

An Empirical Analysis of Short-Term Rentals on Newly Built Homes in the United States

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Abstract:

This paper investigates the effects short-term rentals have on the price of newly built homes. The study uses data from the Manufactured Housing Survey Public File to perform an empirical analysis of whether the Rental Vacancy Rate effects the price of newly built homes. We find that the Rental Vacancy Rate does have a significant effect ($p < .01$), which parallels some past research. This may have implications for regulation of short-term rentals.

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1.0 INTRODUCTION

There has been a significant increase in the prevalence of short-term rentals in the United States over the last ten years. Airbnb, a peer to peer service, provides short term housing for people. They have contributed to this trend that extends internationally with over 5 million listings available.

The Global Financial Crisis of 2008 may also be playing a role in the presence of short-term rentals. Many people defaulted on their homes between 2006 and 2009, which lowers your credit score significantly. This means it becomes very difficult to receive loans for example which is what a mortgage falls under. Bracha et al., (2012) investigated this issue, by looking at a potential shift in confidence people have for homeownership in Michigan. They found that while a majority of people still thought that buying a house is without a doubt better than renting or probably better than renting, when asked to choose either of these two options they preferred the latter suggesting they know owning is better than renting, but may not be something they may actually do, or suggest to someone else.

This study aims to enhance understanding of how short-term rentals impact the of housing market. More specifically, this paper investigates if short-term rentals artificially inflate the price of newly built homes across the United States. This may be especially true in major metropolitan areas Zou (2019). From a policy perspective, this analysis is important because it can help determine if mortgages need to be incentivized so that people will be more likely to buy a house. On the other hand, with Airbnb, the short-term rental market is a very unrestricted market. There are very few restrictions as it relates to renting out your house as an Airbnb. On the consumer side, this allows consumers to find the best house to rent for the best price. While this is good in terms of market efficiency, there may

be problems with inflation of the price of houses that are on the market for mortgages. The relevance of this study is that there have been quite a few recent studies examining an issue very similar to this, mostly as it pertains to Airbnb.

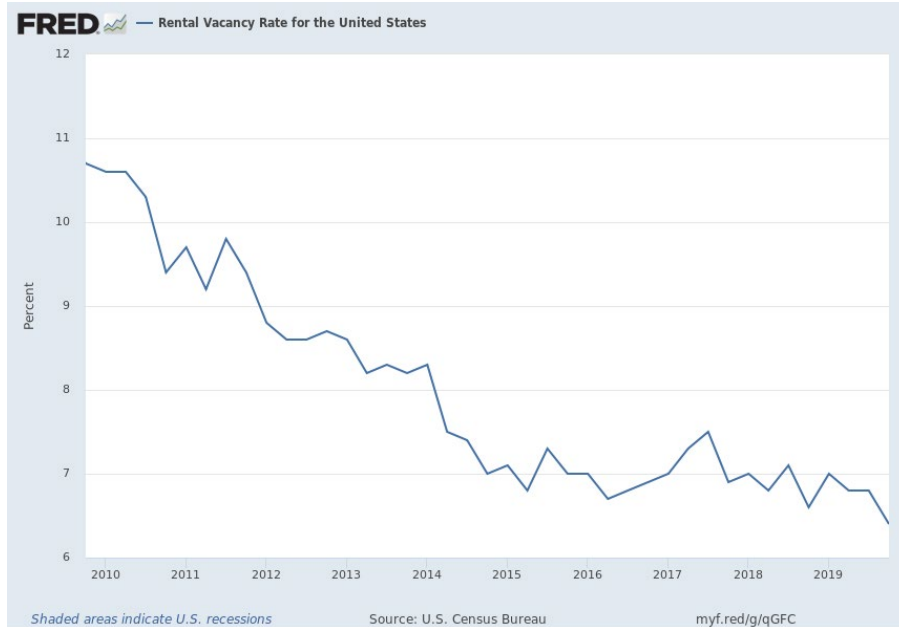
This paper was guided by three research objectives, the last two being unique to this study: First it investigates the possibility of inflation in the housing market for mortgages caused by short-term rentals; Second, it incorporates the Rental Vacancy Rate as the tool used to quantify how the short-term rental market is performing; Last, it analyzes this phenomena on a national scale with the data organized regionally. Some studies done, only provide analysis on certain metropolitan areas and this paper contrast takes a broader approach.

