Policy Results of the 2008 Housing Crisis on Overcrowded Houses in California

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Abstract

This paper discusses the effects of policies that were introduced, passed, and became law as a result of the 2008 Housing and Financial Crisis on overcrowded houses in the state of California. This study focuses on counties in the Bay Area such as San Francisco and Santa Clara from the years 2006-2015. The measures of administrative data and surveys are provided by the U.S. Department of Housing and Urban Development, Comprehensive Housing Affordability Strategy, and U.S. Census Data. This study utilizes the Differences-in-Differences regression analysis method to determine the effects of policies using Santa Clara during 2009-2013 as a control. These results reveal that the policies implemented after the 2008 Housing and Financial Crisis had decreased the local estimate of overcrowded houses by 1.8 percent.

1 Introduction

The motivation for this paper is to illustrate and discuss the effect of the policies that were made during the 2008 Housing and Financial Crisis. Whether or not that the emergency policies helped the economy go back to a steady state in the United States. In 2008, the United States faced a recession and a financial crisis that was mainly caused by the premeditated loopholes of loans that first time home buyers and bank systems were taking advantage of. What were some of these loopholes? One of many problems that the U.S. financial system failed to keep in check was the lending standards that banks took advantage of. Some of these advantages included the lax lending standards, which allowed people with low credit scores to take out loans than they were advised to be able to purchase a home for. To be able to purchase a home, these lenders took out hundreds of thousands of U.S. dollars to purchase and put down a mortgage. Banks took these risks because if homebuyers were not able to pay their monthly mortgage, they would be able to take back the house and be able to sell it for a higher price since house prices were increasing at that time. This affected everyone all around the country, however this paper will discuss the effects of the 2008 Housing and Financial Crisis and the outcomes of the policies made during and after to correct the U.S. economy and housing market. In particular, this paper will look at the percentage of homes in California that house more than it is able to. The population of the state of California is the largest in the country, some counties are very dense which leads to overcrowding in their rooms. If a room contained more than one person, doubling up, then a house would be considered to be overcrowded. Since many people were looking to buy homes for their families to develop and grow during the 2000s, and even today, people thought it was a great idea, and deal, to take out the loans the banks were providing and purchase the home. However, as the U.S. Department of the Treasury cracked down on the practices of

banks, and people could not keep up with their mortgages and loans and ended up defaulting on their homes which lead to houses being back onto the market, but there were less and less buyers due to these risky loaning practices used by banks. This caused families to suffice to smaller homes which causes them, their children, relatives, etc. to double up which caused houses to become overcrowded. This paper will analyze the policies made and how they were able to help decrease the number of houses that were overcrowded.

The data used and discussed in this paper comes from a variety of sources including the U.S. Department of Housing and Urban Development (HUD), U.S. Department of Housing and Urban Development (HUD), and U.S. Department of Housing and Urban Development (HUD). This data contains the years 2006-2010, 2009-2013, and 2011-2015. The data is used to estimate the effects of the policies made to combat the housing and financial crisis. Focusing on housing in California and overcrowded houses. The method that is used to analyze the dataset is Difference-in-Difference research method to generate causal estimates on the effect of policies made on the rate overcrowded houses.

The results from this study found that the implications of the policies made to regulate the economy and banks does reduce the proportion estimates of houses that are overcrowded in the counties studied in California which were San Francisco and Santa Clara. In addition, this paper goes on to discuss the validity, practices, and further implications that can be used for other counties that the dataset contains.

2 Literature Review

This paper contributes to Economics and Econometric literature in many ways as there are many papers and studies done on the 2008 Housing and Financial Crisis. These papers and studies included to determine how the economy fixed itself and the implications of the policies that were created and implemented to not only temporary help the economy but were further kept ensuring that the problems and loopholes were to not arise again to create another financial crisis and recession similar. A number of studies were done on overcrowding of houses in California due to its large population and high demand of housing in the past, present, and future. Populations studies such as the "Housing Crowding Effects on Children's Wellbeing: National and Longitudinal Comparisons", written by Claudia D. Solari and Robert D. Mare in 2008 discuss the poor living conditions on houses in California in the Los Angeles area. Their study concluded that the poor living conditions due to overcrowding lead to such as lack of a comfortable, quiet space, less sleep, higher probability of illness, privacy, develop educational, behavioral, and physical health disadvantages, etc. Another study done to measure the mental health due to the financial crisis that can be tied with overcrowded houses is the study done by Rachel E Dwyer, Lisa A. Neilson, Michael Nau, and Randy Hodson, "Mortgage worries: young adults and the US housing crisis", written in 2016.

