; Peter Blair Henry, New York University; Luisa Blanco, Pepperdine University; Jermaine Toney, Rutgers University.

\*UC-Berkeley and NBER (email: [ruckerj@berkeley.edu](mailto:ruckerj@berkeley.edu)).

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more likely to have a home equity loan or line of credit (Lovenheim 2011).

Whereas US house prices rose by an average of 40 percent from 1995 to 2004, house prices fell by an average of one-third between 2006 and 2011, and these housing price changes are even more dramatic in certain metropolitan statistical areas (e.g., Bay Area). The housing boom of the late 1990s and early 2000s and subsequent housing bust between 2007 and 2011 provide a unique opportunity to investigate the impacts of parental wealth on children's college degree attainment. This study uses this period as a natural experiment to analyze parental wealth effects. Specifically, I use the boom and bust of the real estate market as an exogenous shock to parental wealth by analyzing variation in house price changes across neighborhoods and over time to identify an effect of parental wealth on the likelihood of graduating from college. This research design, which capitalizes on exogenous changes in parental housing equity driven by local housing booms and busts, enables one to address concerns about the potential endogeneity of parental wealth to facilitate causal inference.

*Data: PSID (1968–2017).*—In order to analyze the effect of parental wealth on children's postsecondary educational outcomes, I employ a nationally representative longitudinal dataset from the Panel Study of Income Dynamics (PSID) spanning the years 1968 to 2017. The analysis sample includes PSID children born between 1979 and 1994 who have been followed until at least age 22, to encompass the peak housing boom and bust periods when these cohorts were in their teenage years. The PSID contains extensive data on education, income, wealth, housing, employment status, and detailed characteristics of family background. The ability to link children's postsecondary educational outcomes to their parent's economic resources throughout childhood is a key asset of the data assembled for this project.

I use residential location histories during childhood at the neighborhood level to match local-level data on housing prices to those that prevailed during an individual's childhood years. In particular, I match PSID data to annual census tract-level house price data (Federal Housing Finance Agency (FHFA)

housing price indices (HPI), 1975–2018; Bogin, Doerner, and Larson 2019).<sup>1</sup> This linking of data over time enables me to measure neighborhood-level housing price changes at specific childhood stages of development for each child in the sample. The analysis sample for this paper includes 3,923 individuals from 225 different counties of upbringing in 770 neighborhoods.

### I. Empirical Strategy

The research design and empirical approach overcomes three primary challenges to credibly estimate the causal effects of parental housing wealth on children's postsecondary outcomes. First, home equity and parental housing wealth changes are likely to be endogenous in part because parents may choose to liquidate equity in their home to pay for college. Home values may also proxy for permanent income, which is likely to be positively correlated with unobserved academic ability. If higher-ability children are both more likely to attend selective colleges and have parents with greater (housing) wealth, then this could lead to a spurious correlation between parental housing wealth and college enrollment decisions and degree attainment. I address this by using neighborhood-level housing price shocks during the four years prior to the student becoming college age as an instrument for parental wealth during ages 13–17. The model includes census tract fixed effects that minimize potential omitted variables bias and mitigate concerns that parents of high-ability children sort into higher housing price growth localities.<sup>2</sup>

Second, changes in housing prices may be correlated with changes in local K–12 school quality (or other local amenities) that also influence college preparation of students upon reaching college age. I combat this issue by including renters (as a control group), who should not respond to housing wealth effects, and thus one can difference out the change in college graduation rates that may be due to unobserved

<sup>1</sup>I find a similar pattern of results when using HPIs at zip code and county levels, respectively.

<sup>2</sup>To address concerns about bias from endogenous mobility, as a robustness check I used the earliest childhood address to identify neighborhood of upbringing and find a similar pattern of results.

changes in K–12 schools or local amenities capitalized into local housing values. The difference in impacts on outcomes between children whose parents were homeowners versus renters can be interpreted as a parental wealth effect that is purged of bias due to unobserved heterogeneity in local amenities. Third, while self-reported data on housing values provide variation in wealth at the individual level, a drawback is that they may possess significant mismeasurement. The instrumental variables approach taken in this paper largely circumvents these challenges. Additionally, housing equity comprises the dominant share of parental wealth, and aggregate median and mean reported housing values in the PSID closely track the national FHFA HPI.

The study's research design exploits exogenous variation in house prices by location and over time during the period of the 1980s, 1990s, and 2000s. To identify the causal relationship between parental wealth and children's college degree attainments, the regression model specification includes birth year fixed effects to account for common time trends and neighborhood fixed effects so that the estimated reduced-form relationship between house prices and postsecondary education outcomes is not confounded by time-invariant differences in the value placed on higher education (preferences) across neighborhoods. With the inclusion of child neighborhood fixed effects and birth year fixed effects, the model's identifying variation is driven solely by differences in the geographic timing and strength of the housing boom and bust, which captures both differences in within-neighborhood house price growth over time and between-neighborhood differences in a given year in the magnitude of recent house price growth or declines. The identification strategy thus compares college degree attainment of students who grew up in the same neighborhood but whose parents experienced different home equity growth/losses based on their children's geographic location and timing of when they became college age.