The rest of the paper is organized as follows: Section 2 provides some graphs analysing some trends in the housing market. Section 3 gives a brief literature review. Section 4 outlines the empirical model, data and estimation methodology. Section 5 presents and discusses the empirical results. This is followed by a conclusion in section 6.

2.0 TRENDS IN THE HOUSING MARKET

Figure 1 depicts the Rental Vacancy Rate for the United states since 2010. This statistic measures how many rental units are on the market that currently have no residence. It is has been steadily decreasing during this time, which can mean a few things. Firstly, in 2010 the economy was just starting to recover from the global financial crisis, so the rate was probably high at least in part due to that. On the flip side this can mean, as a result of the financial crisis, some people have decided that renting is a better option than buying.

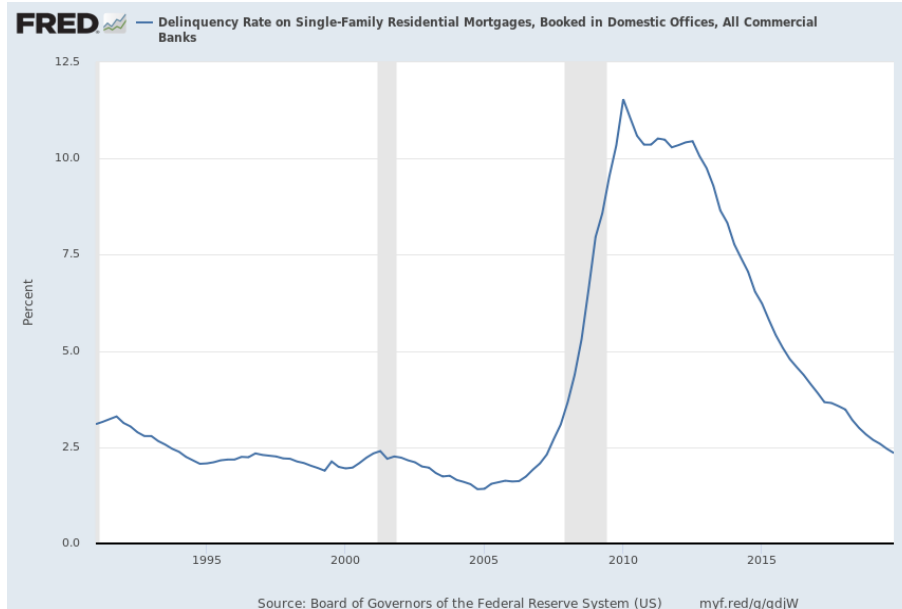
Figure 1: Rental Vacancy Rate for the United States



Source: St. Louis Federal Reserve

Figure 2 shows the delinquency rate in the United States for single family homes since 1990. It spiked in early 2011 at about 12% decreasing sharply ever since. The delinquency rate measures how many houses are on the market that have been defaulted by the homeowner. Usually a default occurs when a homeowner is no longer able to pay the mortgage of a home and therefore declares bankruptcy. The delinquency rate is important because it can show us the potential volatility in the market. Since it is generally speaking a lagging indicator, it is hard to predict downward trends in the market from this measure, but it is still a useful measure.

