

Energy Burden and Owning a Home:

Understanding the effect of energy costs on the owner-occupied housing rate

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Introduction

With looming fears of a recession, the demand for and affordability of housing are likely to come into question.

The percentage of people who own and occupy their home in California from 2017-2021 was 55.5%. This study looks to examine the factors that contribute to change in the owner-occupied housing rate. Specifically, the study outlines the relationship between home occupancy and a factor not often included in understanding the cost of owning a home, household energy burden.

Literature Review

While there are several studies on the effect of energy burden on home occupancy, none look to understand the relationship in Southern California.

Brown et al. 2020: Acknowledge the complexity of the term “energy burden” in defining it as the share of income spent on energy costs.

Čermáková et al. 2022: Find that high energy burdens contribute to reduced demand for housing due to unaffordability. Find an association between high burdens and poorer health as well as reduced share of income available for healthcare, mortgage payments, and food.

Research Question

How do household energy burdens impact home occupancy rates in Southern California?

Hypothesis: Cities with higher mean energy burdens will be associated with lower owner-occupied housing rates.



Variables

Variable	Definition
Owner-Occupied Housing Rate (OOHR)	Owner-occupied housing rate expressed as a percentage
Energy Burden (EnrgBurd)	Percent of household income spent on energy costs
Income (ln(Income))	Natural log of median household income expressed in 2021 inflation-adjusted US dollars (thousands of dollars)
Percentage White (WhitePct)	Percent of total population who are white alone
Education Level (Edu)	Percent of people 25 and older who have earned a bachelor's degree
Employment (Employ)	Employment-population ratio for the civilian population 16 to 64 years old

Sources: U.S. Census Bureau & U.S. Department of Energy

Empirical Framework

Owner-occupied housing rate is analyzed using an OLS regression of data collected in 2021 from cities in Orange, Riverside, San Diego, and Imperial Counties.

OLS Equation:

$$OOHR_i = \beta_0 + \beta_1 EnrgBurd_i + \beta_2 lnIncome_i + \beta_3 WhitePct_i + \beta_4 Edu_i + \beta_5 Employ_i + \varepsilon_i$$

Regression Results

VARIABLES	dependent variable = OOHR
EnrgBurd	8.902*** (2.450)
lnIncome	54.09*** (7.142)
WhitePct	0.218** (0.0869)
Edu	-0.314** (0.142)
Employ	-1.058*** (0.286)
Constant	-128.3*** (37.86)
Observations	33
R-squared	0.686
Robust standard errors in parentheses	

*** p<0.01, ** p<0.05, * p<0.1

Descriptive Statistics

Variable	Mean	Std. dev.	Min	Max
OOHR	58.4	10.6	40	80.1
EnrgBurd	2.1	0.8	1	4
lnIncome	4.5	0.2	3.8	4.9
WhitePct	40.1	16.5	10.8	76.6
Edu	35.4	16.0	9.9	73.3
Employ	68.2	4.0	59.5	79.4

Correlation Matrix

	OOHR	EnrgBurd	lnIncome	WhitePct	Edu	Employ
OOHR	1					
EnrgBurd	0.2994	1				
lnIncome	0.2750	-0.6978*	1			
WhitePct	0.1854	-0.4693*	0.5392*	1		
Edu	-0.0040	-0.7674*	0.8137*	0.7005*	1	
Employ	-0.2414	-0.6513*	0.6158*	0.3734*	0.5612*	1

*** p<0.01, ** p<0.05, * p<0.1

Conclusions & Further Research

Conclusion:

