
Housing in recreation-dependent counties is less affordable

Methods and Data Sources

Background

To help community leaders better understand the factors driving housing affordability, we developed a statistical model that measures the relationship between housing affordability and other community conditions in non-metro counties. The purpose of this research is to highlight the factors that contribute to unaffordable housing to help communities anticipate challenges as they consider how to recover from the COVID-19 pandemic and how best to pursue economic development strategies such as developing an outdoor recreation economy.

This document describes the data, methods, and results described in the report, Housing in recreation-dependent counties is less affordable: <https://headwaterseconomics.org/equity/housing-affordability-recreation-counties/>.

Data Sources

The analysis includes data for 1,975 non-metro counties in the United States. We define “non-metro” counties as places without a city of 50,000 or more residents and without a large share of residents commuting to large cities, as defined by the Office of Management and Budget. We exclude metro counties from this analysis because their housing markets and economies are more complex and require a different modeling strategy than non-metro counties. Table 1 provides summary statistics and sources for the variables used in the analysis.

Recreation counties are identified using the 2017 county typologies created by the U.S. Department of Agriculture’s Economic Research Service. A county is classified as recreation-dependent if it has a relatively high share of employment and income from tourism-related industries and a high share of housing that is second homes. We use the “overlapping” classification, which means that a county can be classified as dependent on recreation and other industries, like manufacturing and government. Of the 1,162 non-metro recreation counties, 26% also are classified as dependent on other sectors.

Monthly median mortgage and rent costs, housing units per capita, the share of housing that is second homes, and the Gini coefficient are drawn from the 2014-2018 county-level 5-year averages from the American Community Survey. Net migration is calculated for the years 2010-2019 from the Census Bureau Population Estimates.

Earnings per job is calculated as the total earnings in the county divided by total employment, as reported by the U.S. Department of Commerce’s Bureau of Economic Analysis Regional Economic Accounts. To match the time-period used for housing price data, we use the 2014-2018 average. Both earnings and employment are determined by place of work, not place of residence. Full-time and part-time jobs are included equally. Employees, sole proprietors, and active partners are included.

The share of income from dividends, interest, and rent (DIR) and share of employment in high tech sectors also are calculated as the average from 2014-2018 data from the Bureau of Economic Analysis' Regional Economic Accounts. The share of income from tourism-related industries is the average for 2014-2017 (the latest year available) calculated from County Business Patterns.

We measure housing affordability using the share of earnings per job used by housing, calculated as mean monthly earnings per job divided by median monthly earnings spent on mortgage or rent. This metric allows us to understand relative housing costs for the average worker in a county.

For the remainder of this paper we use the shorthand of “wages” for earnings per job.

Table 1. Summary statistics and data sources for variables used in model.

Variable	Mean	Std. Dev.	Source and Dates
Dependent Variables			
% of monthly earnings spent on mortgage	32%	9%	Calculated
% of monthly earnings spent on rent	19%	5%	Calculated
Median monthly mortgage cost	\$1,093	\$216	American Community Survey (ACS), 2014-2018 5-year estimates
Median monthly rent cost	\$671	\$138	ACS, 2014-2018 5-year estimates
Earnings per job/month	\$3,641	\$911	Regional Economic Accounts (REA), 2014-2018 average
Explanatory Variables			
Net migration per 1,000 residents	-2%	5%	Census Bureau Population Division, 2010-2018
=1 if county is recreation-dependent	0.16	0.36	Economic Research Service County Typology Codes, 2017
Housing units per capita	0.52	0.14	ACS, 2014-2018 5-year estimates
% of housing that is second homes	10%	12%	ACS, 2014-2018 5-year estimates
% of income from dividends, interest, and rent (DIR)	19%	6%	REA, 2014-2018 average
% of employment in high tech (Information and Professional, Technical, and Scientific Services)	4%	2%	REA, 2014-2018 average
% of employment in tourism-related industries	16%	9%	County Business Patterns, 2014-2017 average
Growth in earnings per job	-3%	14%	REA, 2014-2018 average
Gini coefficient	0.45	0.04	ACS, 2014-2018 5-year estimates
=1 if county is micropolitan	0.32	0.01	Office of Management and Budget, 2010

Methods

Regression Model

We estimate the relationship between housing cost and other variables using the following log-log ordinary least squares regression model:

$$\ln(\text{ratio}) = \beta_0 + \beta_1 \text{net migration rate} + \beta_2 \text{Recreation} + \beta_3 \ln(\text{housing units per capita}) + \beta_4 \ln(\% \text{ second homes}) + \beta_5 \ln(\% \text{ income from DIR}) + \beta_6 \ln(\% \text{ empl in high tech}) + \beta_7 \ln(\% \text{ empl in tourism}) + \beta_8 \% \Delta \text{ in earnings per job} + \beta_9 \ln(\text{Gini}) + \beta_{10} \text{Micropolitan} + u_i$$

Ratio refers to the ratio of monthly earnings per job to either monthly mortgage cost or monthly rent cost and u_i is the county-specific error term not captured by this set of explanatory variables. The double log specification captures the non-linear relationship between many of the explanatory variables and the dependent variable. Growth in earnings per job and net migration are specified as rates. We use indicators for recreation-dependent counties and micropolitan counties.