This study mainly focuses on the percentage of homes that are overcrowded due to the population of a particular county and areas and will not present casual inferences and results on psychological complications due to overcrowding. Tying in with the findings of this study that can be implemented and replicated by many other counties in California and states with similar data, with the economic and psychological studies, causal inferences can be generated to determine the effects of living in an overcrowded house. Policies such like the ones made during

the 2008 Housing and Financial Crisis can help with the decrease in overcrowded houses like this study concludes to.

3 Data

The data set that this paper utilizes to discuss and illustrate the effects of the policies made on the overcrowding of houses comes from the California Open Data Portal. The data set used is the "HCI Housing Overcrowding-Data". This data is drawn from U.S. Department of Housing and Urban Development (HUD), Comprehensive Housing Affordability Strategy (CHAS) and U.S. Census American Community Survey (ACS). In addition, it is a part of a series of indicators in the Healthy Communities Data and Indicators Project (HCI) of the Office of Health Equity: Healthy Communities Data and Indicators Project of the Office of Health Equity. The data contains a compilation of years such as 2006-2010, 2009-2013, and 2011-2015. The information that this dataset provides is administrative data such as race, county, income status, housing status, conditional population, total population, and estimates based on population. This study focuses on the *estimate* variable as it provides context of the population of the area studied as it is calculated by a ratio of the population of 25 years or older with a high school or greater educational attainment and the population of 25 years or older.

It is unlikely that the data can be polluted with errors as there is little data surveyed that this study uses that can be caused by human or data collection errors. However, there can still be errors that can occur such as random errors in counting the population of a county as an estimate is likely to be used rather than counting the population of a county which can lead to less precision on this and other studies. In addition, high variability in different parts of a county can

lead to less precision and distorted causal inferences due to the population of a county being higher than another part.

4 Method

This study implements the Differences-in-Differences research design and method to determine the effects of the self-fixing economy and policies on overcrowded houses in the focused region of the Bay Area and the counties studied, San Francisco and Santa Clara. A Differences-in-Differences research method is useful for a few reasons to be used for this study. First, it allows researchers to estimate the impact of an intervention or treatment on a particular outcome, by comparing the difference in the outcome between the treatment and control groups before and after the intervention. This can help to control for potential confounding factors that might affect the outcome, and can provide more robust estimates of the intervention's effects. Second, the approach can be useful for comparing the effects of an intervention on different subgroups within a population. For example, researchers might compare the effects of an intervention on men and women, or on different age groups, to see whether the intervention has different effects on different subgroups. Overall, differences-in-differences is a valuable tool for econometric researchers, as it allows them to estimate the impact of interventions, such as policies, on outcomes and compare the effects of interventions on different subgroups within a population.

The motivation to use San Francisco and Santa Clara is due to how close they are to one another and are in the Bay Area, which is one of the most populated regions in the world. Since

the data contains the years reported 2006-2010, 2009-2013, and 2011-2015, the year 2009-2013 of Santa Clara will be used as a control to the effects of the policies made. During that time, all regions and counties are affected by the policies made countrywide, however during that timeframe, we can examine the "in process" effects of the policies made. The treatment of this study is the policies made and passed to become law. The treatment group will be San Francisco during 2006-2010 before the treatment effect, which is most likely before policies were made and passed and San Francisco during 2011-2015 after the treatment effect. The control group will be Santa Clara during 2006-2010 before the treatment effect and Santa Clara during 2009-2013 a little before and a little after the treatment effect. I utilize this combination of data to view the effects of the policies on the estimated proportion of houses that are overcrowded. A balance test of the means of estimates is provided for both counties.

To perform the Differences-in-Differences, below is the regression equation used to provide a numerical analysis of the fits and magnitude of the causal effect.

$$Estimation_i = \beta_0 + \beta_1 Treat_i + \beta_2 Post_i + \beta_3 Treat_i * Post_i + \varepsilon_i \qquad (1)$$

This equation represents the Differences-in-Differences estimator between the dummy variables $Treat_i$ and $Post_i$ and the interaction between them. $Estimation_i$ represents the local estimate of the overcrowded houses, $Treat_i$ is a dummy variable that represents zero before the treatment and equal to one after the treatment, $Post_i$ is another dummy variable that separates the observations into a treatment and control group as it is equal to one for when an observation is located in San Francisco and zero for when an observation is located in Santa Clara, and ε_i as

an error term for unobservables. The coefficient estimate of interest is β_3, which is the coefficient of the interaction term between $Treat_i$ and $Post_i$ and is the estimated effect of the policies made as a result of the 2008 Housing and Financial Crisis on the estimate of overcrowded houses.

