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Race and the Housing Cycle: Differences in Home Equity Trends Among Long-Term Homeowners

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ABSTRACT

During the past decade, housing markets across the United States experienced dramatic upheaval. Housing prices rose rapidly throughout much of the country from 2000 until the start of 2007 and then fell sharply during the next 2 years. Many households lost substantial amounts of equity during this downturn; in aggregate, U.S. homeowners lost $7 trillion in equity from 2006 to 2009. Aggregate home equity holdings had fallen back to 2000 levels by early 2009. Whereas this intense volatility has been well documented, there remain unanswered questions about the variation in experiences across racial groups, particularly among those who purchased their homes before the boom and kept them through the collapse of the market. Did this housing market upheaval widen the already large racial and ethnic gaps in housing wealth? Using the American Housing Survey, we analyze differences in the changes in home equity experienced by homeowners of different races and ethnicities between 2003 and 2009. We focus on homeowners who remained in their homes over this period, and find that blacks and Hispanics gained less home equity than whites and were more likely to end the period underwater. Black–white gaps were driven in part by racial disparities in income and education and differences in types of homes purchased. Latino–white disparities were most dramatic during the market's bust.

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Scholars of urban disadvantage have long argued that racial and ethnic minorities suffer disproportionately in economic downturns because of their overrepresentation in vulnerable industries, occupations, and communities (Cummings, 1987; Massey & Denton, 1993; Wilson, 1987, 1996). Wacquant (2008) adds that not only are minorities disparately harmed by recessions, but that segregation limits the ability of minorities to benefit from economic expansions as well. Most of this work has focused on the impacts of employment growth and decline; there has been less analysis of the racially disparate consequences of housing market dynamics.

More literature is now emerging on the recent housing crisis, but it has understandably focused on those who bought during the subprime boom, and borrowers going through foreclosure. We look instead at the homeowners who purchased their homes before the peak years and who managed to stay in their homes through the market's 2007 to 2009 decline. By doing so, we are surely understating the total losses suffered during this period, but the experience of these homeowners remains highly

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relevant. Whereas many homeowners who bought before the height of the boom saw net gains in equity, racial disparities in equity gains during this volatile period might have widened the already substantial gaps in wealth across racial groups (Conley, 1999; O'Brien, 2012; Shapiro, 2004; Spilerman, 2000; Taylor, Kochhar, Fry, Velasco, & Motel, 2011). Despite racial disparities in homeownership (Kuebler & Rugh, 2013), home equity accounts for the largest share of asset wealth for many people of color (Oliver & Shapiro, 2006). Further, some of these households suffered considerable losses in equity and ended the period underwater, even though they avoided foreclosure. Such losses—or even reductions in expected gains—may have had significant impacts on their wellbeing. They may have led households to reduce their spending, cut back on investments in education and training, delay retirement decisions, and diminish or even eradicate the bequests that they hoped to pass on to their children (Case, Quigley, & Shiller, 2005; Engelhardt, 1996).

Motivated by an interest in understanding the fallout of the most dramatic rise and fall of the housing market in almost a century, this article explores whether market upheaval further widened the already large racial/ethnic gaps in home equity. Since housing is an inherently place-based good, and the distribution of households by race and ethnicity remains uneven early in the 21st century (Logan & Stults, 2011), we also look to how differences in residential patterns by race map onto disparities in equity growth. Specifically, we examine the extent to which racial and ethnic differences in home equity trajectories were driven by the settlement of racial groups across different metropolitan areas, which had different housing market dynamics. In other words, did households belonging to particular racial or ethnic groups fare better than others simply because they were concentrated in cities that experienced more favorable price trends?

We begin with a discussion of the potential mechanisms through which recessions differentially affect white and minority homeowners, and a review of the literature examining them. Following the review of the mechanisms, we discuss the data and methods used to compare the equity changes experienced by homeowners of different races between 2003 and 2009. We next discuss our results, which show, on average, that homeowners of all races who bought before 2003 and were able to keep their homes through 2009 accumulated home equity. However, black and Hispanic households experienced significantly smaller increases in equity over the same time period and were more likely to end the period with negative equity (or underwater) even after controlling for unit characteristics, socioeconomic status, and metropolitan-level housing price changes. Black–white gaps were driven in part by racial disparities in income and education, as well as differences in types of homes purchased. Latino–white disparities were most dramatic during the market's bust.

Race and Recession: Mechanisms of Disparate Impact

Numerous scholars have documented the importance of asset holdings in determining educational, labor force, and other outcomes, as well as the fact that home equity is often the largest source of wealth for people of color (Conley, 1999; Shapiro, 2004; Spilerman, 2000). Whereas recent studies have documented growing racial disparities in wealth (Taylor et al., 2011) and homeownership (Kuebler & Rugh, 2013), few have considered the degree to which macroeconomic swings might have differential effects on wealth, and home equity specifically, across racial and ethnic groups. Below, we propose several pathways: regional geography, differences in appreciation across housing types, racial differences in debt accumulation and mortgage lending, and intrametropolitan segregation.

One potential explanation for the differences in equity gains across groups is regional geography: differences in the distribution of households by race across regions and metropolitan areas in the United States may have mapped onto regional differences in house price changes. Figure 1 shows the pattern of home equity changes of households in our sample by census region between 2003 and 2009. On average, prices rose until around 2007 and then fell sharply through 2009. But homeowners in the West experienced the most dramatic up and down swings in the housing market. The average home equity held by Northeastern homeowners rose significantly during the boom, but declined very little during the bust, while homeowners in the South and the Midwest experienced far less change across the cycle.

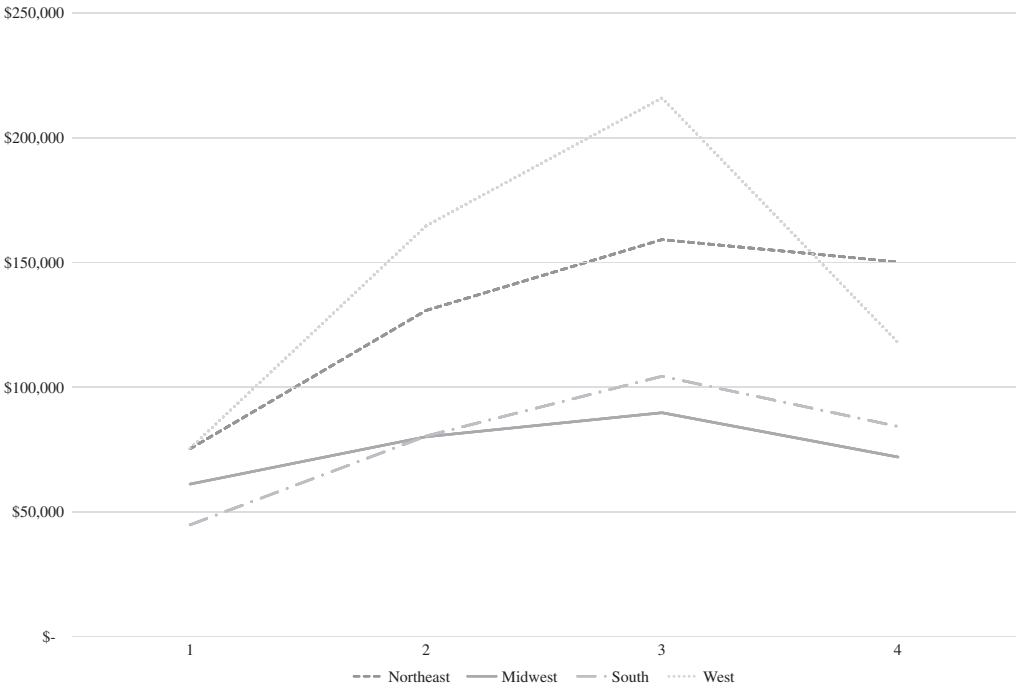

Figure 1. Average equity by region, 2003–2009.