Family wealth and income in adolescence may have an effect on completed schooling because it affects families' abilities to afford college expenses. If parents cannot smooth perfectly their income streams, then income during adolescence may be particularly important for postsecondary schooling. Parental wealth during adolescence

(13–17 years old) may also be an important determinant of educational attainment.

*Model Specification.*—I estimate variants of the following 2SLS/IV model of the effects of parental wealth (induced by housing shocks) on the likelihood of graduating from college:

$$\begin{aligned} \widehat{Wealth}_{fct13-17} &= \alpha_1 \Delta HPI_{ct13-17} \\ &+ \alpha_2 (\Delta HPI \times Own) \\ &+ \alpha_3 Own_{fct13-17} \\ &+ \alpha_4 X_{ifct} + \theta_c + \varphi_t, \end{aligned}$$

$$\begin{aligned} \Pr(CollegeGrad)_{ifct} &= \beta^{2SLS} \cdot \widehat{Wealth}_{fct13-17} \\ &+ \beta_2 Own_{fct13-17} + \beta_3 X_{ifct} \\ &+ \gamma_c + \delta_t + \varepsilon_{ifct}, \end{aligned}$$

where  $i$  indexes individuals;  $f$  indexes parental family;  $c$  indexes community of upbringing;  $t$  indexes birth year; and  $\Delta HPI$  represents the (unanticipated) four-year change in the neighborhood-level HPI between ages 13–17 and is the instrument for parental wealth (*Wealth*), along with that variable interacted with whether the parent was a homeowner/renter. The variable *Own* is an indicator for parental home ownership,  $X$  is a vector of childhood family characteristics (including parental income-to-needs ratio, gender, race/ethnicity),  $\gamma_c$  ( $\theta_c$ ) represent county fixed effects (or neighborhood fixed effects depending on specification),  $\delta_t$  ( $\varphi_t$ ) are birth year fixed effects, and  $\varepsilon_{ifct}$  is the error term of the second-stage regression. Standard errors are clustered at the childhood county level to account for correlated errors within local areas and the strong geographic component of housing wealth. In light of the high returns to four-year college degree attainment, it is the focal outcome.

## II. Results

The results indicate that shocks to parental wealth during adolescence influence children's college degree attainment. The findings demonstrate that the timing of parental wealth is important, with adolescence among the critical developmental stages for schooling outcomes.

TABLE 1—FIRST-STAGE AND REDUCED-FORM MODEL ESTIMATED EFFECTS OF LOCAL HOUSING PRICE CHANGES ON PARENTAL WEALTH AND CHILDREN'S COLLEGE DEGREE ATTAINMENT

	Dependent variable						
	Parental wealth, avg. during ages 13–17		Probability(graduate from college)				
Local house price shock variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Percent change in local HPI between ages 13–17 × homeowner	1.3285 (0.4899)		0.0413 (0.0148)	0.0321 (0.0144)			
Percent change in local HPI between ages 13–17 × renter	-0.4665 (0.2728)		-0.0086 (0.0231)	-0.0032 (0.0232)			
Unanticipated change in local HPI between ages 13–17 × homeowner		0.8396 (0.4187)			0.0357 (0.0119)	0.0299 (0.0114)	0.0408 (0.0223)
Unanticipated change in local HPI between ages 13–17 × renter		-0.3597 (0.2034)			0.0060 (0.0178)	0.0090 (0.0178)	0.0205 (0.0443)
Average parental income-to-needs ratio between ages 13–17				0.0171 (0.0053)		0.0171 (0.0053)	
<i>p</i> -value of excluded instruments	0.0004	0.0134					
Childhood county fixed effects	Yes	Yes	—	—	—	—	—
Childhood neighborhood fixed effects	No	No	Yes	Yes	Yes	Yes	Yes
Birth year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of children	3,784	3,805	3,896	3,896	3,923	3,923	1,160
Number of childhood counties	217	218	224	224	225	225	161

*Notes:* The analysis sample includes PSID children born between 1979–1994 who have been followed until at least age 22, to encompass peak housing boom and bust periods when cohorts were in teenage years (ages 13–17). Parental wealth variable is in units of \$50,000 in real 2009 dollars, adjusted using the CPI. The census tract-level house price shock variables have been converted to std deviation units and were obtained from FHFA data (1975–2018, <https://www.fhfa.gov/DataTools/Downloads/Pages/House-Price-Index-Datasets.aspx>). The outcome is an indicator variable of whether an individual earned a four-year college degree, obtained from information in the 2013 wave of PSID's Roster and Transfer Module and 2017 survey interview. Models include control for whether parents were homeowners/renters in teenage years. Column 7 reports results for subsample of children whose parents reported four-year college degree attainment expectations for them when child was in elementary/middle school or first years of highschool (PSID-CDS). The regressions are weighted by family weights in the PSID to produce nationally representative estimates. Robust standard errors (clustered on childhood county) in parentheses.