5 Results

Table 1 represents the population estimates of the counties San Francisco and Santa Clara. The *numerator* variable represents the population of 25 years or older with a high school or greater educational attainment, the *denominator* variable represents the total population of 25 years or older, the *estimate* variable represents the ratio between the *numerator* and *denominator* variables which is the local population ratio and represents if a house is overcrowded and is zero which indicates no overcrowded households. Looking at the mean of the *estimate* variable it is depicted that there is an estimated 7.5 percent of the population in San Francisco and Santa Clara that report overcrowdedness in their homes based on the population ratio.

Table 1: Summary Statistics of Estimate Variable and California Ratio

Statistic	N	Mean	St. Dev.	Min	Max
numerator	14,047	124.205	1,321.675	0	47,611
denominator	14,047	1,809.831	17,910.120	2	621,463
estimate	14,047	7.523	12.565	0.000	100.000

Table 2 represents the estimated means of the *estimate* variable. As this paper focuses on the counties San Francisco and Santa Clara, it takes a look at its *estimate* means between the reported years in the data set. There is a trend that can be inferred between the years 2006-2010 and 2011-2015, as the *estimate* means drop by 2.694 and 1.909 percentage points, respectively. This presents a brief conclusion between the years before, a little during, and after the policies made as a result of the 2008 Housing and Financial Crisis.

Table 2: Summary of Estimates Based on Report Year and County

	Years	County	Estimate Means
1	2006-2010	Santa Clara	7.783
2	2006-2010	San Francisco	6.660
3	2009-2013	Santa Clara	8.818
4	2009-2013	San Francisco	6.324
5	2011-2015	Santa Clara	5.089
6	2011-2015	San Francisco	4.751

Figure 1 illustrates the means of the *estimate* variable using the Difference-in-Differences method. A dotted line is drawn at the reported years 2009-2013 to show the “during” effects of the policies made during the recession. The graph shows how in 2006-2010, there is a steady number of houses that are considered to be overcrowded based on the population ratio. During the midst of the recession, depicted at the dotted line in 2009-2013, there is an increase in the

number of houses that are considered to be overcrowded in Santa Clara than in San Francisco. This can be due to the number of observations of Santa Clara compared to San Francisco, in the data set, there are a lot more observations of Santa Clara than in San Francisco, which can cause a bias in the data. However, since the population in San Francisco is consistently and significantly higher than Santa Clara, there is still a strong belief that the bias can be negligible. After the policies were made, the economy and housing market were able to recover and illustrated in the graph, the differences between the two counties and the counter factual can be seen as is drops significantly.

