



The Effect of Health Insurance Coverage on Homeownership and Housing Prices: Evidence from the Medicaid Expansion

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Objective. Homeownership as a way of wealth accumulation is important for low-income people and the U.S. government has implemented policy to encourage homeownership among low-income people. This article investigates the effects of health insurance coverage among low-income people on homeownership and house prices. *Methods.* To estimate the causal effects of health insurance coverage, we exploit the Medicaid expansion provisions of the Affordable Care Act as a source of exogenous variation in health insurance coverage and use it as an instrumental variable. *Results.* Using county-level data from 2010 to 2018, this study finds that an increase in health insurance coverage among low-income people results in an increase in homeownership rates and housing prices for bottom-tier houses, and the results are robust. *Conclusion.* Our study provides new evidence in supporting that higher shares of population with health insurance could increase both homeownership and house prices.

Homeownership has been viewed as an effective way to build wealth, as home values generally appreciate over time. Mortgage payments that increase a homeowner's equity is a form of forced savings, and thus homeowners are accumulating wealth as any mortgage is repaid. Home equity represents the largest component of net worth excluding pensions and social security for most homeowners, and becoming a homeowner is associated with greater future wealth accumulation (Goodman and Mayer, 2018). For this reason, policymakers often view an increase in homeownership as an important public policy goal and encourage it with incentives such as the mortgage interest deduction and subsidies.

Homeownership as a way of wealth accumulation is especially important for low-income people, for whom housing equity is a larger part of their net wealth than for affluent households, and the U.S. government has implemented policy to encourage homeownership among low-income people. The Community Reinvestment Act of 1977 was passed to reduce discriminatory credit practices against low-income neighborhoods and make homeownership more accessible to low-income people. In 1995, President Bill Clinton and the Department of Housing and Urban Development released the "National Homeownership Strategy," stating the following: "The strategy recommends a series of concerted actions to help middle-income and low-income families, racial and ethnic minorities, families with children, and young adults overcome current barriers to homeownership."¹ At the same

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¹Available at https://www.globalurban.org/National_Homeownership_Strategy.pdf.

SOCIAL SCIENCE QUARTERLY, Volume 102, Number 2, March 2021

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DOI: 10.1111/ssqu.12932

time, low-income homeowners are more likely to be forced out of their homes as they are likely to have higher monthly mortgage payments as a fraction of their income and be unable to pay their mortgage payments on time when hit by unexpected events, such as job loss or large medical bills.

This study examines the link between health insurance and homeownership among low-income people. Having health insurance protects people from experiencing financial distress when they face adverse health shocks, and there are two possible channels through which the financial protection provided health insurance can increase homeownership. First, health insurance largely eliminates out-of-pocket medical expenses and thus may reduce the likelihood of mortgage delinquency among homeowners. Second, health insurance may reduce the likelihood of evictions among renters and help them maintain good credit and get approved when applying for mortgages. In addition, having health insurance may encourage renters to become homeowners, if renters become less worried about missing their mortgage payments as they feel more protected from negative health shocks.

Of course, the relationship between health insurance and the demand for housing is endogenous, as there are many possible confounding factors. Poor renters are less likely to become homeowners, and poor homeowners are probably more likely to miss their mortgage payments. At the same time, low-income people (who are not eligible for Medicaid) are less likely to be able to obtain health insurance. Furthermore, reverse causality may be present in the relationship. Housing price appreciation may encourage homeowners to obtain health insurance through the wealth effect, while discouraging renters to obtain health insurance due to the prospect of higher future rents or higher down payments if they wish to be homeowners.

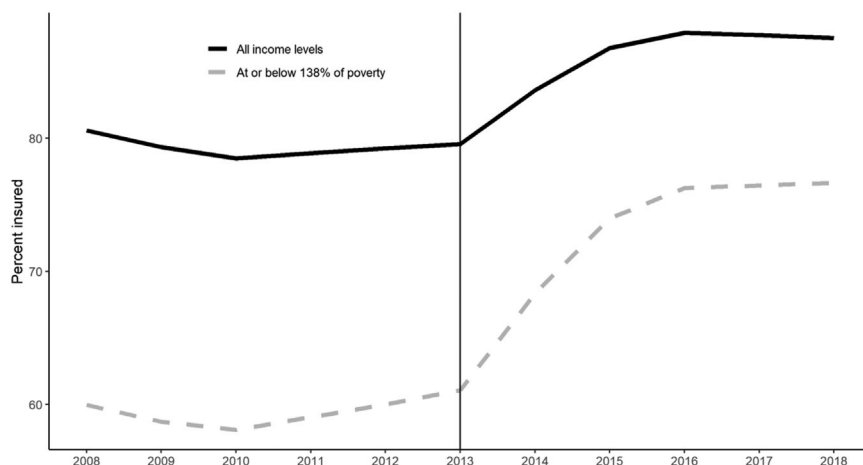
To identify the causal effect of health insurance on homeownership, we use the Medicaid expansion under the Affordable Care Act (ACA) as a source of exogenous variation to instrument the share of low-income people with health insurance and then estimate the effect of health insurance coverage on homeownership at the county level. Though intended to apply nationwide, the Supreme Court ruled that the states had to be allowed to decide for themselves whether they would adopt the expanded Medicaid eligibility rules. As a result, the expansion of Medicaid in states provides a plausible source of exogenous variation, and many studies find that states that expanded Medicaid in 2014 experienced an increase in their rates of health insurance coverage compared to nonexpansion states.