Even this disaggregation conceals considerable variation across cities within regions, at least in terms of the magnitude of the boom and bust. By March 2009, housing prices had fallen to more than 10% below March 2003 levels in five of the 20 cities tracked by the Case Shiller index, while they remained at least 10% above 2003 levels in five others. The geographic patterns are fairly striking: seven of the eight cities that had experienced peak-to-trough declines of more than 30% as of 2009 were in the West or in Florida: Las Vegas, Nevada; Los Angeles, California; Miami, Florida; Phoenix, Arizona; San Diego, California; San Francisco, California; and Tampa, Florida. Indeed, the only city outside of the Sand States to fall into this group was Detroit, which continued to suffer long-term decline largely unrelated to the foreclosure crisis (S&P/Case-Shiller Home Price Indices, 2015). Given the disproportionate concentration of Asians and Latinos in the Western United States (and the additional concentration of Latinos in Florida), these groups may have experienced greater price volatility over the cycle, and perhaps smaller net gains in equity (Rugh, 2014). Table 1 shows the uneven regional distribution of homeowners in our sample. Gorbachev, O'Flaherty, and Sethi (2015) find that Hispanics gained more wealth than whites between 1999 and 2007, largely because they were concentrated in metropolitan areas that experienced higher rates of house price appreciation.

Even when living in the very same metropolitan area, homeowners belonging to different racial and ethnic groups may have seen varying levels of appreciation. For one thing, housing markets are often characterized by segmentation by type and value, and the types of homes that minorities own (which are typically lower priced) may have seen greater or lesser appreciation than those owned by whites. In some markets, for example, lower priced homes experienced greater volatility than higher priced homes, and because minority homeowners are more likely to own these homes, they may have been exposed to the more dramatic swings in prices (Cohen, Coughlin, & Lopez, 2012).

Differences in debt accumulation could also contribute to differences in home equity growth. Whereas price trends surely affect the amount of equity one holds in a home, so too do borrowing patterns. A household that takes on additional debt may see its home equity fall, even when prices are rising. Whereas the reasons are disputed, considerable evidence shows that subprime lending rates were higher among minority borrowers (Bond & Williams, 2007; Faber, 2013). These loans were often

Table 1. Baseline (2003) characteristics for the sample of homeowners.

	All	White	Black	Asian	Hispanic
Total households	2,324	1,614	295	108	307
Housing unit characteristics[a]					
In central city	42.3%	38.5%	53.6%	53.0%	49.3%
Household income	$77,414	$83,008	$61,453	$76,233	$61,955
Initial equity (2003)	$59,279	$67,116	$31,673	$55,611	$45,422
Initial value (2003)	$171,474	$180,259	$128,959	$196,621	$158,000
Year unit built	1961.9	1962.2	1958.8	1969.3	1961.5
Year bought	1992.4	1992.1	1992.2	1993.8	1994.1
Income	$81,657	$88,207	$63,897	$80,656	$64,267
High school graduated	53.1%	52.5%	64.5%	49.2%	46.7%
College graduated	37.7%	43.1%	23.1%	42.3%	21.5%
Region[b]					
Northeast	19.0%	21.9%	11.2%	17.7%	10.6%
Midwest	26.4%	30.0%	21.6%	25.1%	11.1%
South	37.8%	32.6%	59.9%	29.0%	48.2%
West	16.9%	15.5%	7.2%	28.2%	30.1%

[a]Observations are weighted with American Housing Survey pure weights.
[b]Estimates of regional representation may not sum to exactly 100% because of rounding.

characterized by higher loan-to-value ratios, and sometimes were structured so debt burdens could grow over time (through optional monthly payments, for example). Because of this, a homeowner would likely have a worse equity position with a subprime loan than if they had a prime loan holding the value of the home constant. Minority households may have also been more compelled to take on debt than whites because of their relatively worse labor market outcomes (Hout, Levanon, & Cumberworth, 2011). These less favorable labor market conditions, combined with the fact that minority households have smaller asset holdings to begin with (Taylor et al., 2011), could have led to tighter budget constraints and a greater need to rely on debt to smooth cash flow.

Racial segregation might magnify racial disparities in equity growth within metropolitan areas, as homes in largely minority neighborhoods face more volatile demand. For example, as has been the case in previous downturns (Massey & Denton, 1993; Wacquant, 2008; Wilson, 1987, 1996), the incomes of minority workers were hit harder than those of whites during the recent recession, as disproportionately more lost their jobs and suffered wage declines (Economic Policy Institute, 2014; Hout et al., 2011). Given that declines in income likely lead to declines in the ability to purchase a home, and that individuals in segregated metropolitan areas typically prefer homes in neighborhoods in which their own race is predominantly represented (Bobo & Charles, 1996; Krysan & Farley, 2002), disproportionately rising unemployment among minorities should lead to a disproportionate decline in demand for homes in minority neighborhoods. This reduced demand could result in relative decline in home values vis-à-vis homes in white neighborhoods.

Lenders and brokers may also have treated largely minority and largely white neighborhoods differently. Thus, even controlling for the initial price of their homes, minority homeowners may live in neighborhoods within cities that experienced greater losses and/or greater volatility in prices, perhaps because lenders—and brokers—marketed these neighborhoods more aggressively during the boom and withdrew credit more sharply during the bust.[1] Although the mechanism is unclear, past research shows that residential racial segregation is strongly associated with racial disparities in lending. Been, Ellen, and Madar (2009), for example, found a significant correlation between the gap in the share of black and white borrowers who obtain subprime loans in a metropolitan area and the degree of black–white segregation in that metropolitan area.[2] The authors found a similar link between Hispanic–white segregation levels and gaps in the share of Hispanic and white borrowers who receive subprime loans. Hyra, Squires, Renner, and Kirk (2013) also found a significant connection between black–white (but not Latino–white) segregation and subprime lending.