Figure 1: Line Plot Illustrating Difference-in-Differences

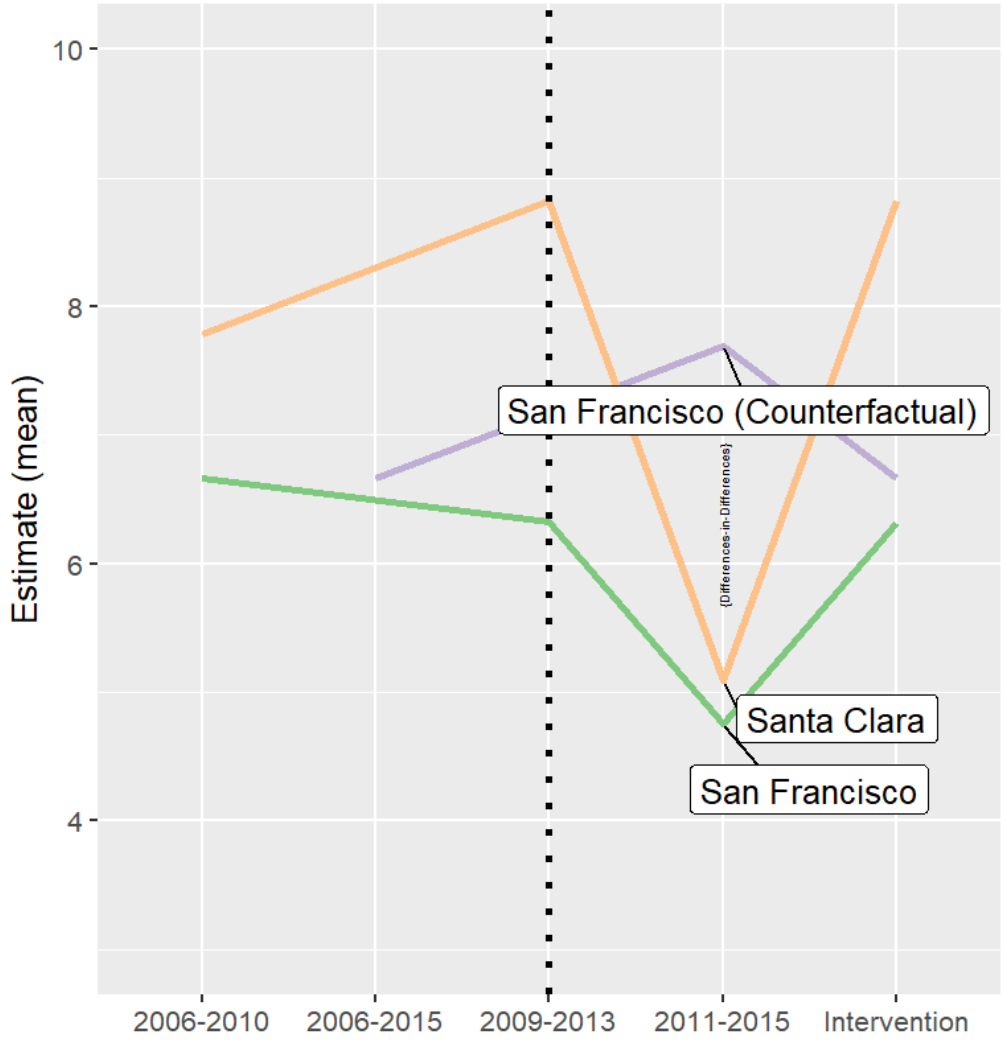

Table 3 presents the estimates of the regression results from Equation (1). This study focuses on observing the estimate of interest, the interaction between *Treat* and *Post*, (*Treat* * *Post*). Resulted is that the treatment, the policies made after the recession, leads on average to a decrease in overcrowded houses in both counties of San Francisco and Santa Clara by about 1.794 percent. This estimate is also statistically significant at the 99% significance level.

This shows that from all else equal of characteristics, it can be concluded that the polices introduced, passed, and became law, per the process of law making, is working and overall did decrease the amount of houses that are overcrowded.

Table 3: Regression Results

	Dependent variable:
	estimate
Treat	2.447***
	(0.287)
Post	-0.700
	(0.454)
Treat*Post	-1.794***
	(0.524)
Constant	6.371***
	(0.245)
Observations	14,047
R^2	0.011
Adjusted R^2	0.010
Residual Std. Error	12.498 (df = 14043)
F Statistic	50.594*** (df = 3; 14043)
Note:	*p<0.1; **p<0.05; ***p<0.01

6 Conclusion

There were a number of problems that occurred during the 2008 Housing and Financial Crisis, which included houses being overcrowded. From this study, using the Differences-in-Differences method to estimate the effects of policies made as a result of the recession on overcrowded houses, it finds that the policies created a positive effect on decreasing the average percentage of houses that were overcrowded before, during, and after the recession by about 1.8 percent. The effect is statistically significant and could open more opportunities for further studies. The estimated effects do make sense as people had a hard time trying to find and purchase houses during the years 2009-2013 and after the policies were made to regulate the economy and housing market, the years 2011-2015 show how the *estimates* decreased as a result of the policies.

7 Discussion

There could have been many other reasons as to why a household is overcrowded, it could be due to racial status as many immigrant races “double-up” in a room traditionally and/or for economic reasons based on income. The dataset contains many other demographic information such as race, income status, and housing status. This study can be replicated in many other counties that the dataset provides. Possibly, it can also be done on examining the overcrowdedness of a household based on different races. There were many studies done on the 2008 Recession and mental difficulties of living in an overcrowded house. I believe that this study provides some information on how policymakers and their policies are actually working due to the aftereffects of the economy and markets. There is a stigma that overtime the market

fixes itself, but there are times where government intervention is necessary in order to quickly, and possibly temporarily, correct the market onto a better path and in this case, the policies seemingly worked.

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