When the ACA was passed into the law in 2010, one of the goals was to expand Medicaid to give more low-income people public health insurance and thus to improve their ability to pay their medical expenses. The ACA expanded Medicaid eligibility to all individuals earning less than 138 percent of the federal poverty level—prior to passage of the ACA, Medicaid eligibility was limited to minor children and single parents in most states, subject to federal mandatory minimum coverage levels. The ACA's most major provisions came into force in 2014. As shown in Figure 1, the share of people covered by private and/or public health insurance, regardless of their income levels, started to increase gradually in 2010 but drastically in 2014, due to the ACA's (1) individual mandate provision, which requires most citizens and legal residents of the United States to have health insurance or pay a tax penalty, and (2) health exchanges (also known as the Health Insurance Marketplace), which are regulated marketplaces administered by either federal or state governments and provide health plan shopping and enrollment services to people and small businesses. However, the impact of the ACA was greater for people with income below 138 percent of the federal poverty level, due to the Medicaid expansion provision of the ACA.

Consistent with our hypothesis, this study finds that an increase in health insurance coverage among low-income people results in an increase in homeownership among people

FIGURE 1

Growth in Population Share with Health Insurance



SOURCE: Small Area Health Insurance Estimates (U.S. Census Bureau)

who make less than \$20,000. The results are robust to the exclusion of states that had generous Medicaid before the ACA and aggregating the data to the state level. We also find suggestive evidence that an increase in health insurance coverage among low-income people increases house prices for bottom-tier houses, which are likely to be purchased by low-income people. Our findings suggest that having health insurance not only encourages renters to become homeowners and protects homeowners from losing a home by reducing the risk of a financial catastrophe from huge medical bills, but also helps low-income homeowners accumulate wealth through higher house prices.

The Literature Review

Evidence suggests that states that expanded Medicaid under the ACA experienced an increase in their rates of health insurance coverage compared to nonexpansion states after 2014. Frean, Gruber, and Sommers (2017), using the 2012–2015 American Community Survey, find that insurance coverage increased among those who were newly eligible for Medicaid. Courtemanche et al. (2017) find that coverage increased by 5.9 percentage points in expansion states compared to 2.8 percentage points in states that did not expand Medicaid by the end of 2014 (see also Kaestner et al., 2017; Wherry and Miller, 2016).

There is robust evidence that expanding health care coverage improves personal finances among new beneficiaries. Finkelstein et al. (2012) find that the Oregon Health Insurance Experiment, a random experiment in which uninsured adults in Oregon randomly acquired the ability to enroll in Medicaid, led to reduced risk of medical debt accumulation. Gross and Notowidigdo (2011), using cross-state variation in Medicaid expansions from 1992 to 2004, find that a ten percentage point increase in Medicaid eligibility reduces personal bankruptcies by 8 percent. Mazumder and Miller (2016) also find that Massachusetts health care reform, which began in 2006, reduced bankruptcy filings among subprime borrowers. Hu et al. (2018) find the ACA Medicaid expansions significantly

decreased the amount owed for nonmedical debt, using quarterly data from the Federal Reserve Bank of New York Consumer Credit Panel, covering the period 2010–2015.

If the ACA Medicaid expansions have improved the overall financial health among new beneficiaries, then the ability to make timely home payment might have improved among those households. Consistent with this view, Gallagher, Gopalan, and Grinstein-Weiss (2019) find that the ACA reduced rent and mortgage delinquency by reducing exposure to out-of-pocket medical expenses, using administrative tax data and survey responses from the period 2014–2016. Their findings also indicate the indirect effect of public health insurance on homeownership, and this is the main hypothesis we aim to test in this article. If having health insurance reduces mortgage delinquency and foreclosures, health insurance coverage should be positively correlated with homeownership. Similarly, if health insurance reduces rent delinquency and evictions, more renters will maintain a good credit history and be approved for a mortgage, which in turn will lead to higher homeownership rates. Furthermore, increased access to health insurance among low-income renters might encourage them to become homeowners if their perceived risk of medical bankruptcy is lower. To the best of our knowledge, this is the first study to examine the causal link between health insurance coverage and homeownership. This is our main contribution.

In addition to homeownership, we examine if health insurance coverage increases local house prices. Foreclosed houses are likely to sell at low prices because they are often physically damaged during the foreclosure process and because financial institutions have an incentive to sell them quickly. Not surprisingly, foreclosure on a home reduces the prices of nearby homes. Lin, Rosenblatt, and Yao (2009) find that foreclosure reduces local house prices. Campbell, Giglio, and Pathak (2011) find that the magnitude can be as much as 9 percent. Therefore, house prices are likely to be positively affected by health insurance coverage through two channels: an increase in the demand for housing among renters, and a decrease in foreclosures. Again, to the best of our knowledge, this study is the first systematic study of the link between health insurance and house prices. As mentioned above, homeownership is an important way to accumulate wealth, especially low-income people. Therefore, we believe that it is noteworthy to empirically investigate this hypothesis.