Further, when minority and white households are living in different neighborhoods, it may mean that they participate in different social networks and have access to a different set of lenders. As a result, they may obtain very different information about available mortgage channels and products, leading

minorities to take on less favorable loans with relatively higher debt burdens (Woodward & Hall, 2010). Indeed, research has shown significant differences in the channels through which white and minority homebuyers acquired mortgages during the housing boom, which explain some of the disparities in subprime lending (Bayer, Ross, & Bayer, 2014; Reid & Laderman, 2009).

Finally, the clustering of subprime lending in minority neighborhoods led to higher foreclosure rates in minority neighborhoods (Edmiston, 2009; Hernandez, 2009; Immergluck, 2008). Many studies have documented the home price declines that are associated with proximity to concentrations of foreclosure (Harding, Rosenblatt, & Yao, 2009; Hartley, 2010; Haughwout, Mayer, & Tracy, 2009; Immergluck & Smith, 2006; Lin, Rosenblatt, & Yao, 2009; Rogers & Winter, 2009; Schuetz, Been, & Ellen, 2008; Wassmer, 2010). These spillover effects may have intensified price declines among homes owned by minority households in segregated areas. Rugh and Massey (2010) argue that racial segregation exacerbated such foreclosure accumulation.

Data

Our core data set is the national American Housing Survey (AHS). Administered by the U.S. Census Bureau, the AHS is a nationally representative, longitudinal data set following housing units over time. Every 2 years, the U.S. Census Bureau gathers data from the household head about both the housing unit and all the people living in the unit. We naturally limit our analysis to homeowners, and as noted, we focus on homeowners who stay in their housing units over time. For a household to qualify as staying in its home across waves of the survey, a respondent must indicate that at least one household member has lived in the unit for 2 years, and that household member's age and gender must be in line with what at least one household member reported in the previous wave.[3]

We focus on the years spanning the housing bubble and subsequent market collapse in the United States. As shown in Figure 1, the timing of these phenomena varied across different regions but, consistent with average trends, we mark the start of the housing boom as 2003, the peak of the market as early 2007, and the bottom as 2009.

Our key variable of interest is home equity, or the difference between the value of a home and the outstanding principal on associated mortgages. We focus primarily on home equity because this combined measure is a better assessment of a household's financial wellbeing than simply using the value of the home. This is particularly true given racial differences in the use of subprime mortgages during the housing boom (Faber, 2013). Further, households with negative equity are more vulnerable to foreclosure (Bhutta, Dokko, & Shan, 2010; Gerardi et al., 2013) and may not be able to move to new employment opportunities (Ferreira, Gyourko, & Tracy, 2011).

To capture home values, we rely on self-reported assessments of the current market value of the unit. We take several steps to minimize the potential for error in this measure. To remove outliers, we trim the top and bottom 1% of self-reported values.[4] We also discard the top and bottom 1% of changes in self-reported values across survey waves (e.g., a home with a value that drops from $500,000 to $50,000 in 2 years). Finally, focusing on *changes* in equity reported by a given household over time helps to weed out any systematic differences across households in reporting home values, given that any bias would be consistent over time.

We estimate outstanding principal as the balance of the initial mortgage together with the balance of any second mortgage yet to be paid off. Since the AHS does not ask directly about mortgage balance, we follow Chan, Dastrup, and Ellen (in press) to estimate the outstanding principal from other mortgage information included in the survey (i.e., interest rate, years since origination, and amount of mortgage debt at origination). We calculate outstanding balance for the first and second mortgages only, but very few households have additional liens.[5] We then estimate home equity in each wave as self-reported value net of outstanding principal.

Significant variation in reporting error across racial groups could threaten our ability to estimate disparities in home equity trends. Such biases could potentially result from racial differences in the use of subprime mortgage credit during the housing boom, access to information about changing home prices, or the timing of home purchases. Chan et al. (in press) demonstrate that homeowners

consistently report that their homes are worth more than market estimates suggest; however, they find little evidence of differences across racial and ethnic groups in the degree to which self-reported values exceed market estimates. In some of their models, for example, black households are more likely than whites to undervalue their homes, whereas in others they are indistinguishable from whites or tend to value their homes at higher levels. In light of these findings, we have little reason to believe that there are systematic racial differences in reporting error.

We group homeowners into one of four mutually exclusive racial and ethnic categories: non-Hispanic white, non-Hispanic black, non-Hispanic Asian/other (referred to as "Asian" for the remainder of the article as the bulk of households in this group self-identify as Asian), and Hispanic. To account for potential racial differences in types of housing purchased (with different types enjoying differential rates of appreciation), some of our models control for the decade in which the housing unit was built, the year in which the unit was purchased (differenced from 2005), the baseline (i.e., 2003) value of the unit, and a dummy variable for whether the unit has had a major remodel.[6] It is possible that racial and ethnic disparities in home equity accumulation could have been driven, in part, by socioeconomic differences. Higher levels of educational attainment, for example, may have led borrowers to prefer certain mortgage providers or types over others, resulting in differences in debt accumulation. Further, lower income borrowers may have been more likely to take equity out of their homes. Some models, therefore, control for demographic characteristics (i.e., the natural log of household income and dummy variables for whether the highest level of education attained by the household head was high school or college).

Sampling

We limit the sample to owner-occupied structures in metropolitan areas with 1–4 units. We exclude mobile homes. Because the AHS follows housing units—and not households—over time, we also restrict our analysis to a balanced sample of households who stayed in the same unit from 2003 to 2009. In this way, we can track changes in home equity for these households. As noted, this restriction also ensures that any unobserved bias in reporting home values that is particular to a given household is consistent over time—and therefore does not affect our estimate of changes. Whereas we have no way of knowing what happened to the equity holdings of those who moved, this sampling frame likely biases our estimates of wealth loss, and racial differences in wealth loss in particular, toward zero given the well-documented disparities in foreclosures during this time period (Hall, Crowder, & Spring, 2015).

We considered tracking households for another 2 years (through 2011), as home prices continued to fall in many markets between 2009 and 2011, but this would have reduced our sample considerably given mobility rates. Almost one in five (458 of 2,324) of the households who stayed in their units through 2009 left for reasons unknown by 2011. (Importantly, the race of the household head was not a significant predictor of a household leaving the sample.) Further, home equity levels in the AHS were relatively flat between 2009 and 2011—especially among those who stayed in their homes. On average, equity declined by only $1,619 during this period, which was the smallest change—in terms of magnitude—over any 2-year period since 2003.

Our final sample consists of 2,324 homeowners across 128 metropolitan areas. Table 1 displays the baseline characteristics of this sample. The large majority of included households (1,614) are white, whereas 307 are Hispanic, 295 are black, and 108 are Asian. Most black and Asian households live in central cities, whereas Whites and Hispanics tend to be in suburbs. White incomes are the highest, followed by Asian, Hispanic, and black households. There are stark disparities in initial (i.e., 2003) home equity across race, with whites having more than twice the home equity of black households ($67,116 vs. $31,673). Asian homeowners also have relatively high levels of equity ($55,611), whereas the typical Hispanic homeowner falls in the middle ($45,422). Asian homes were worth the most in 2003 ($196,612), followed by white ($180,259), Hispanic ($158,000), and black ($128,959) homes. Homeowners in the sample typically purchased their homes in the early 1990s and units were around 40 years old at the start of the housing boom. On average, whites and Asians in the sample had higher incomes and were more likely to have completed college than blacks and Hispanics.