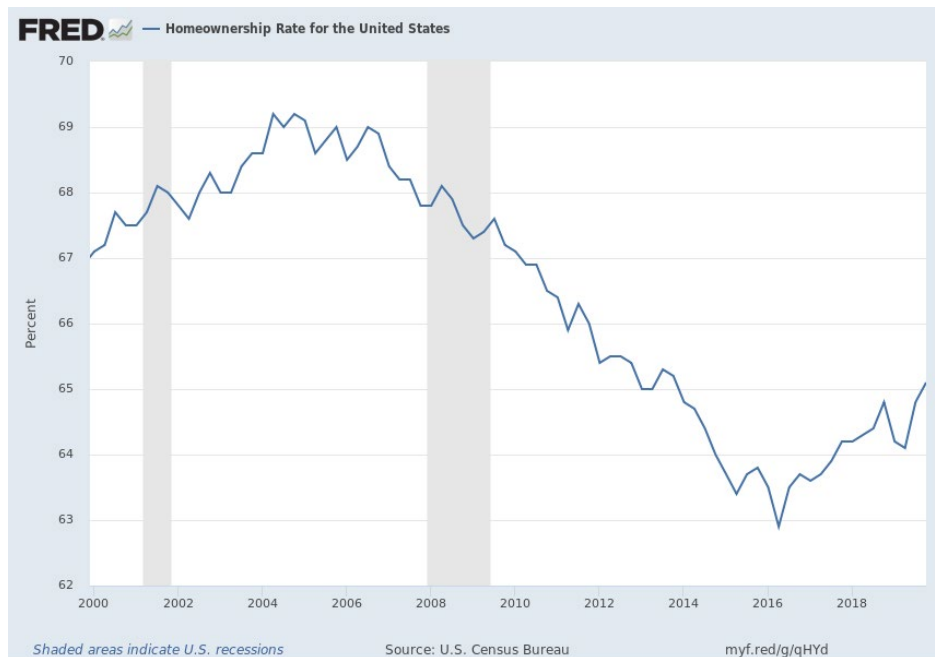
Figure 2: Delinquency Rate of Single-Family Residential Mortgages



Source: St. Louis Federal Reserve

Figure 3 displays the homeownership rate in the United States since 2010. Over the last ten years, the homeownership rate decreased, with a small upwards trend emerging in 2016. This graph shows us that homeownership may not be as popular as it used to be, or it may begin to climb again back to pre-recession levels. This statistic is important because it can tell us how consumers, generally speaking, view housing. The housing market is a great place to look to see how the economy is doing as a whole, because many supply chains are involved with building homes. Additionally, taking on the investment of a house is a huge commitment that people make generally speaking, and therefore is a good indicator to see if people are comfortable with taking this risk.

Figure 3: Homeownership Rate for the United States



Source: St. Louis Federal Reserve

3.0 LITERATURE REVIEW

As mentioned before, Airbnb is seen as a major contributor to the increasing prevalence of short-term rental units. With this, access to more information allows consumers to find the best housing unit. Since Airbnb has a huge presence, especially in metropolitan areas, it forces the providers of this service to list competitive prices for their rental unit. This free market model to the short-term rental market was analyzed by Einav et al., (2016). They discuss how peer to peer markets enable decreased searching costs on the demand and supply side of the housing market. Since peer to peer markets are often characterized with less regulation than more, there is a potential for unintended consequences. When unintended consequences exist, regulations often follow, which may or may not be effective in solving the problem.

Peer to peer markets were also analyzed by Sundararajan, (2016) and describes it as the Sharing Economy. He describes the Sharing Economy as allowing anyone to participate in the market. This is true of industries like the housing market with Airbnb and the transportation market with Uber. Since peer to peer markets transactions can take place without a third party, they are more efficient than other markets. The author argues that the sharing economy shifts both consumers and producers away from ownership. He does not view this as a completely good thing as there is a potential for people to enter market who are inexperienced or do not have a commitment to the market.

This trend in short-term rentals is self-evident on a global scale, and is seen as a net benefit to consumers and producers, however some people question how this may impact other parts of the housing market. Zou, (2019) investigated this very phenomenon focusing their research in Washington D.C. They look at specifically how the density of Airbnb units are impacting the price of the homes in the surrounding area. They find that Airbnb mildly increases the price of homes in the surrounding area. In terms of policy implication, they suggest not doing anything that impedes a residents right to earn an income through home-sharing, but that some regulation may be necessary to protect the mortgage market. Finding and getting rid of illegal listings as well as revising zoning codes are given as possible policy suggestions for this.

Short-term rentals such as Airbnb were also analyzed to see how they are affecting the hotel industry by Zervas et al., (2017). They conducted an empirical analysis using Airbnb data as well as from other government sources to see how hotel revenue is affected by the rise of Airbnb. They found that the traditional lodging industry may be experiencing an 8-10% revenue loss due to Airbnb. This shows that the potential negative

effects of this peer to peer company may extend beyond what is being discussed in this analysis.