Data and Methodology

This study draws data from several sources. For our homeownership variable, we use the 2010–2018 American Community Survey 5-year estimates from the U.S. Census Bureau.² We obtain county-level numbers of occupied housing units for homeowners and renters whose household income in the past 12 months was less than \$20,000 (in 2018 inflation-adjusted dollars). The rationale for using \$20,000 is that most newly eligible people are likely to be in this income category. In states that expanded Medicaid coverage, a childless adult can qualify for Medicaid if his household income is below 138 percent of the federal poverty level. Since the federal poverty level is approximately \$12,000 for one-person households during this period, this means that childless adults who earn approximately less than \$17,000 are newly eligible population if they are one-person household. For two-person households, the threshold is approximately \$22,000, as the federal poverty level is about \$16,000. Thus, it seems reasonable to use \$20,000 rather than using the next income category available in the data, \$25,000, which would include many people who earn

²S2503 Financial Characteristics. Available at <https://data.census.gov/cedsci/table?q=dp&tid=ACSDP1Y2018.DP05>.

too much income to qualify for Medicaid, or the preceding income category, \$15,000, which would exclude many newly eligible people. After excluding observations with missing values and balancing the panel, the resulting sample size is 28,233 (3,137 counties \times nine years) for homeownership regressions. Table 1 shows that the average homeownership rate during this period among people who earn less than \$20,000 was 52.7 percent, which is much lower than the national average (around 65–67 percent). There are counties with 100 percent homeownership rates, but they are always small population counties, and this issue will be corrected by using population weights in our regressions.

Data on housing prices are obtained from Zillow, an online real estate database company, which provides home value for all homes within a region called the Zillow Home Value Index (ZHVI).³ Housing price indexes from Zillow are increasingly being used by researchers (e.g., Adelino, Schoar, and Severino, 2017; Kuroki, 2019), as Zillow provides readily available data at seven geographic levels: neighborhood, ZIP code, city, congressional district, county, metropolitan area, and state. Because the Medicaid expansions affect only low-income people, who are most likely to own (or buy) cheaper houses if they are homeowners (renters), data on “Bottom Tier” houses (typical value for homes that fall within the 5th to 35th percentile range for a given region) are used. As of November 2020, Zillow provides bottom-tier home values for 2,847 counties, but the total numbers of counties used in this study is 2,528 due to missing explanatory variables and unbalanced panels. This makes the sample size for our house price regression 22,752 (2,528 counties \times nine years).

Table 1 shows summary statistics for house prices. The average price for bottom-tier houses is approximately \$90,000 during this period. However, the highest bottom-tier house price exceeds \$1 million, and extremely affluent counties are less likely to contain many people who are eligible for Medicaid and be able to buy a house. Later in the house price analysis, these counties will be excluded to check the sensitivity of the results.

Our data on health insurance coverage are obtained from the *Small Area Health Insurance Estimates* (SAHIE) program of the U.S. Census Bureau.⁴ The most recent round of the SAHIE is 2018. We use the share of people with health insurance among those whose family income is less than 138 percent of the federal poverty level (FPL) and under age 65. Supplementary Appendix Figure 1 shows the geographical distributions of the share of people with health insurance at the county level. Counties in states that had generous Medicaid, such as Massachusetts and New York, have high rates of insurance coverage among low-income people throughout the period. Counties in states that expanded Medicaid in 2014, such as Arizona, Arkansas, Oregon, and Washington, experienced a large increase in the share of low-income people with health insurance in 2014, while health insurance coverage among low-income population in counties in nonexpansion states, such as Florida, Texas, Georgia, and Oklahoma, remained low even after 2014. During the period 2010–2018, the average share of low-income population insured is 68 percent.

To isolate the portion of the correlation that is due to the causal effect of health insurance coverage on homeownership and house prices, we employ an instrumental variables strategy by instrumenting the share of low-income people with health insurance with the Medicaid expansion under the ACA, which provided plausibly exogenous variation in health insurance coverage. The choice of instrument is motivated by the fact that not all states expanded Medicaid, and even among those states that expanded Medicaid, their

³Available at <http://www.zillow.com/research/data/#median-home-value>. The Zillow home value index is explained in detail in supplementary Appendix.

⁴Available at <https://www.census.gov/data/datasets/time-series/demo/sahie/estimates-acs.html>. For the detailed description of the SAHIE, please refer to supplementary Appendix.