Methods

Our primary variable of interest is change in home equity, which is measured as the current market value of the unit net of outstanding mortgage principal. We estimate a series of regression models to analyze how equity changed over time across racial groups both nationally and within metropolitan areas. We begin with simple ordinary least squares models regressing change in home equity on dummy variables for black, Asian, and Hispanic household heads (with white as the reference category), which give national average changes for each racial group. We additionally control for baseline (2003) equity, which allows us to examine race/ethnicity differences among homeowners who initially hold similar levels of equity. This is arguably a more meaningful comparison, as a $10,000 decrease in equity surely represents a far larger change for someone who initially holds only $10,000 in equity than it does for someone who initially holds $1,000,000. Baseline equity may also proxy for other, unobserved characteristics of the unit and household.

Next, we include Metropolitan statistical area (MSA) level measures of house price appreciation over the time period, as captured by percentage changes in the Federal Housing Finance Agency house price index, and eight mutually exclusive dummy variables indicating census region and whether the unit is in a central city (e.g., Northeast central city, Northeast suburb, etc.), which capture both regional differences and city–suburban differences across regions. This model allows us to test whether racial differences in home equity trajectories are simply due to differences in the distribution of households across regions and metropolitan areas with different house price trends. We then add a number of covariates to control for housing unit characteristics (i.e., dummy variables indicating the decade in which the housing unit was built, the year in which the unit was purchased, whether the unit has had a major remodel, and the value of the home in 2003). Finally, we add measures of household socioeconomic status (i.e., logged household income and educational attainment), which may be related to changes in home equity.

We estimate each of the ordinary least squares models for several time periods: the housing boom (2003–2007), the collapse of the market (2007–2009), and the net change (2003–2009). The dependent variable in each time period is equity in the later year minus equity in the earlier year, or the absolute change in home equity (in dollars). We choose to model absolute changes in equity rather than percentage changes, but, as noted, we include initial levels of equity in our models, which addresses the fact that absolute changes may be larger for owners with smaller initial levels of equity. Because many households experienced declines in equity, we are unable to transform the equity changes with a log. We also estimated a series of models in which home equity was measured as a percentile rank based on the starting year (2003) distribution of home equity among all households, following Gorbachev et al. (2015). The dependent variable in these models was the change in percentile rank, and the findings were substantively equivalent to those presented here.

Finally, we identify whether a household is underwater (i.e., whether the value of the home net of the outstanding debt owed for the mortgage is negative) and use this dichotomous variable (coded 1 if the household is underwater and 0 if not) for supplementary analyses. We estimate a series of logistic regression models in which ending the period underwater is the dependent variable. These models use the same covariates as those used to predict changes in home equity. We first predict the likelihood of being underwater in 2009 using dummy variables and baseline (2003) equity, then add unit characteristics, measures of socioeconomic status, change in metropolitan-level housing values, baseline home value, and region-by-city dummy variables.

Observations are weighted in all regression models using pure weights provided by AHS, which weight by the inverse probability of selection. (Results were substantively indistinguishable when we used final weights instead of pure weights, or if observations were unweighted.) We cluster standard errors at the metropolitan-area level.

Results

Figure 2 shows weighted racial and ethnic differences in average home equity for the time period studied among households in our sample of homeowners. On average, homeowners from each of the four groups

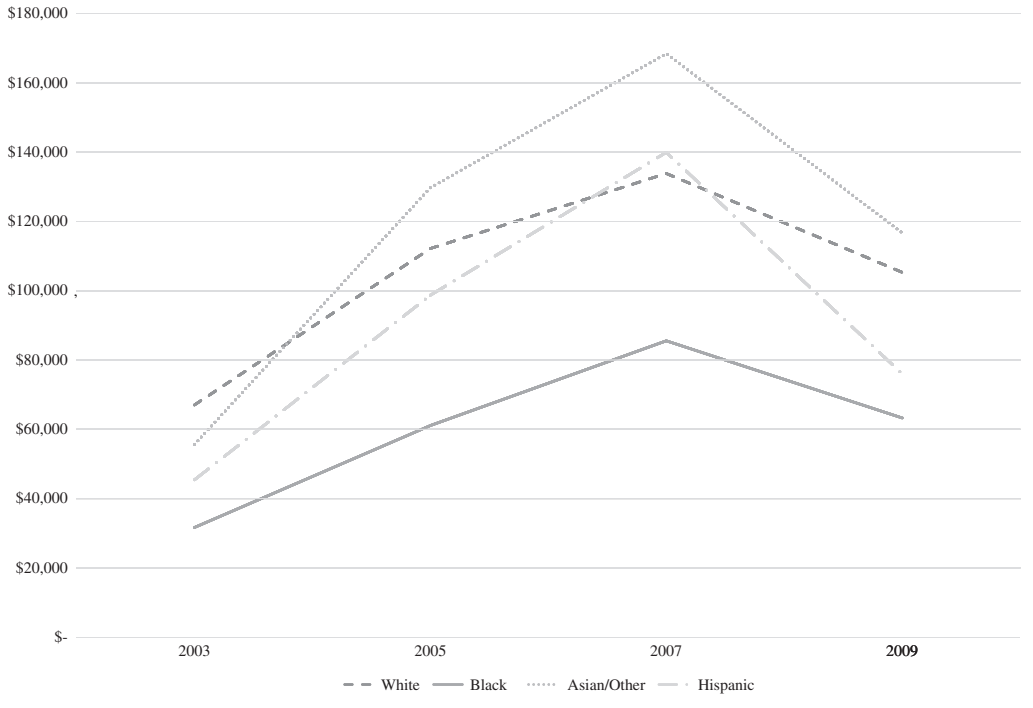

Figure 2. Average equity by race, 2003–2009.

enjoyed a gain in equity from 2003 to 2009, but there were notable differences in trajectories. Average home equity for Hispanic homeowners increased dramatically from 2003 to 2007, reaching parity with whites in the sample. Whereas much of that increase was then wiped out between 2007 and 2009, average Hispanic home equity increased by $30,582 over the 6-year period. Many Asian homeowners also experienced large home equity gains during the housing boom, but they did not see as large a decline during the downturn. On average, Asian home equity was $61,127 higher in 2009 than it was in 2003. Compared with Hispanics and Asians, home equity trajectories were much flatter for white and black homeowners. On net, the change in average equity holdings among black homeowners during this period rose by $31,609, while average equity holdings among white homeowners rose by $38,282. In raw dollar amounts, it appears that Asians and whites enjoyed larger equity gains over the cycle than blacks and Hispanics did.