Moreover, the combined effects of parental wealth and income are stronger than the income effects alone on college completion. The results are robust to a wide variety of empirical specifications.

The findings suggest that parental wealth changes induced by neighborhood-level housing price shocks significantly affect children's likelihood of graduating from college. If I find that children's college outcomes among those whose parents are renters versus homeowners respond similarly to house price shocks, this would suggest that the relationship I detect between local housing price changes and children's postsecondary outcomes is spurious. Instead, I find parental housing wealth effects for homeowners

and none for renters, which suggests that the findings are not driven by a failure to control for unobserved changes in local amenities. Thus, the model provides a useful specification check, and the results pass this falsification test.

The results indicate that among homeowners, a standard deviation increase in the four-year change of the local HPI (between ages 13–17) leads to a \$66,425 (and \$41,980 if unanticipated) increase in average parental wealth in the years immediately preceding their child reaching college age (Table 1, columns 1–2). The findings from the reduced-form models indicate that the magnitude of this housing price shock results in between a 3–4.1 percentage point increase in the probability of earning a 4-year college degree

(Table 1, columns 3–7). These postsecondary education effects of housing price shocks are all concentrated among children whose parents are homeowners, with no impacts on renters (as expected). The results are robust to the inclusion of neighborhood fixed effects and controls for parental income (columns 4, 6). The effects appear particularly pronounced among youth whose parents reported four-year college degree attainment expectations for them when they were in elementary school, middle school, or the first years of high school (PSID-CDS, column 7). Furthermore, I find no significant effects of local house price changes on children's academic achievement during high school (results not shown to conserve space); rather, the local house price shocks are shown to impact only postsecondary education outcomes. The estimated aggregate house price shock effect is consistent with both positive house price shocks increasing the probability of college completion and negative shocks decreasing the probability.

The 2SLS/IV estimates indicate that a \$50,000 increase in parental wealth during ages 13–17 results in between a 2.8–3.5 percentage point increase in the probability of graduating with a 4-year college degree (Table 2, columns 1–2).<sup>3</sup> Among those who attended college, there is suggestive evidence that housing-price-shock-induced parental wealth increases in the years immediately leading up to college reduce the probability of attending an in-state college, reduce the probability of initially attending a community college, and lead to increases in both college tuition and markers of college quality (Lovenheim and Reynolds 2013). In light of the fact that the average four-year home price change was \$80,000 during the boom and home prices fell by one-third between 2007–2011, these effects translate into sizable impacts on both the extensive and intensive margins of postsecondary education outcomes.

The destabilizing effect of negative house price shocks on parental wealth accumulation and children's subsequent higher education outcomes is particularly pronounced for children from lower income families and families with high mortgage debt in the years immediately preceding college age. All children are

TABLE 2—2SLS/IV ESTIMATES OF IMPACTS OF PARENTAL WEALTH ON CHILDREN'S LIKELIHOOD OF GRADUATING FROM COLLEGE

Dependent variable (second stage)	Probability(college graduate)	
	(1)	(2)
Parental wealth, average during ages 13–17	0.0276 (0.0146)	0.0347 (0.0198)
Childhood county fixed effects	Yes	Yes
Birth year fixed effects	Yes	Yes
Demographic controls	Yes	Yes

*Notes:* See notes to Table 1 for data and sample. In column 1, the instrumental variables are the four-year percent change in the local HPI between ages 13–17 and that variable interacted with whether parent was homeowner/renter; in column 2, the instrumental variables are the unanticipated four-year change in the local HPI between ages 13–17 and that variable interacted with whether parent was homeowner/renter. The regressions are weighted by family weights in the PSID to produce nationally representative estimates. Robust standard errors (clustered on childhood county) in parentheses.

not equally affected by housing market fluctuations (boom and bust). Educational outcomes of youths whose parents are homeowners with relatively low income, high household debt, and/or low levels of housing equity are especially vulnerable to the destabilizing effects of negative house price surprises, particularly when it occurs leading up to college age. The findings indicate that the housing market downturn that accompanied the Great Recession led to a reduction in the likelihood of graduating from college, particularly for African-American youth.

### III. Conclusion

Blacks lost more wealth due to the real estate and foreclosure crisis than any single event in recent history. Home ownership accounts for more than 80 percent of wealth for the average US household. This study demonstrates significant effects of changes in parental wealth induced by house price shocks during the years immediately preceding high school graduation on college degree attainments, with lower- and middle-income students most affected.

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<sup>3</sup>The 2SLS models include county fixed effects (instead of neighborhood), so there is a sufficiently strong first stage.

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