TABLE 1
Summary Statistics

Statistic	N	Mean	SD	Min	Max
County-level variables for homeownership analysis					
Homeownership (household income <\$20K)	28,233	52.7	12.1	0.0	100.0
Percent insured (less than 138% of the FPL)	28,233	68.0	12.2	26.0	94.7
Poverty rate	28,233	16.4	6.4	2.6	56.7
Unemployment rate	28,233	6.6	3.0	1.1	28.9
Percent black	28,233	8.9	14.4	0.0	85.8
Percent Hispanic	28,233	9.0	13.5	0.0	96.4
Percent age >65	28,233	17.5	4.5	3.6	57.6
Population	28,233	101,469	324,874	258	10,120,540
County-level variables for house price analysis					
Bottom-tier house price	22,752	89,779	69,462	11,179	1,041,849
Percent insured (less than 138% of the FPL)	22,752	68.7	12.2	30.3	94.7
Poverty rate	22,752	16.2	6.1	2.6	51.2
Unemployment rate	22,752	6.7	2.8	1.1	28.9
Percent black	22,752	9.3	13.9	0.0	81.3
Percent Hispanic	22,752	8.9	12.9	0.2	96.4
Percent age >65	22,752	17.1	4.3	3.7	57.6
Population	22,752	122,770	358,477	688	10,120,540
State-level variables					
Bottom-tier house price	459	124,114	63,877	43,783	380,050
Homeownership (household income <\$20K)	459	41.6	6.9	15.9	56.1
Percent insured (less than 138% of the FPL)	459	70.6	11.3	42.7	93.3
Poverty rate	459	14.3	3.2	7.6	23.9
Unemployment rate	459	6.1	2.2	2.4	13.5
Percent black	459	11.6	10.5	0.7	49.8
Percent Hispanic	459	11.5	10.0	1.3	48.9
Percent age >65	459	14.5	2.0	7.4	20.4
Population	459	4,623,865	5,200,658	409,529	29,937,967

implementation dates varied.⁵ Connecticut, Minnesota, the District of Columbia, and most counties in California⁶ expanded Medicaid under the ACA prior to 2014 (4/1/2010, 3/1/2011, 7/1/2010, and 1/1/2012, respectively).⁷ Twenty-one states had signed on when the expansion went into effect in January of 2014. Michigan (4/1/2014) and New Hampshire (8/15/2014) expanded mid-2014. Pennsylvania (1/1/2015), Indiana (2/1/2015), and Alaska (9/1/2015) expanded in 2015; Montana (1/1/2016) and Louisiana (7/1/2016) expanded in 2016. Virginia (1/1/2019), Maine (1/10/2019), and Idaho (11/1/2019) expanded in 2019.⁸ Utah partially expanded Medicaid in April of 2019, and Nebraska expanded Medicaid in October of 2020. Because the homeownership data cover the period 2010–2018, states that expanded Medicaid after 2018 are considered nonexpansion states throughout this work. However, it is important to note that Delaware, Massachusetts, New York, and Vermont fully expanded Medicaid to childless adults prior to 2014.⁹ These states had more generous health insurance coverage of their low-income populations before Medicaid expansion under the ACA in 2014. These four states have been viewed as non-expansion, control states in some studies (e.g., Kaestner et al., 2017; Hu et al., 2018) but excluded from other studies (e.g., Wherry and Miller, 2016; Slusky and Ginther, 2018). These states may be systematically different (e.g., more economically vibrant), and inability to account for the differences can produce spurious results. In this study, we use both specifications.

For the Medicaid expansion to be a valid instrument, it needs to be correlated with the share of low-income people with health insurance. Figure 2 shows the trend in the share of people with health insurance among states that expanded in January 2014 (i.e., traditional expansion states) and nonexpansion states and confirms the stylized fact that the Medicaid expansion resulted in a larger increase in the number of people with health insurance in expansion states than in nonexpansion states.¹⁰ The gap between traditional expansion states and nonexpansion states widened considerably after 2013, clearly indicating the treatment effect. As shown below, the instrument performs well in the first stage.

Another necessary condition for a good instrument is that it does not exert any direct effect on homeownership or house prices besides the indirect effect through increased health insurance coverage among low-income individuals. Even though the Medicaid expansion created quasi-experimental variation, the potential nonrandomness of states' decisions to expand Medicaid is harder to deal with. As the exogeneity of the instrument is fundamentally untestable, the best we can do is to control for observable characteristics of counties

⁵Supplementary Appendix Figure 2 summarizes the timing of the ACA Medicaid expansions.

⁶In California, 48 counties (out of 58) expanded prior to 2014. Of these 48 counties, 10 counties expanded in July 2011, and 38 counties expanded in January 2012 (Caswell and Waidmann 2017). Supplementary Appendix Figure 3 shows the geographical distribution of Medicaid expansion dates in California by county.

⁷New Jersey and Washington were technically early expansion states, but in these states existing enrollees were transferred to new programs, and no new beneficiaries were enrolled prior to 2014 (Sommers et al. 2013).

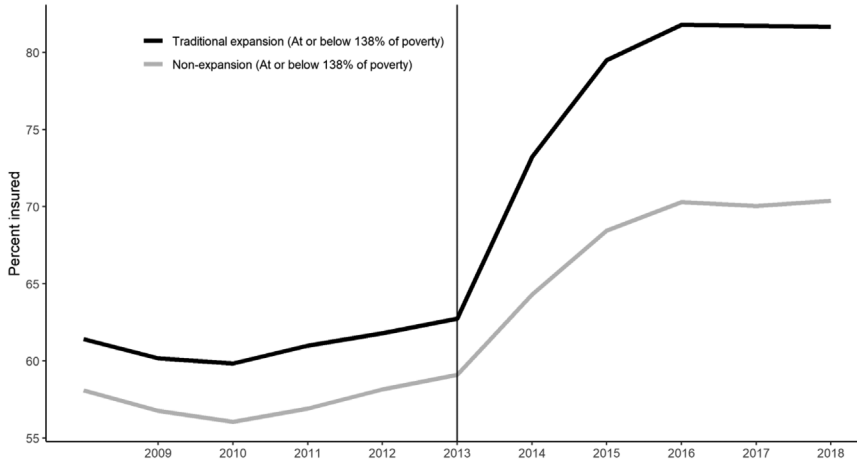
⁸Information on the ACA Medicaid expansions comes from the Kaiser Family Foundation (2019) and Hu et al. (2018).