Peer to peer markets are generally regarded as markets with less rules and regulation and this may be the case especially for the case of Airbnb. DiNatale et al., (2018) researched how short-term rentals impacted small cities in Oregon and how regulations are shaped around this market. They found that only 35% of small cities, characterized by a population less than 100,000, are currently regulating Airbnbs despite being a concern for these cities. If Airbnbs are potentially hurting big and small cities, in several different ways as discussed, it is important that a closer look is taken in this emerging market.

As mentioned before, shifts in attitudes towards the housing market were analyzed by Bracha et al., (2012). They surveyed 986 people from Michigan and asked them a variety of questions about the overall economy and the housing market. They found that 65% of people viewed the economy looking worse in five years from 2008 when they were surveyed. As it relates to the housing market, they found that a majority of people (~80%) still believed that owning a home is either without a doubt better or probably better than renting which is expected. They did however find that people preferred the phrase “owning is probably better than renting” than “owning a home is without a doubt better than renting.” This means that while people know or believe that owning is better than renting, they may actually have some doubts about this, in light of the recession at the time.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Data

The study uses annual panel data from 2014 to 2018. Data were obtained from the Manufactured Housing Survey Public Use File provided by the US Census Bureau. Data was also used from the St. Louis Federal Reserve. The MHS provide estimates for prices of homes that are newly built in the United States based on housing characteristics such as square footage, and number of bedrooms.

Table 1: Summary Statistics (by Region)

Variable (Midwest)	Observation	Mean	Std. Dev.	Min	Max
PRICE	6257	70504.22	27049.58	26700	165000
RVR	6257	.0707996	.0030878	.066	.083
SQFT	6257	1416.124	374.6215	700	2600
BEDROOMS	6257	2.754195	.6567027	1	3

Variable (Northeast)	Observation	Mean	Std. Dev.	Min	Max
PRICE	3363	81949.12	39261.26	26400	239100
RVR	3363	.0707811	.0030818	.066	.083
SQFT	3363	1346.238	337.0298	480	2100
BEDROOMS	3363	2.424324	.9056453	1	3

Variable (South)	Observation	Mean	Std. Dev.	Min	Max
PRICE	8212	74204.47	27788.46	24000	156000
RVR	8212	.0707774	.0030664	.066	.083

SQFT	8212	1589.52	468.7552	500	2600
BEDROOMS	8212	2.781296	.6241991	1	3

Variable (West)	Observation	Mean	Std. Dev.	Min	Max
PRICE	5127	94902.93	42448.87	26400	269100
RVR	5127	.0707764	.0030626	.066	.083
SQFT	5127	1451.856	403.5788	500	2500
BEDROOMS	5127	2.52994	.8481181	1	3

4.2 Empirical Model

Following Zou (2019) this study adapted the empirical model used by them. Instead of using Airbnb density as the independent variable of interest, the rental vacancy rate was used since this is a national analysis rather than focusing on one metropolitan area.

The model could be written as follows:

$$\begin{aligned} \text{PRICE} = & \beta_0 + \beta_1 \text{RVR}_{it} + \beta_2 \text{SQFT}_{it} + \beta_3 \text{BED}_{it} + \beta_4 \text{NortheastDummy} + \\ & \beta_5 \text{SouthDummy} + \beta_6 \text{MidwestDummy} + \beta_7 \text{WestDummy} + \beta_8 \text{singledummy} + \\ & \beta_9 \text{doubledummy} + \varepsilon_i \end{aligned}$$

RVR_{it} is the rental vacancy rate of the economy at time t for housing unit i . RVR_{it} is used as the independent variable of interest and is estimated to have a positive relationship with the price of homes. As the rental vacancy rate decreases, this means more people are renting homes, which raises the price of mortgages. The definition of RVR is the percentage of all rental units in the market currently available, that are vacant.