Because the average minority homeowner began the period with substantially less home equity than the average white homeowner, nonwhite gains were larger in percentage terms. White households in our sample experienced a 57% increase in equity, while average Hispanic equity increased by 67%. Average equity doubled for black (100% increase) and Asian (110%) households. Compared with white homeowners, average percentage gains for minorities were larger during the housing boom, and average percentage losses were more dramatic during the market's collapse.[7] We choose to focus primarily on average change measured in dollar values, because we believe it is a more meaningful estimate not only of how home equity affects household behavior but of racial disparities. Even though average home equity among black households increased by a greater percentage than that among whites, the disparity in equity between these two groups grew from $35,369 to $42,042. The difference between average Hispanic home equity and average white home equity also grew, from $21,620 to $29,320. (That said, our models control for baseline equity.)

Although average homeowner equity increased for each of these racial groups between 2003 and 2009, a substantial minority suffered losses. Approximately 20% of white homeowners saw a reduction in their home equity over this cycle, compared with 24% for nonwhite homeowners. The fact that average Asian home equity increased by over $60,000 from 2003 to 2009 while almost one in four Asians lost equity speaks to the diversity of experience within that community.

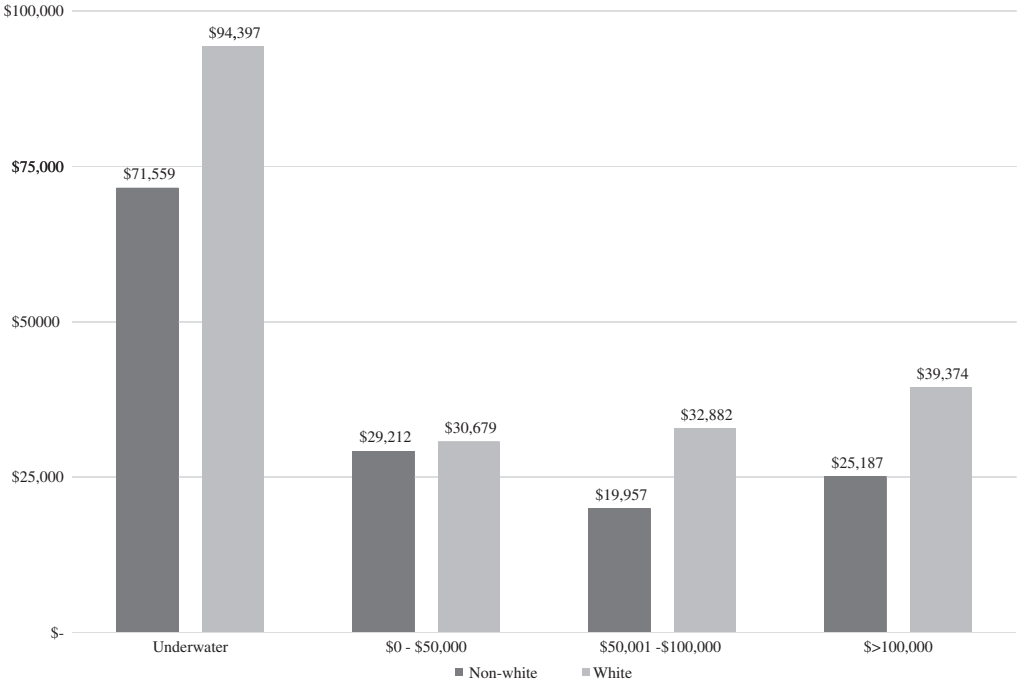

Figure 3. Average change in equity by race and starting equity position, 2003–2009.

Our key interest lies in exploring racial disparities in equity trajectories among similarly situated homeowners. Figure 3 moves in that direction by disaggregating average change in home equity by starting equity position and white/nonwhite race. (We collapse nonwhite racial groups into one category because of small cell sizes.[8]) Racial disparities are evident at all starting equity positions, but were most dramatic at both ends of the distribution. White homeowners with over $100,000 in equity in 2003 gained $14,187 more in equity on average than similarly positioned minority homeowners did. White homeowners who began the period underwater gained an average of $22,838 more than homeowners of color did. The relatively strong gains among those who were underwater in 2003 were driven in part by the fact that homeowners of all races experienced declines in outstanding principal, while households with positive equity in 2003 gained debt by 2009. For example, mortgage debt declined by an average of $14,713 for underwater minority households and $11,495 for whites. Among households that had over $100,000 in equity in 2003, minorities added $30,558 in debt on average, compared with $12,444 among whites. Concurrently, changes in home value were generally more positive among underwater households than those with over $100,000 in equity. However, underwater minority households gained $26,057 less, on average, than white households that began the period with negative equity.

Regression Estimates of Home Equity Trends

The first column in Table 2 shows estimated coefficients for a simple regression that includes only race dummy variables and the initial equity held by the homeowner in 2003. The results are consistent with the story in Figure 3: both black and Hispanic households gained significantly less equity than white households (the reference category) did, controlling for baseline equity. Changes experienced by Asians were statistically indistinguishable from those seen by whites. Consistent with Figure 3, homeowners with higher starting equity positions experienced smaller gains.

The second column tests the extent to which racial disparities in home equity changes between 2003 and 2009 were explained by the distribution of racial groups across regions, city versus suburb, and

Table 2. Model estimates of changes in home equity from 2003 to 2009.

	Model 1	Model 2	Model 3	Model 4
Black	− 13,673*	− 11,171+	− 9,114+	− 8,206
	(6597.39)	(5797.14)	(5180.08)	(5496.97)
Asian/other	19,664	20,716	15,493	14,332
	(18374.03)	(17626.71)	(16836.87)	(16610.64)
Latino	− 14,226+	− 15,896*	− 10,377+	− 13,413*
	(7523.78)	(6212.35)	(5592.82)	(5421.73)
Equity in 2003	− .17***	− .19***	− .44***	− .44***
	(.04)	(.04)	(.04)	(.04)
Change in HPI (%; 2003–2009)		64,578+	83,769**	80,089**
		(33160.52)	(29424.77)	(29791.06)
Years since purchase in 2005			2018***	2040***
			(288.15)	(283.03)
Remodeled			− 1,091	− 798
			(4446.38)	(4518.74)
Value in 2003			.30***	.29***
			(.04)	(.04)
ln (Household Inc.)				188
				(2169.71)
High school graduate				− 21,121***
				(5820.63)
College graduate				− 8,483
				(5245.17)
Constant	50,843***	78,537***	2,202	16,258
	(5188.05)	(16308.03)	(17671.40)	(31862.99)
n	2,324	2,324	2,324	2,324
R^2	.023	.071	.12	.13
Region*City interactions	No	Yes	Yes	Yes

Note: HPI = House price index. ln = MSA-clustered standard errors are given in parentheses. Observations are weighted with American Housing Survey pure weights. Models 3 and 4 include dummy variables for the decade in which the unit was built.
$^{+}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

metropolitan areas that experienced different housing market trends. This model shows that disparities persisted after including MSA-level change in housing price index and eight mutually exclusive dummy variables indicating Census region and whether the unit was in a central city. Home equity trends were positively correlated with the surrounding metropolitan area's housing prices.