⁹All nonelderly adults, whether childless or parents, with incomes up to 100% of the FPL were covered prior to 2014 in Delaware. In Massachusetts, parents with incomes up to 133% of the FPL were eligible for Medicaid, and childless adults with incomes below 100% of the FPL were able to obtain limited coverage under the MassHealth program. New York's Family Health Plus program covered childless adults with incomes up to 100% of the FPL and parents with incomes up to 150% of the FPL. Vermont Health Access Plan provided coverage to childless adults with incomes up to 150% of the FPL and parents with incomes up to 185% of the FPL.

¹⁰For our graphing purpose, we exclude states that expanded before and after January 2014, as the implementation dates are not uniform among these early and late expansion states. These excluded early expansion states are California, Connecticut, Minnesota, and the District of Columbia, and late expansion states include Michigan, New Hampshire, Pennsylvania, Indiana, Alaska, Montana, and Louisiana.

FIGURE 2

Population Share with Health Insurance Among Traditional and Nonexpansion States



SOURCE: Small Area Health Insurance Estimates (U.S. Census Bureau)

and assume that states' decisions to expand Medicaid is not directly correlated with home-ownership or house prices.

Our empirical strategy is two-stage least squares (2SLS). In all regressions, estimates will be weighted by county-level population, as counties are extremely heterogeneous in size (ranging from 688 to more than 10 million in our sample). In the first stage for the county-level analysis, we estimate the following equation using weighted least squares with weights proportional to county population:

$$PercentInsured_{it} = \beta MedicaidExpansion_{st} + \alpha X_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (1)$$

where i , t , and s denote, respectively, county, year, and state. $PercentInsured_{it}$ is a continuous variable for the share of low-income population with health insurance. $MedicaidExpansion_{st}$ is a variable that takes a value of one if the county i is located in state s that expanded Medicaid on January of year t . For early and late adopters, if they expanded Medicaid in, say, April, the variable equals $9/12 = 0.75$. Otherwise, the variable takes a value of zero.

In the second stage, we estimate the following equations, using the predicted $PercentInsured_{it}$, derived from the first stage estimation, again using weighted least squares with weights proportional to county population on two outcome variables of interest:

$$Homeownership_{it} = \beta \widehat{PercentInsured}_{it} + \alpha X_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (2)$$

$$\ln(HousePrice)_{it} = \beta \widehat{PercentInsured}_{it} + \alpha X_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (3)$$

$Homeownership$ is the homeownership rate, and $\ln(HousePrice)$ is the natural logarithm of house prices for bottom-tier houses. In Equations (1)–(3), county fixed-effects λ_i remove time-invariant county characteristics (e.g., historically high health insurance coverage, homeownership rate, and housing prices, respectively), and year fixed-effects θ_t

remove yearly macroeconomic shocks and national trends that might otherwise bias the coefficients. X_{it} is county-level variables to capture the demographic, racial, and economic structure of counties. Yearly county-level poverty rates are obtained from the U.S. Census Bureau's *Small Area Income and Poverty Estimates (SAIPE) Program*,¹¹ and yearly county-level unemployment rates are obtained from the Bureau of Labor Statistics' *Local Area Unemployment Statistics*.¹² As demographic controls, we use the population shares of blacks, Hispanics, and people aged over 65 (Medicare-eligible population), obtained from the U.S. Census Bureau's *Annual County Resident Population Estimates by Age, Sex, Race, and Hispanic Origin: April 1, 2010 to July 1, 2018*.¹³ Table 1 shows summary statistics of county-level variables used in this study.

While poverty rates and unemployment rates control for local economic conditions that might be correlated with housing markets and health insurance, it is worth mentioning the rationale for controlling for these population characteristics. First, during this period, those age 65 and older were more likely to own a home than any other age groups (Moore, 2018). Second, there are substantial disparities in health insurance coverage, homeownership, and the average value of houses they own, across race and ethnicity. In 2018, 8 percent of white people were uninsured, while 11 percent of black people and 19 percent of Hispanic people were uninsured (The Kaiser Family Foundation, 2020). In 2020, approximately 76 percent of white households were homeowners, compared to 47 percent of black households and 51 percent of Hispanic households (U.S. Census Bureau, 2020a).¹⁴ One study that examines U.S. metropolitan areas finds that homes in neighborhoods where the share of the population is 50 percent black are valued at roughly half the price as homes in neighborhoods with no black residents (Perry, Rothwell, and Harshbarger, 2018).¹⁵

One issue when the treatment variable does not vary within groups (states in this case) is that standard errors are often biased downward due to the groups having a shared error structure, thereby leading to greater statistical significance and increasing the likelihood of incorrectly rejecting the null hypothesis (Moulton, 1990). One approach to alleviate this concern is to aggregate data to the same level as the treatment variable (Bertrand, Duffo, and Mullainathan, 2004). Therefore, as a robustness check, we turn to state-level data. However, tradeoffs are worth mentioning. We are no longer able to eliminate the effects of both time-invariant county unobservable characteristics and time-varying county characteristics and control for spatial heterogeneity in differential homeownership and housing price patterns across counties. Also, we are forced to pick one date for California, even though the timing of expansions varies at the county-level for California. We use January 2012 for California, as that is when most counties in California expanded.