Independent variables consist of five variables obtained from various sources. First, RVR_{it} (rental vacancy rate i at year t) represents the percentage of vacant rental units in the

United States. This serves as a proxy for the short-terms rental market. $SQFT_{it}$ represents the square footage of a home i at year t . BED_{it} is the number of bedrooms in home i at time t . The next variable is region which is segmented into four dummy variables. This variable analyzes any possible regional effects of housing. The last variable is another dummy variable that shows whether a house is a single-family house or double-family house.

5.0 EMPIRICAL RESULTS

The empirical estimation results are presented in Table 2. Two regressions were conducted in this analysis, one being an Ordinary Least Square Regression and the second being a Tobit Regression. A Tobit model was used as some dependent variables were missing, but still had their corresponding explanatory variables. The empirical estimation shows the positive and significant relationship at the 1% level of the rental vacancy rate and the price of newly built homes. Square-footage, number of bedrooms, region and type of home are all significant as well at the 1% level. The first regression does not include the dummy variables, and it is shown that the R squared variable increases when these variables are included in the model.

One limitation of this study is that more variables that would explain the price of homes were not available in the data set used such as number of bathrooms, and what the surrounding area is like. Another limitation of this study is that it only provides analysis for 5 years. Ideally a 10 to 20-year analysis would provide a good estimation of this phenomenon. The last major limitation of this study was the independent variable of interest. As stated before, the rental vacancy rate was used as a proxy for the short-term rental market which is not the best or worst indicator. A dataset which uses Airbnb density is ideal but, that data is not available on a national scale.

Table 2: Regression Results for OLS

COEFFICIENT (PRICE)	Model 1	Model 2
RVR	681380.8*** (58698.6)	701070.7* ** (52027.44)
SQFT	53.34*** (.4715774)	41.08*** (.544)
BED	6591.163*** (266.571)	4973.321* ** (239.4292)
NortheastDummy		- 6693.159* ** (539.6052)
MidwestDummy		- 16772.82* ** (473.461)
SouthDummy		- 22156.4** * (452.0603)
West Dummy		omitted - 19789.2** *
SingleDummy		(472.9808)
DoubleDummy		
Constant	66026.37*** (4224.349)	100780** * (3806.657)
Observations	22959	22959
Unadjusted R-squared	0.3719	0.5067

Note: *** , ** , and * denotes significance at the 1%, 5%, and 10% respectively. Standard errors in parentheses

In this Tobit regression, all variables are also to be found significant at the 1% level, however the model is severely limited since the dummy variables couldn't be used as the regression would not run with them. In this model, the RVR is also found to have a

positive and significant relationship with the price of newly built homes suggesting that the short-term rental market may be artificially increasing the price of mortgages.

Table 3: Regression Results for Tobit Model

Variable (PRICE)	Tobit Model 1
RVR	567837.6*** (62085.93)
SQFT	56.77296*** (.4680391)
BED	7074.969*** (53656)
Constant	53656.97*** (23.8)
Observations	23800
Pseudo R-squared	0.0212
Uncensored	23465
Left Censored	335
Right Censored	0

Note: ***, **, and * denotes significance at the 1%, 5%, and 10% respectively. Standard errors in parentheses

Some policy implications to consider are regulation of the short-term rental market, which would look like limiting the number of units of short-term rental units allowed in a certain area, depending on the population of said area. Another policy implication to consider is incentivizing homeownership. It is clear that renting has become quite popular as of the past ten years, however shorter term commitments are not seen as valuable as longer term commitments and mortgages provide much more value to the economy than rentals since they are more versatile to the person who has the mortgage compared to someone who has to pay rents.

5.0 CONCLUSION

Future research should include data from Airbnb which looks at multiple cities in the United States and investigates how this emerging market is impacting local economies as a whole, not simply in terms of the housing market. Whether the short-term rental market is artificially increasing the price of mortgages is still on the table. My models show that the rental vacancy rate and the price of newly built homes have a positive relationship, however it is unclear if inflation of home prices is occurring beyond the actual value.

If the value of newly built homes are being affected by the prevalence of short-term rentals, then it should be investigated for how they are being affected. Additionally, what can potentially be done in terms of regulations to prevent potential adverse effects should be researched. This however should be taken with a grain of salt as regulations can and often not only not fix the problems they set to ameliorate, but create unintended consequences.

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