These same patterns hold after adding in additional covariates describing housing unit characteristics[9] (Model 3). The magnitude of the coefficient on the black and Hispanic indicator variables does not substantively change. On average, across the country, black and Hispanic households gained $9,114 and $10,377 less than white homeowners who owned similar homes from 2003 to 2009 did, respectively. The number of years a household had been in its home before 2005 was positively correlated with home equity changes, as was the value[10] of the home in 2003.

The magnitude of the coefficient on the black indicator variable shrinks as we add more controls and loses significance once we include variables for income and educational attainment (Model 4), suggesting that some of the disparity between black and white homeowners is explained by differences in socioeconomic status. The same cannot be said for the Latino–white disparity, which is largely unaffected by the inclusion of these measures.

As for robustness tests, we explored the possibility that the relationship between change in equity between 2003 and 2009 and both equity position and home value in 2003 was nonlinear. We estimated change in equity including quadratic terms for baseline equity and value, and the findings were substantively identical to the results presented above. The significance of the negative coefficient on the Latino dummy variable is insensitive to model specification. Finally, as noted above, we estimated models in which the dependent variable was the change in percentile rank of equity, and the findings were substantively equivalent to those presented here.[11]

Table 3. Model estimates of changes in home equity from 2003 to 2007 and 2007 to 2009.

	Changes from 2003 to 2007			Changes from 2007 to 2009		
	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Black	− 2,932	− 2,667	− 2,922	− 9,997*	− 6,307	− 5,684
	(4785.81)	(4547.60)	(4677.53)	(4721.67)	(4185.26)	(4122.60)
Asian/other	21,886	21,662	20,474	− 4,496	− 1,381	− 1,381
	(14460.55)	(14600.09)	(14406.15)	(8775.21)	(8859.03)	(8974.19)
Latino	9,620	10,931	7,839	− 22,749*	− 16,923**	− 16,415*
	(7295.09)	(7118.47)	(7501.46)	(9314.02)	(6265.80)	(6731.44)
Constant	56,112**	41,183	71,268	− 55,247**	−544	− 1,689
	(18966.34)	(25873.45)	(44905.98)	(19980.68)	(14953.06)	(23979.39)
n	2,324	2,324	2,324	2,324	2,324	2,324
R^2	.26	.26	.26	.19	.27	.27
Baseline equity (2003)	Yes	Yes	Yes	Yes	Yes	Yes
Baseline value (2003)	Yes	Yes	Yes	Yes	Yes	Yes
Unit characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Region*City interactions	Yes	Yes	Yes	Yes	Yes	Yes
Change in HPI (%)	No	Yes	Yes	No	Yes	Yes
Household head characteristics	No	No	Yes	No	No	Yes

Note: HPI = House price index.
MSA-clustered standard errors are given in parentheses. Observations are weighted with American Housing Survey pure weights. Covariate output omitted.
$^{+}p < .1$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

Disaggregating Home Equity Trends

We next separated model changes in home equity during the housing market's boom (2003–2007) and changes during the bust (2007–2009). The first three columns of Table 3 display selected estimates from the first period. On average, equity changes between racial and ethnic groups were statistically indistinguishable during the boom. Findings are the same under more relaxed sampling conditions in which households are only required to have stayed in their units between 2003 and 2007. The last three columns of Table 3 show similar models for the collapse of the housing market (2007 to 2009). Black households lost significantly more equity than whites during this period, although these differences become insignificant after MSA house price index change is added to the model, suggesting that another driver of black–white disparities was the housing markets in which they bought homes. However, we find that Hispanic homeowners lost more equity than white homeowners did on average, even after controlling for a host of individual factors, unit characteristics, and metropolitan area house price appreciation. Findings are equivalent within a larger sample of households who stayed in place between 2007 and 2009.

Table 4 shows results from models for each of the components of the change in home equity: change in self-reported value of the unit and change in outstanding principal from 2003 to 2009. These estimates are imprecise, but the directions of the coefficients suggest that black and Latino homeowners gained less value and more debt than comparable white homeowners did.

We identify several important stylized facts here. First, black and Hispanic homeowners enjoyed less equity gain on average between 2003 and 2009 than similarly situated white borrowers did. Second, on average, Hispanics lost ground compared with whites during the bust. Third, disparities between blacks and whites appear to be driven more by differences in socioeconomic status and the types of homes purchased than the disparities between Latinos and whites are. Finally, whereas estimates are noisy, differences in equity growth appear driven more by changes in values than by changes in debt.

Negative Equity

Homeowners of color within our sample were more likely to be underwater throughout the boom and bust of the housing market. Figure 4 shows the percentage of homeowners of each race that had

Table 4. Model estimates of changes in self-reported value and outstanding principal from 2003 to 2009.

	Changes in self-reported value		Changes in outstanding principal	
	Model 11	Model 12	Model 13	Model 14
Black	− 741	− 405	− 717	2,502
	(7,055)	(6,736)	(3,968)	(4,080)
Asian	19,269	21,240	3,015	2,789
	(13,635)	(13,391)	(7,401)	(7,157)
Hispanic	− 121	− 7,412	8,970	3,161
	(8,906)	(5,433)	(6,041)	(4,471)
Constant	20,486***	21,600	10,221***	− 3,371
	(6,036)	(26,867)	(2,442)	(14,625)
Observations	.0203	.0918	.00803	.0644
R^2	2,324	2,324	2,324	2,324
Baseline equity (2003)	Yes	Yes	Yes	Yes
Baseline value (2003)	Yes	Yes	Yes	Yes
Region*city interactions	Yes	Yes	Yes	Yes
Change in HPI (%)	No	Yes	No	Yes
Unit characteristics	No	Yes	No	Yes
Household head characteristics	No	Yes	No	Yes

Note: HPI = House price index.
MSA-clustered standard errors are given in parentheses. Observations are weighted with American Housing Survey pure weights. Covariate output omitted.
$^{+}p < .1$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

negative equity from 2003 to 2009. Not surprisingly, given the increase in prices and the fact that most homeowners hold amortizing mortgages, homeowners of all races experienced substantial declines in negative equity from 2003 to 2007. The percentage of black, Hispanic, and Asian households that had negative equity declined by almost two thirds between 2003 and 2007, while whites experienced a decline of almost half. Loan-to-value (LTV) ratios were generally higher for nonwhite homeowners but also declined sharply for all racial groups during the housing boom.[12] These gains were short lived,