For the state-level analysis, county-level variables in the equations above are replaced with state-level variables. State-level bottom-tier house prices obtained from Zillow, and the same American Community Survey is aggregated to the state level. State-level poverty rates are again obtained from the U.S. Census Bureau's *Small Area Income and Poverty Estimates (SAIPE) Program*. State-level unemployment rates are obtained from the Bureau of Labor Statistics' *Statewide Data, Annual Average Series*.¹⁶ The demographic controls are

¹¹ Available at <https://www.census.gov/programs-surveys/saipe/data/datasets.html>.

¹² Available at <https://www.bls.gov/lau/#cntyaa>.

¹³ Available at <https://www.census.gov/data/datasets/time-series/demo/popest/2010s-counties-total.html>.

¹⁴ Black applicants are more likely to be rejected when applying for mortgages than comparable white applicants and less likely to have parents who can provide down-payment assistance (Charles and Hurst, 2002).

¹⁵ Not surprisingly, home equity represents a higher fraction of their wealth especially for Black and Hispanic homeowners (Goodman and Mayer, 2018).

¹⁶ Available at <https://www.bls.gov/lau/rdscnp16.htm>.

obtained from the U.S. Census Bureau's *Annual State Resident Population Estimates for 5 Race Groups by Age, Sex, and Hispanic Origin: April 1, 2010 to July 1, 2018*.¹⁷ Summary statistics of state-level variables used in this study are shown in Table 1. The sample size for state-level regressions is 459 (50 states plus the DC \times nine years).

Results: Homeownership

Table 2 reports the ordinary least squares (OLS) and instrumental variable (IV) estimates from county-level regressions when the dependent variable is the homeownership rate among people who earn less than \$20,000. Standard errors are clustered at the state-year level. Column (1) in Table 2 suggests that the positive correlation between the homeownership and health insurance coverage exists but is only marginally statistically significant. However, when health insurance coverage is instrumented, the coefficient becomes statistically significant at the one percent level, as shown in column (2). In the first stage of 2SLS, the instrument has the expected sign and performs very well, as shown in the column (1) in supplementary Appendix Table 1. The Medicaid expansion is associated with a 3.8 percentage points increase in the share of low-income population with health insurance. To reject the hypothesis that the instrument is weak, the rule of thumb is that the first-stage F -statistic should be greater than 10 (Staiger and Stock, 1997). The F -statistic on the excluded instrument in the first stage is 21 ($p < 0.001$).

Although our preferred specification above incorporates information from 50 states and the District of Columbia from 2010 through 2018, there are some concerns about the potential nonrandomness of states' decisions to provide generous health insurance coverage to low-income residents before the Medicaid expansion under the ACA in 2014. Therefore, as a robustness check, we repeat our analysis after excluding Delaware, Massachusetts, New York, and Vermont from the control group. As mentioned above, some studies exclude them from the control group (e.g., Wherry and Miller, 2016; Slusky and Ginther, 2018). The results are shown in column (3) in Table 2. When Delaware, Massachusetts, New York, and Vermont are excluded, the 2SLS estimate is still statistically significant at the one percent level. The F -statistics on the excluded instrument in the first stage is 37 ($p < 0.001$; shown in column (2) in supplementary Appendix Table 1).

These county-level homeownership regression results indicate that an increase in health insurance coverage leads to an increase in homeownership among low-income people. The magnitude from the 2SLS estimates suggests that a ten percentage points increase in the share of low-income population with health insurance leads to 0.6–0.9 percentage points increase in the homeownership among people who make less than \$20,000. Of course, we need to keep in mind that interpretation of the 2SLS should be done cautiously, as 2SLS estimates the local average treatment effect (LATE), which is the average treatment effect only for the subpopulations affected by the observed changes in the instrument. That is, the estimates from 2SLS are the effect only for the portion of an increase in health insurance coverage due to the Medicaid expansions, and not for an increase in health insurance coverage due to the national trend or local economic conditions.

Next, as an additional robustness check, we repeat our analysis with state-level data. The results are shown in columns (4)–(6) in Table 2. Standard errors are now clustered at the state level. The OLS estimate is not statistically significant, but the statistical significance increases to the 5 percent level when the health insurance variable is instrumented

¹⁷ Available at <https://www.census.gov/data/tables/time-series/demo/popest/2010s-state-detail.html>.