Results

Table 2 contains the regression results and marginal effects on the dependent variable for a 10% increase in the explanatory variable. The marginal effects for the logged variables are simply the coefficient. The marginal effects for the linear variables (net migration and percent change in earnings per job) is calculated as $e^{\beta} - 1$, where β is the coefficient. For the recreation indicator, the marginal effect is the percentage difference in the dependent variable in a recreation county compared to a nonrecreation county. We do not present the marginal effects for coefficients that were not statistically significant.

Table 2. Regression results and marginal effects.

Variable description	Coefficients		Marginal Effects (% change in dependent variable for a 10% increase in the explanatory variable) ^a	
	% of earnings spent on mortgage	% of earnings spent on rent	% of earnings spent on mortgage	% of earnings spent on rent
Net migration per 1,000 residents, 2010-2018	0.536***	0.714***	7%	10%
=1 if county is recreation-dependent	0.039**	0.054***	4%	6%
ln(housing units per capita)	-0.039	-0.104***	-	-1%
ln(% of housing that is second homes)	0.037***	0.035***	0.4%	0.3%
ln(% of personal income that is from dividends, interest, and rent)	0.213***	0.118***	2%	1%
ln(% of employment in high tech sectors)	0.029***	0.036***	0.3%	0.3%
ln(% of employment in tourism-related sectors)	0.059***	0.074***	0.6%	0.7%
% change in earnings per job, 2014-2018	0.175***	0.156***	2%	2%
ln(Gini coefficient)	0.290***	0.159***	3%	2%
=1 if county is micropolitan	-0.014	0.013	-	-
Constant	-0.274***	-1.039***		
Observations	1,942	1,940		
R-squared	0.31	0.24		

*: p<0.10; **: p<0.05; ***: p<0.01

^a For the binary indicator variables, Recreation and Micropolitan, the value reflects the change in the dependent variable in a Recreation or Micropolitan county, respectively.

Nearly all coefficients are significant and of the expected sign.

The model shows that a 10% increase in the net migration rate is associated with a 7% increase in the share of earnings per job spent on mortgages and a 10% increase in the share spent on rent. Residents of recreation-dependent counties pay 4% more of earnings on mortgages and 6% more on rent, indicating there are unobserved characteristics of recreation counties beyond the economic indicators included in the model. We call this the

“recreation premium” and expect it is a measure of the high quality of life, natural and cultural amenities, and social cachet associated with some recreation communities, particularly resort areas.

Unexpectedly, our housing supply variable (housing units per capita) is significant only for renters, for whom the share of earnings spent on rent decreases by 1%. We expect this reflects, in part, the difficulty of measuring the actual availability of housing. For example, many of the communities with the greatest housing supply per capita also have the highest share of second homes, which do not provide housing for people working in the county. Increasing the share of housing that is second homes is associated with a small but significant increase in the share of earnings spent on mortgages and rent: 0.4% and 0.3%, respectively. A 10% increase in the share of personal income from dividends, interest, and rent (investment income) is associated with a 2% increase in the share of wages spent on mortgages and a 1% increase in the share spent on rent.

A 10% increase in employment in high tech sectors, often associated with unaffordable housing, is associated with a 0.3% increase in the share of wages spent on mortgages and rent. The same increase in the share of employment in tourism-related industries is associated with a 0.6% increase in the share of wages spent on mortgages and a 0.7% increase in the share of wages spent on rent.

A 10% increase in the growth rate of earnings per job is associated with a 2% increase in the share of wages spent on housing for homeowners and renters.

A 10% increase in the Gini coefficient, our measure of income inequality, is associated with a 3% increase in the share of wages spent on mortgages and a 2% increase in the share of wages spent on rent.

The indicator for micropolitan counties is not statistically significant, suggesting that there is no systematic difference in housing affordability between micropolitan and rural counties, not captured by the measurable factors included in the model.

The share of jobs in tourism-related industries and the share of second homes alone explain only a very small amount of the differences in housing affordability between counties. But because recreation counties are defined as counties with very high levels of tourism-related industries and second homes, we expect these factors, at very high levels, do influence housing affordability. Thus the influence of very high levels of second homes and employment in tourism-related industries likely contributes to the size of the recreation premium.

Several of the explanatory variables are correlated, particularly the recreation indicator, which is defined by a high share of employment in tourism and share of housing that is second homes. We calculated the variance inflation factor to check for multicollinearity. The largest value is 2.29 for the log of housing units per capita, suggesting that the collinearity between our explanatory variables is not sufficiently large to affect the coefficient estimates.

Sources

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About Headwaters Economics

Headwaters Economics is an independent, nonprofit research group whose mission is to improve community development and land management decisions. <https://headwaterseconomics.org/>