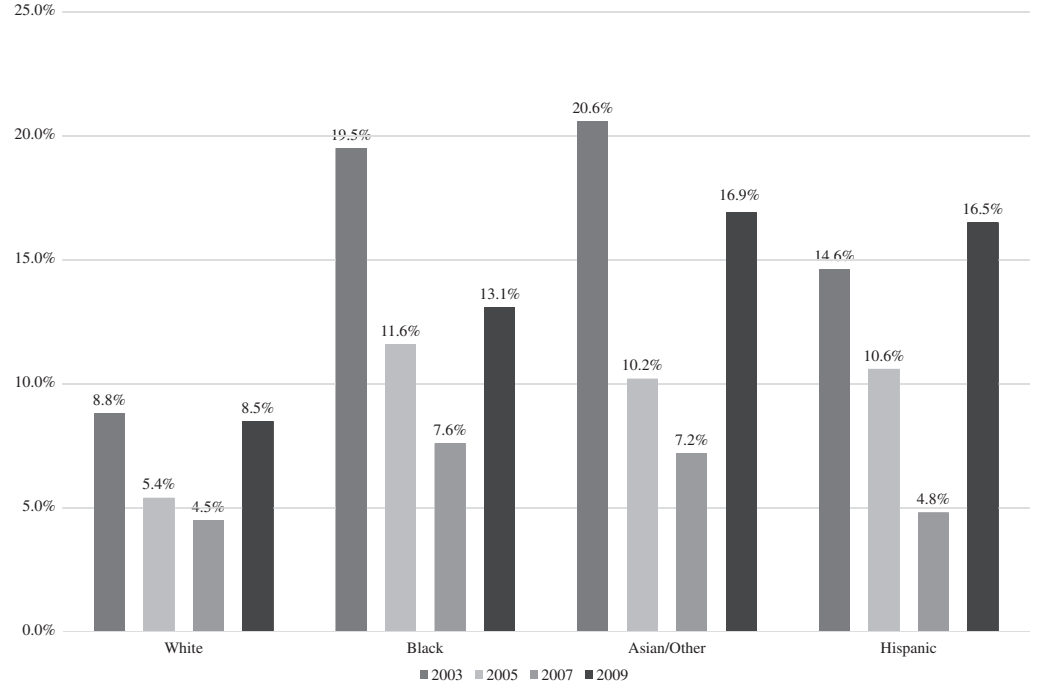

Figure 4. Share of households in the sample, by race, that are underwater.

Table 5. Models of ending period underwater.

	Model 15	Model 16	Model 17	Model 18
Black	1.439^{+}	1.488*	1.435*	1.419^{+}
	(.270)	(.276)	(.260)	(.271)
Asian/other	1.766	1.695	1.628	1.670
	(.626)	(.581)	(.591)	(.611)
Latino	1.809*	1.717^{+}	1.576*	1.692*
	(.489)	(.486)	(.363)	(.406)
Observations	2,324	2,324	2,324	2,324
Region*city interactions	Yes	Yes	Yes	Yes
Baseline equity (2003)	Yes	Yes	Yes	Yes
Baseline value (2003)	Yes	Yes	Yes	Yes
Unit characteristics	No	Yes	Yes	Yes
Change in HPI (%)	No	No	Yes	Yes
Household head characteristics	No	No	No	Yes

Note: HPI = House price index.
Estimates are displayed as odds ratios. MSA-clustered standard errors are given in parentheses. Observations are weighted with American Housing Survey pure weights.
$^{+}p < .1$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

however, as the collapse of the housing market led to increases in LTV ratios across the board. Latino and Asian homeowners experienced the largest average increase in LTV ratio from 2007 to 2009, at 0.13 and 0.14, respectively, while average LTV rose by 0.08 for blacks and 0.07 for whites.

The percentage of homeowners who were underwater rose significantly during the bust, especially for Hispanics. Households that started the period underwater were more likely to be underwater in 2009, although there were differences in the rate of persistence across racial and ethnic groups. Only 17.4% of white homeowners who were underwater in 2003 were also underwater in 2009, compared with 27.6% for people of color. Nonwhite homeowners with more than $100,000 in equity in 2003 were more than twice as likely (7.3%) to have negative equity in 2009 as whites (3.1%).

Table 5 shows results from logistic regressions, which model the likelihood of a homeowner being underwater in 2009. The displayed odds ratios can take any values above 0, with values greater than 1 indicating an increased likelihood of ending the period underwater and values between 0 and 1 indicating a decreased likelihood. The estimates reinforce the story of racial disparities displayed in Figure 4: by the end of the period, white homeowners were significantly less likely to be underwater than minorities, even after controlling for initial equity and value. These findings show that the equity losses experienced by many minority homeowners during the bust were quite meaningful: black households were approximately 1.4 times more likely and Hispanic households were approximately 1.7 times more likely to end the period underwater than similarly situated white households were. Racial disparities in the likelihood of ending the period underwater were robust to several measures of starting equity position including a quadratic measure of starting equity and variables for both home value and mortgage debt, and excluding any measure of baseline financial status. Negative equity is not only a reduction of potential consumption, but puts these households at risk of foreclosure going forward, in the event that the homeowner(s) lose their job(s) (Bhutta et al., 2010; Gerardi et al., 2013). Faced with negative equity, households lose the ability to sell their house to pay off their mortgage. Negative equity can also lock households in place (Ferreira et al., 2011), making it difficult to move for employment opportunities.

Discussion

This article investigates racial and ethnic differences in home equity changes over the boom (2003–2007) and bust (2007–2009) of the American housing market. On average, homeowners of all races who bought before 2003 and were able to keep their homes through 2009 accumulated home equity. However, Hispanic households experienced significantly smaller increases, even after controlling for unit characteristics, socioeconomic status, starting equity position, starting home value, and the

metropolitan area's change in housing prices. Latino–white differences were most dramatic during the housing market's bust. Black homeowners also gained less equity than whites did, but these disparities can largely be explained by differences in education and income, as well as differences in types of homes purchased.

We also find that white homeowners who held on to their homes throughout the market tumult of the early 21st century were significantly less likely than Latino or black homeowners to end the period underwater, even after controlling for initial equity position. Negative equity is a significant predictor of foreclosure (Bhutta et al., 2010; Gerardi et al., 2013) and can limit labor market options through spatial lock-in (Ferreira et al., 2011), suggesting the racial and ethnic differences in home equity changes may have had broad consequences.

Although our findings have important implications for contemporary debates about racial disparities in housing opportunity (Farley, 2011; Krysan, 2011), we acknowledge that this study has a number of limitations. First, we have a relatively small number of observations given our model specifications, so some of our estimates are imprecise. Because of this, we are unable to draw stronger conclusions regarding differences across and within racial and ethnic groups. Our sampling decisions allow us only to make inferences about a specific population: the set of households who bought their homes before the housing boom and managed to keep them through the collapse of the market. The focus on these homeowners ignores the equity losses incurred by households who lost their homes to foreclosure, and the equity losses and gains of households who sold their homes between 2003 and 2009. Given racial disparities in foreclosures, it is possible that these sampling choices mute racial differences in home equity trajectories, leading to conservative (i.e., biased toward zero) estimates of racial disparities. That said, further empirical work suggests that the racial disparities seen for these homeowners may be consistent with those experienced by the larger set of homeowners. For one thing, race is not a predictor of a homeowner leaving their home between 2003 and 2009. Moreover, when we estimate models of house price appreciation including all homes owned in 2003, regardless of whether the occupant remained there over time, we obtain qualitatively similar results.