TABLE 2
Homeownership Regression Results

	OLS (1)	2SLS (2)	2SLS (3)	OLS (4)	2SLS (5)	2SLS (6)
Percent insured	0.016* (0.008)	0.096*** (0.024)	0.061*** (0.018)	0.026 (0.025)	0.162** (0.064)	0.112*** (0.039)
ln(Population)	8.501*** (0.881)	8.384*** (0.826)	8.958*** (0.838)	7.167* (4.345)	8.649** (4.025)	9.986*** (3.696)
Poverty rate	-0.081*** (0.015)	-0.085*** (0.016)	-0.096*** (0.015)	-0.119 (0.113)	-0.072 (0.150)	-0.164 (0.112)
Unemployment rate	0.181*** (0.029)	0.272*** (0.043)	0.218*** (0.038)	0.194*** (0.068)	0.410*** (0.139)	0.309*** (0.093)
Percent black	-0.353*** (0.061)	-0.328*** (0.062)	-0.284*** (0.059)	-0.684** (0.273)	-0.375 (0.347)	-0.486*** (0.185)
Percent Hispanic	-0.347*** (0.055)	-0.344*** (0.057)	-0.345*** (0.059)	-0.369 (0.360)	-0.288 (0.374)	-0.425 (0.327)
Percent age >65	0.234*** (0.050)	0.193*** (0.054)	0.237*** (0.052)	0.252 (0.291)	0.050 (0.379)	0.097 (0.278)
DE, MA, NY, and VT excluded?	No	No	Yes	No	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Area fixed effects	County	County	County	State	State	State
S.E. clusters	State-year	State-year	State-year	State	State	State
Observations	28,233	28,233	27,396	459	459	423

* $p < 0.1$;
** $p < 0.05$;
*** $p < 0.01$. Standard errors are shown in parentheses.

and to the one percent level when Delaware, Massachusetts, New York, and Vermont are excluded. The magnitude from the 2SLS estimates suggests that a ten percentage points increase in the share of low-income population with health insurance leads to 1.1–1.6 percentage points increase in the homeownership among people who make less than \$20,000. However, it is worth noting that the F -statistic on the excluded instrument in the first stage for state-level regressions when all 50 states plus the DC are included is only 8.9, less than the conventional threshold of 10, as shown in column (5) in supplementary Appendix Table 1. This may indicate that the instrument is perhaps “weak” when state-level variables are used. Nevertheless, these 2SLS results from state-level regression strengthen statistical evidence on the causal effect of health insurance on homeownership. Taken together, the findings are consistent with the hypothesis that having health insurance has a positive effect on homeownership, presumably by reducing mortgage delinquency and helping low-income renters to become homeowners by eliminating their medical expenses.

Results: House prices

Next, we combine state-level variation from the Medicaid expansion with county-level house price data. Column (1) in Table 3 shows that a higher health insurance coverage is positively associated with house prices at the county level. The magnitude we find suggests that a ten percentage points increase in the share of low-income population with health insurance is associated with a 4 percent increase in bottom-tier house prices. Column (2) shows the 2SLS result when the share of low-income population with health insurance is instrumented with the Medicaid expansion. The instrumented share of low-income population with health insurance is positive and but statistically significant only at the 10 percent level. The magnitude of the coefficient is practically unchanged from the OLS estimate. However, when Delaware, Massachusetts, New York, and Vermont are excluded, the 2SLS estimate become statistically significant at the 5 percent level, as shown in column (3). When we perform state-level analysis, the statistical significance of the coefficients of interest is similar, though the IV estimates from state-level regressions are approximately twice as large as those from county-level regressions. Overall, evidence suggests that an increase in health insurance among low-income people seems to increase house prices for bottom-tier houses.

Finally, as showed in summary statistics in Table 1, some counties have extremely high house prices even for their bottom-tier houses. Because low-income people are less likely to affect the bottom-tier house prices in these counties, we exclude counties above the 75th percentile in terms of their housing price ($> \$100,800$) in 2010, the first year in the sample. To give a brief overview of these counties, the top five counties are Nantucket County in Massachusetts (bottom-tier house price in 2010 = \$646,709), San Francisco County (\$543,169), Marin County (\$485,487), and San Mateo County (\$481,398) in California, and New York County in New York (\$468,835). The sample size is reduced to 17,064, with 1,896 counties. The regression results (not shown) show that the coefficient from 2SLS is 0.004 and statistically significant only at the 10 percent level. This is counterintuitive, as we would expect the coefficient to become larger when counties with expensive houses are excluded. That is, the Medicaid expansions only affected low-income people, who are least likely to affect house prices in expensive areas, and thus the house price effect should become more pronounced when expensive areas are excluded. Therefore, we consider this evidence for the positive house price effect of health insurance to be more suggestive than definitive.

