The Housing Market

An Analysis of the Housing Market in Portland, Oregon

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12/13/2019

Abstract

Housing is a major problem facing American cities. The combination of an increasing national population and a shift in preference towards living in cities has driven up the demand for housing in urban areas. Due to land limitations and zoning restrictions, the housing stock in urban America has been unable to keep pace with the demand for living in the city. Portland, Oregon is such a city facing a housing crisis. In the summer of 2017, I spent time working at a startup aiming to alleviate the housing shortage within the city through the construction and financing of accessory dwelling units, an innovate to solution to restrictive single-family zoning regulations. That worked sparked in interest that drove me to study the city's housing market in this project.

National Overview

Before narrowing the scope of the analysis to just Portland, Oregon, I thought it would be worthwhile to take a glance at the national housing market. To do so, I used data from Zillow to examine the relationship between population and median single-family home price at the metropolitan level. The data drawn from Zillow is from August, 2019 and includes the 804 largest metropolitan areas in the United States. To test the relationship between population and median home price, I ran a linear regression with home price as the dependent variable and ranked population as the independent variable. Each of the 804 cities included is ranked from 1 to 804 based off their population as of August, 2019. The results of the regression are displayed in the graphic below.

City Population and Median Home Price

Median single family home prices rise as the city population increases.

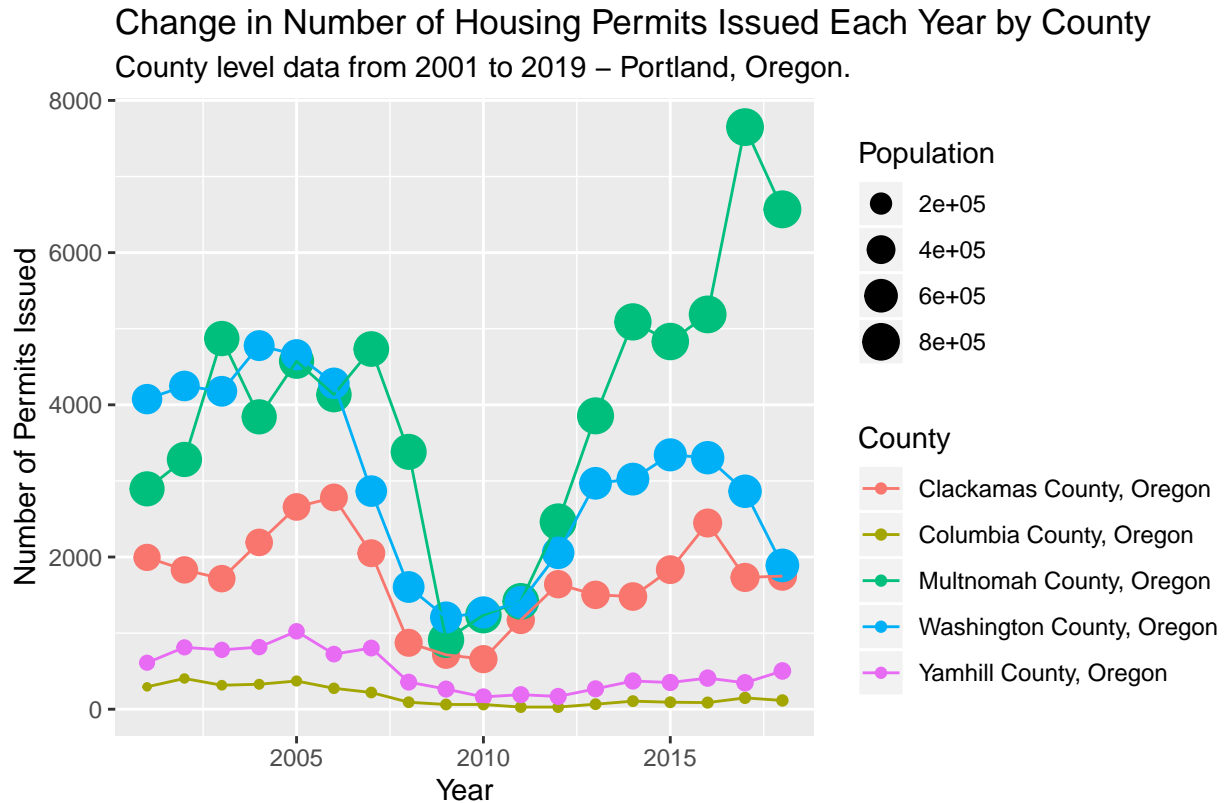|	Coefficient	Confidence Interval	
		5th percentile	95th percentile
Intercept	$125,186.65$	$111,423.70$	$138,949.59$
Population Ranked	149.31	119.69	178.93

Data from Zillow.

The regression output displays the effect of an increase in population ranking on median home prices. The coefficient indicates that for each increase in population rank, home prices are expected to increase by \$149.31. This effect is statistically significant at the 5% level.

Portland, Oregon

The bulk of the project centered around the housing market in Portland, Oregon. In analyzing the market, I utilized county level data from Zillow, the Department of Housing and Urban Development, and the Census Bureau. The counties included in the analysis are the five counties in Oregon that fall within the boundaries of the Portland metropolitan area.

In examining the housing market, I focused on median single-family home prices, buidling permit issuances, and population. Initially, I analyzed the change in building permit rates over time broken down by county. The below plot shows that the number of building permits issued each year decreased sharply following the housing market crash of 2008 before beginning to rebound roughly four years later. This depression in the number of building permits issued was more pronounced in the more populated counties. Furthermore, the number of building permits issued has decreased in the past year. However, there is not enough data to know whether that is a temporary change or a larger trend.

Change in Number of Housing Permits Issued Each Year by County
County level data from 2001 to 2019 – Portland, Oregon.

Data Sources: US Census Bureau, Department of Housing and Urban Development, & Zillow

Subsequently, I ran a multi-variate linear regression with the annual change in home price as the independent variable and population and total building permit issued that year as the dependent variables. I also controlled for year and county effects. The results of the regression are on the following page.

The main takeaway from the regression is that the number of building permits issued each has a statistically significant effffect on the change in home price while population did not. For each additional building permit issued, home prices are expected to increase by \$12.668. This effect is statistically significant at the 1% level. Population is not statistically significant which is surprising considering the results of the regression at the national level. Furthermore, the year coefficient was statistically significant at the 5% level. Each year, the annual change in housing prices is expected to increase by \$1,331.030. This expected increase can most likely be explained by inflation in housing valuations.

Conclusion

After analyzing the data, it is apparent that in Portland building permits and median house prices appear to move in conjunction with one another. Both metrics dropped severely following the housing market crash and recession of 2008. Following a several year dip, both a begun to rebound ultimately surpassing the pre-2008 highs.

OLS Regression: Determinants of Changing House Prices

	Dependent variable:
	diff
Permits	12.668***
	(1.737)
Population	−0.058
	(0.087)
Year	1,331.030**
	(521.172)
Columbia County	−4,569.015
	(28,808.600)
Multnomah County	−7,131.986
	(31,137.630)
Washington County	−8,345.662
	(14,076.190)
Yamhill County	−4,868.229
	(24,730.890)
Constant	−2,661,404.000**
	(1,022,270.000)
Observations	90
R^2	0.436
Adjusted R^2	0.387
Residual Std. Error	15,924.380 (df = 82)
F Statistic	9.038*** (df = 7; 82)

Note: *p<0.1; **p<0.05; ***p<0.01