Potential racial differences in measurement error may also bias our results. If, for example, households of one racial or ethnic group are systematically overvaluing their homes and undervaluing their mortgage debt compared with another group, our ability to measure disparities between groups is threatened. Recent research by Chan et al. (in press), however, does not find consistent racial differences in the accuracy of self-reported home values.

We believe our results are thus reflective of patterns in the broader population and suggest that both the rise and fall of the housing market helped to widen the already gaping distance in wealth between minority and white households. Other work has shown that family wealth is a powerful predictor of individual educational and economic outcomes, and despite their significantly lower homeownership rates (Kuebler & Rugh, 2013), home equity is the largest source of wealth generation for blacks and Latinos. Thus, the long-run consequences of these gaps are substantively important and difficult to overcome (Conley 1999; Shapiro, 2004; Spilerman, 2000). Additionally, we may not see the full impact of the last decade's housing market turmoil for some time. Researchers may not be able to identify delayed investments in children's education or reduced bequests caused by lost home equity for several years.

Although home equity is the largest asset for many households, nonhousing wealth likely affects outcomes in the housing market. Unfortunately, we have no data on nonhousing wealth for our sample of households. It is possible that our sample may undercount asset-rich households who find it easier to move away from an underwater home or an area in which housing values are declining. It is also possible, however, that our sample overrepresents higher wealth households, as individuals and families with large nonhousing wealth holdings may not be forced out of their homes if an income earner loses his or her job. Instead, they can leverage their savings to withstand reduced wages. In short, the relationship between nonhousing wealth and stable homeownership is theoretically ambiguous and worthy of additional study—particularly given the wide racial disparities in nonhousing assets (Taylor et al., 2011).

In future work, we hope to learn more about the precise mechanisms through which these disparities occurred. Why did black homeowners enjoy less appreciation and equity gain during the boom than white homeowners with comparable homes in metropolitan areas with the very same market conditions did? Why did Latino homeowners lose more equity during the bust? It could be that racial and ethnic segregation creates racially identifiable submarkets, and the continued unwillingness of white households to buy in communities of color—together with the smaller size and lower wealth of the minority population—means that these neighborhoods enjoyed less demand, even as the market was going up. Realtors and lenders may have treated racially identifiable submarkets differently too, targeting them for different products and outreach. Finally, the foreclosures associated with subprime lending may have been more concentrated in largely Latino neighborhoods, intensifying price declines during the market collapse.

Even without certainty about mechanisms, our results have implications for policy. For one thing, racial differences in mortgage debt accumulation underscore the importance of continuing to monitor lending patterns, and to police any discriminatory behavior. Expanding the data collection requirements under the Home Mortgage Disclosure Act would help in this effort, by providing researchers with a more powerful tool to assess racial disparities in mortgage lending. Relatedly, although the prevalence of steering appears to have declined, audit studies show that minorities continue to face discrimination when searching for a new home, which could constrain their purchases to homes that appreciate more slowly (U.S. Department of Housing & Urban Development, 2013). Additionally, given the concentration of foreclosures in largely minority neighborhoods, efforts to mitigate the negative spillover effects of foreclosures on the value of nearby properties (Gerardi et al., 2013) might also help to reduce racial disparities in home equity trends.

Unfortunately, whereas many advocate for policies to expand homeownership with the explicit purpose of closing racial and ethnic wealth gaps, our findings suggest this may not be the best avenue to do so. Between 2003 and 2009, the racial gap in housing wealth among homeowners widened. Of course, the gap in wealth among renters of different races may have widened even more. The fact that black and Latino households were more likely to end the period underwater is a particular concern.

Finally and most fundamentally, the results remind us that homeownership is a risky investment, and not all homeowners see their home values appreciate. Whereas these homeowners appear to have weathered the storm, many of them—especially minority owners—lost significant amounts of equity along the way. In addition to making homeownership a safer investment, policymakers should develop nonhousing wealth-building tools for poor and middle-class households and also expand access to already existing tools, which largely cater to the affluent (Corporation for Enterprise Development, 2004).

Notes

1. Flippen (2004) argues that appreciation is lower over the long run in neighborhoods with larger minority concentrations and higher poverty rates.
2. Rugh and Massey (2010) rely on this association in using racial gaps in subprime lending in a metropolitan area as an instrument for segregation.
3. There is a variable in the AHS that indicates whether the people living in the unit were also living in that unit in the previous survey wave, but we found that the variable had substantial error.
4. The U.S. Census Bureau top-codes home values using different methodologies each year.
5. Information about the mortgage terms for mortgages beyond the first two is insufficient to estimate remaining debt.
6. Although AHS collects information about the cost of replacement and additions, it does not identify housing units that have undergone major remodeling that might impact the value of the home. We define major remodels as replacement/additions made to the unit of a cost greater than 2% of the self-reported value of the home. We also estimated models including the 2003 value of the home as a covariate, which further controlled for unit quality, but decided to use baseline equity instead.
7. Racial differences in the percentage change of home value follow a similar pattern. Average value rose more dramatically in percentage terms for minorities than for whites during the boom, and fell more sharply during the bust. Across the whole period, average percentage changes in home value were largest for nonwhite homeowners in our sample.

8. Findings were insensitive to how the starting equity categories were constructed. Among white households in the sample, 151 were underwater in 2003, 618 had starting equity between $0 and $50,000, 399 had 50,001 to $100,000, and 446 had over $100,000. Among nonwhite households, 130 were underwater in 2003, 305 had equity between $0 and $50,000, 140 had 50,001 to $100,000, and 135 had over $100,000.
9. Housing units built in the 1940s gained significantly more equity, on average, than units built in other decades. No other coefficients for dummy variables indicating the decade in which the unit was built were significant. To conserve space, we do not show these coefficients in the table.
10. Baseline (i.e., 2003) equity is well correlated with 2003 value (0.60) and years between purchase and 2005 (0.30). However, the variance inflation factors in Model 6 were low: 2.32 for value, 1.92 for starting equity, and 1.25 for number of years since purchase of the home, so we are not concerned with multicollinearity biasing our estimates.
11. In results not shown, we estimated racial differences in home equity trajectories within samples stratified by starting equity position. Although these smaller samples resulted in less-precise estimates, they were consistent with Figure 3.
12. Average LTV among white homeowners, who were the least leveraged in 2003, fell from 0.62 to 0.54. Hispanic and Asian LTV declined from 0.73 and 0.75, respectively, to 0.57—almost on par with white households. Blacks had the highest LTV in 2003 (0.79) and 2007 (0.62).

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Disclosure statement

No potential conflict of interest was reported by the authors.

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