TABLE 3
House Price Regression Results

	OLS (1)	2SLS (2)	2SLS (3)	OLS (4)	2SLS (5)	2SLS (6)
Percent insured	0.004*** (0.001)	0.005* (0.003)	0.006** (0.003)	0.006*** (0.002)	0.013** (0.006)	0.011** (0.005)
ln(Population)	1.648*** (0.103)	1.647*** (0.102)	1.658*** (0.105)	2.798*** (0.469)	2.870*** (0.469)	2.988*** (0.501)
Poverty rate	-0.008*** (0.002)	-0.008*** (0.001)	-0.008*** (0.001)	-0.007 (0.016)	-0.004 (0.018)	-0.005 (0.017)
Unemployment rate	-0.036*** (0.004)	-0.034*** (0.004)	-0.034*** (0.004)	-0.035*** (0.013)	-0.025*** (0.009)	-0.028*** (0.009)
Percent black	-0.017*** (0.006)	-0.017*** (0.006)	-0.013** (0.006)	0.017 (0.034)	0.032 (0.031)	0.026 (0.031)
Percent Hispanic	0.001 (0.005)	0.001 (0.005)	0.004 (0.006)	-0.001 (0.023)	0.003 (0.022)	-0.007 (0.023)
Percent age >65	-0.019*** (0.004)	-0.020*** (0.005)	-0.017*** (0.005)	-0.018 (0.039)	-0.027 (0.037)	-0.021 (0.039)
DE, MA, NY, and VT excluded?	No	No	Yes	No	No	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Area fixed effects	County	County	County	State	State	State
S.E. clusters	State-year	State-year	State-year	State	State	State
Observations	22,752	22,752	21,915	459	459	423

* $p < 0.1$;
** $p < 0.05$;
*** $p < 0.01$. Standard errors are shown in parentheses.

Discussion and Conclusions

Although the ACA was originally intended to apply to all states, the U.S. Supreme Court decision made it optional for states to expand Medicaid coverage, for which childless adults had been for the most part ineligible in nearly all states. Since 2014, there has been substantial economic analysis of the effects of the Medicaid expansions under the ACA, which provided plausibly exogenous, the quasi-experimental variation in expanding healthcare coverage. Given that the Medicaid expansions have reduced the risk of medical out-of-pocket spending among low-income households, we exploit the exogenous variation in the Medicaid expansions at the state level and use it as an instrumental variable to identify the causal effects of health insurance coverage among low-income people on the demand for housing. Specifically, we focus on two outcomes related to the demand for housing: homeownership among people who earn less than \$20,000 and house prices for bottom-tier houses. We hypothesize that people with health insurance are (1) less likely to miss their mortgage payments and experience a foreclosure if they are homeowners, and (2) more likely to maintain a good credit history and be approved for a mortgage if they are renters, both of which lead to higher homeownership rates and housing prices.

We find both homeownership and house prices go up with health insurance coverage among low-income population, and the relationship seems to be causal. Our primary results are robust to the exclusion of states that had generous Medicaid before the ACA and the aggregation of data to the state level. As mentioned above, the results from our first-stage regressions indicate that the Medicaid expansion is associated with a 3.8 percentage points increase in the share of low-income population with health insurance in expansion states. Based on the 2SLS regressions, in which the coefficients on the instrumented health insurance variable range from 0.06 to 0.16, a rise of 3.8 percentage points in the share of insured population suggests a 0.2–0.6 percentage points increase in their homeownership rate in these states. To put these numbers into perspective, the homeownership rate for households with family income less than the median family income was 49.8 percent in the first quarter of 2014 and then increased to 50.7 percent in the fourth quarter of 2018 (U.S. Census Bureau, 2020b).

Of course, we need to keep in mind that the estimate found in this study is the local average treatment effect. Because the Medicaid expansion is used as an instrument for health insurance coverage among low-income population, the effect of health insurance is identified in the population of low-income people who reside in expansion states and obtained health insurance after the Medicaid expansion. The 2SLS results may not be generalizable to other subpopulations, that is, low-income people in nonexpansion states, if there is too much heterogeneity among low-income Americans. Nevertheless, the findings in this study indicate that the benefits from the financial protection provided by the ACA Medicaid expansion may go beyond general financial health and extend to the housing market. Having health insurance may keep people from foreclosures if they are homeowners, and from evictions and bad credit if they are renters. In addition, the positive house price effect found in this study suggests that low-income homeowners benefit from greater wealth accumulation if more people have health insurance.

If policymakers wish to use homeownership as a means of wealth accumulation for low-income households, then one policy implication is to provide free or low-cost health insurance to more low-income people, as many states did under the ACA. Furthermore, expanding Medicaid in nonexpansion states may reduce the racial/ethnic wealth gap, which is often discussed among policymakers and researchers. It is well known that there are substantial wealth disparities between families in different racial and ethnic groups, and

the lower homeownership rate among racial and ethnic minority groups contributes to the wealth gap, as housing is the biggest component of wealth for many families. As black people and Hispanic people are also more likely to be uninsured, providing low-cost or free insurance may be an effective policy tool to increase homeownership among these racial and ethnic minority groups and thus narrow the racial/ethnic wealth gap.

Finally, one limitation must be stated. We fail to examine the exact mechanism through which house prices increase with healthcare coverage in this study. That is, it is not clear whether higher homeownership rates and house prices come from fewer foreclosures or more home purchases, or both, among those who were newly eligible for and enrolled in Medicaid. We leave a thorough investigation of the channels in which health insurance coverage affects housing markets to future research.

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Table A. First-stage regression results

Figure A1. Share of low-income population with health insurance by county and year

Figure A2. Timing of Medicaid expansion by state, 2010–2018s

Figure A3. Medicaid expansion by timing of expansion in California

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