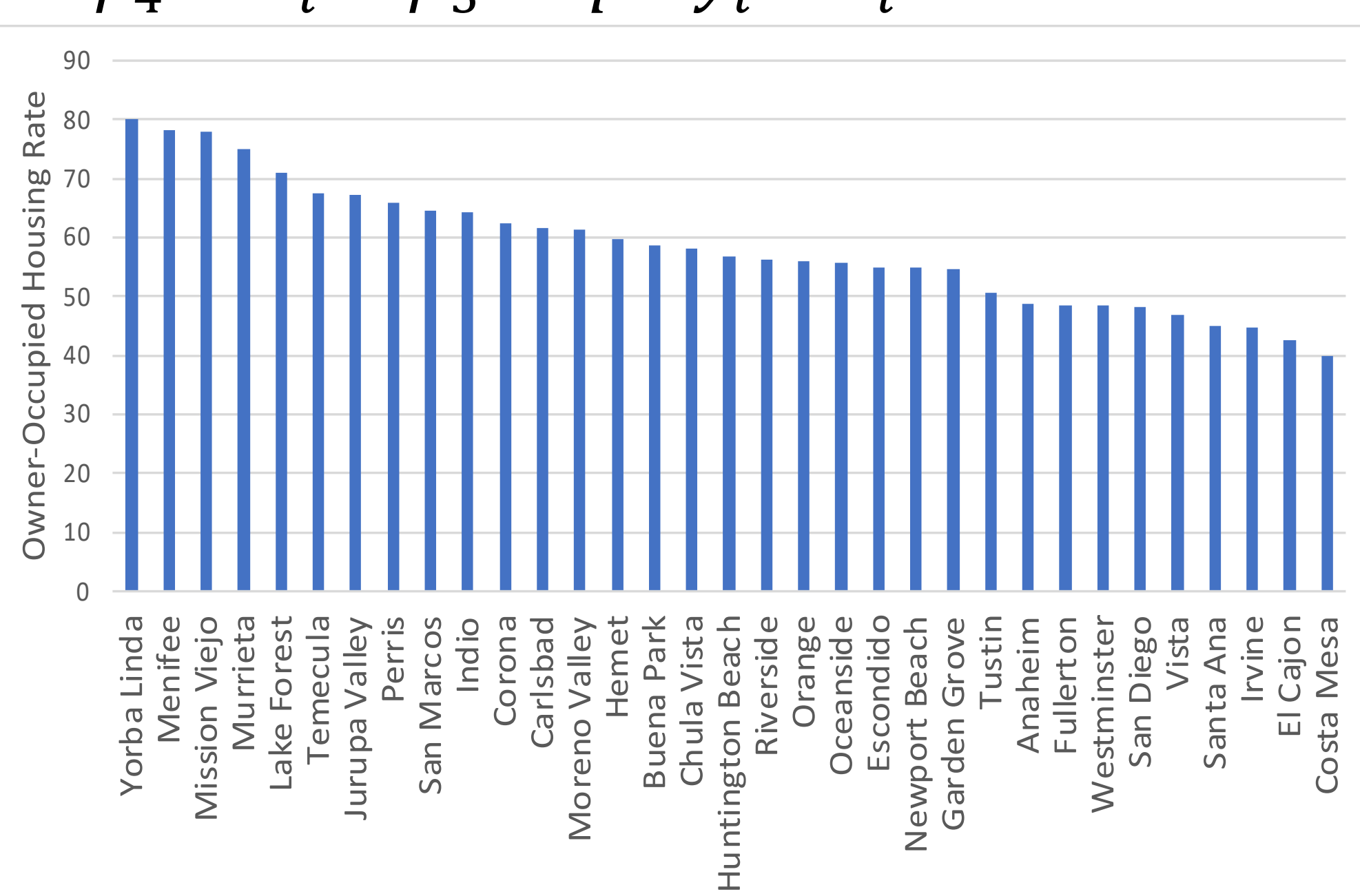
The relationship between the owner-occupied housing rate and energy burden is positive, contradicting the hypothesis.

While all variables have statistically significant relationships with the owner-occupied housing rate, the relatively small coefficients are likely due to multicollinearity.

The result suggests that people may look to live in single-family homes in order to reduce their energy costs by utilizing solar energy.

Further Research:

Following studies could benefit from utilizing data on other factors affecting home energy costs such as the percentage of homes with solar panels. Other indicators of the demand for housing could be used.



Owner-occupied housing rate of observed cities, 2021